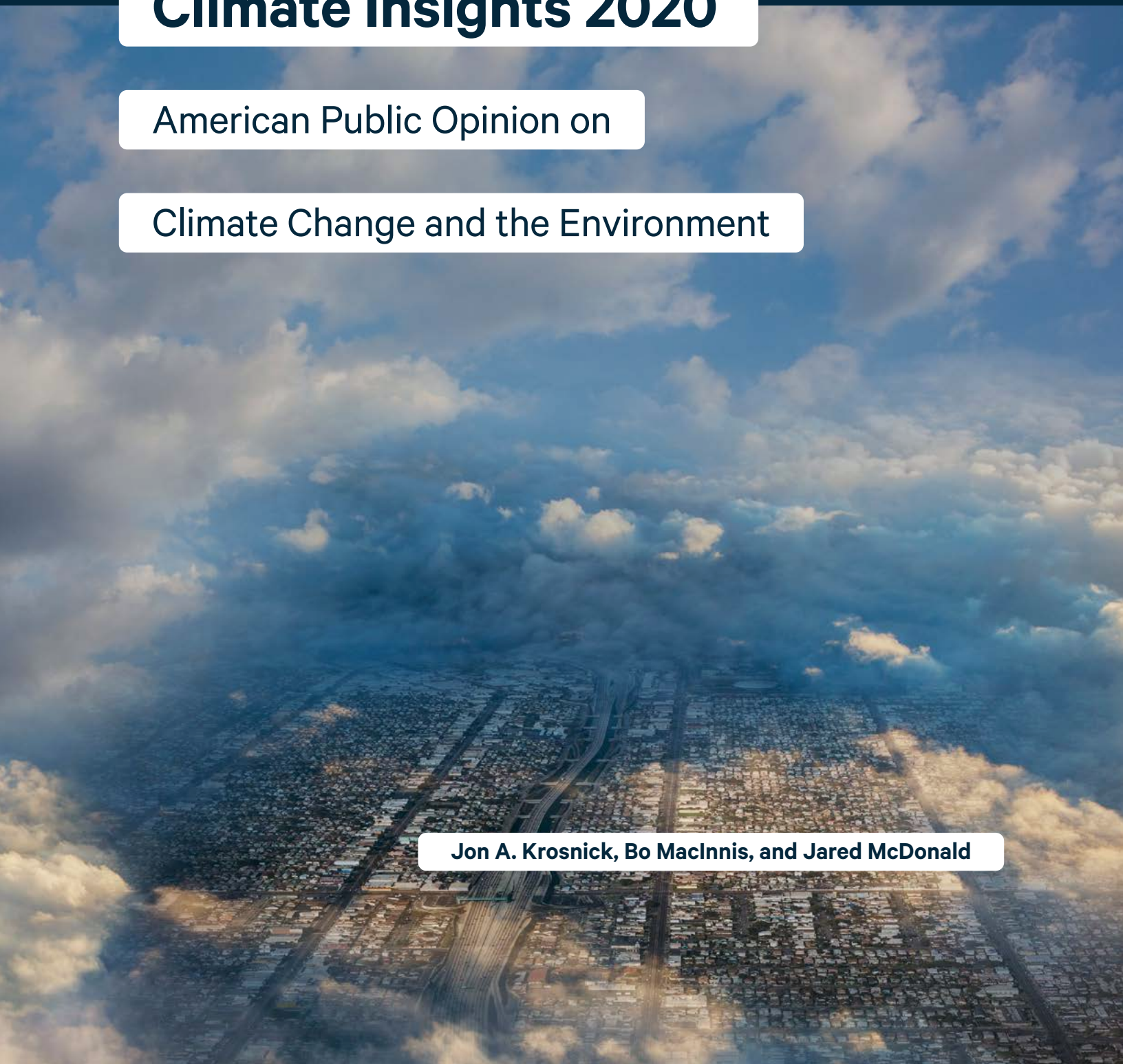
Report 21-05

RESOURCES *for the* FUTURE

Climate Insights 2020

American Public Opinion on Climate Change and the Environment



Jon A. Krosnick, Bo MacInnis, and Jared McDonald

About the Authors

Jon A. Krosnick is a social psychologist who does research on attitude formation, change, and effects, on the psychology of political behavior, and on survey research methods. He is an RFF University Fellow and the Frederic O. Glover Professor in Humanities and Social Sciences, Professor of Communication, Political Science, and Psychology at Stanford University, where he directs the Political Psychology Research Group. Krosnick has authored ten books and more than 210 articles and chapters, in addition to op-ed essays. He is the winner of the Nevitt Sanford Award for his work in political psychology and the AAPOR award for his work on survey research methods and public opinion.

Bo MacInnis is an economist with a PhD from the University of California at Berkeley. Her research focuses on climate change and survey research methods. She is a lecturer in the Department of Communication, and regularly collaborates with Dr. Krosnick on climate change research.

Jared McDonald is a TomKat Center Postdoctoral Research Fellow at Stanford University, collaborating on projects related to climate change public opinion. His research examines voting and electoral accountability in the context of a polarized political environment. He earned his PhD in Government and Politics at the University of Maryland, College Park.

About RFF

Resources for the Future (RFF) is an independent, nonprofit research institution in Washington, DC. Its mission is to improve environmental, energy, and natural resource decisions through impartial economic research and policy engagement. RFF is committed to being the most widely trusted source of research insights and policy solutions leading to a healthy environment and a thriving economy. The views expressed here are those of the individual authors and may differ from those of other RFF experts, its officers, or its directors.

About the Project

This report presents the results of two 2020 surveys by researchers at Stanford University, Resources for the Future, and ReconMR examining American public opinion on issues related to climate change. Since 1997, Stanford University Professor Jon Krosnick has explored American public opinion on these issues through a series of

rigorous national surveys of random samples of American adults, often in collaboration with RFF. For the primary survey for the 2020 iteration of the Climate Insights survey, 999 American adults were interviewed during the 80-day period from May 28, 2020 to August 16, 2020. For the survey reflected in the electric vehicles section, Random Digit Dial telephone interviews were conducted with a representative sample of 502 adults living in the United States between May 28 and August 10, 2020.

This report is accompanied by an **interactive data tool**, which can be used to view specific data from the survey. Please visit **www.rff.org/climateinsights** or **https://climatepublicopinion.stanford.edu/** for more information and to access the data tool, report series, blog posts, and more.

Note: Since 1997, Stanford University Professor Jon Krosnick has led surveys exploring American public opinion on issues related to climate change, human activity, government policies to address climate change, and more, through a series of rigorous national surveys of random samples of American adults. When this research program began, "global warming" was the term in common parlance. That term was used throughout the surveys over the decades and was always defined for respondents, so it was properly understood. In recent years, the term "climate change" has risen in popularity, so both terms are used in this report interchangeably. When describing survey question wordings and results, the term "global warming" is used, to match the term referenced during interviews. Empirical studies have shown that survey respondents interpret the terms "global warming" and "climate change" to have equivalent meanings (Villar and Krosnick 2011).

Acknowledgments

The authors and contributors thank Angelique Uglow (ReconMR), Matt Berent (Matt Berent Consulting), Adina Abeles (Stanford University), and Samy Sekar (Stanford University). We owe a special thanks to David Medeiros of the Stanford Geospatial Center for his outstanding work designing and generating maps. In addition, the authors thank RFF researchers and staff, including Ann Bartuska, James Boyd, Dallas Burtraw, Kathryne Cleary, Roger Cooke, Lauren Dunlap, Rebecca Epanchin-Niell, Kristin Hayes, Ray Kopp, Alan Krupnick, Benjamin Leard, Joshua Linn, Anne McDarris, Richard Newell, Karen Palmer, Daniel Raimi, Daniel Shawhan, Justine Sullivan, Margaret Walls, Ross van der Linde , and Matthew Wibbenmeyer.

Thanks also go to the undergraduate students at Stanford who have supported this effort, include the research assistants in the Political Psychology Research Group at Stanford University: Connor Rokos, Maya Salameh, Paul Mitalipov, Roberta Marquez, Bella Meyn, Sierra Burgon, Mac Simpson, Lindsay Chong, Diana Maria Elsie Jordan, and Larissa Bersh.

Funding for this survey was provided by Stanford University (the Woods Institute for the Environment, the Precourt Institute for Energy, and the School of Earth, Energy & Environmental Sciences), Resources for the Future, and ReconMR.

Photos: *All photos are from Shutterstock unless otherwise noted.*

Cover: John M Lund Photography Inc (cover). Page numbers need to be updated.

Overall Trends: View Apart (page 10); Heather Hacker (page 14); Tatiana Grozetskaya (page 23); Dana R. Lee (page 29); Alexey U (page 34).

Natural Disasters: chuangz (page 39); FashionStock.com (page 43); Roschetzky Photography (page 53); Mark Oatney / Getty Images (page 57).

Policies and Politics: carterdayne / Getty Images (page 64); gyn9037 (page 70); kamilpetran (page 78); John Keith (page 83); Burlingham (page 91); Songquan Deng (page 96).

Political Dynamics: Katherine Welles (page 97); Lane V. Erickson (page 100); Cire notrevo (page 104); ventdusud (page 114); elRoce (page 118); trekandshoot (page 124); Olga Korica (page 128).

Electric Vehicles: Cavan Images (page 134); nikkytok (page 139); F8 studio (page 146); Sergii Chernov (page 149); Artens (page 160).

Opinion in the States: ixpert (page 162); Kan Kankavee (page 169); Steve Lagreca (page 173); grynold (page 178); Malachi Jacobs (page 183); Yevhen Vitte (page 191); Don Mammoser (page 196).

Sharing Our Work

Use of any material in this publication should be credited to the following: Krosnick, Jon A., Bo MacInnis, and Jared McDonald. 2020. Climate Insights 2020: American Public Opinion on Climate Change and the Environment. Washington, DC: Resources for the Future.

The data included in this report comes from sources with varying sharing policies. Please check the references for more information, and email **krosnick@stanford.edu** with any questions.

Contents

Introduction

As we enter the year 2021, the United States continues to grapple with an unprecedented and devastating combination of crises, including the COVID-19 pandemic, an economic crash, and escalating climate change threats. There is much hope that the new administration under President Joseph R. Biden, Jr. and the 117th Congress will steer the nation toward recovery, restoration, and reinvigoration in combating these crises. Of particular interest is how legislation can be enacted to confront global climate change. Especially challenging is the question of whether new climate policies can be implemented while public officials manage the dual crises threatening economic stability and public health.

One reason we might anticipate reduced concern about climate change now is the possibility that care for the natural environment is a "luxury good" to many people. As we will examine in the pages that follow, some might see Maslow's "hierarchy of needs" (1943; 1954) as suggesting that people in contemporary societies can afford to worry about protecting the planet's natural environment only if their basic survival needs have been satisfied. A related presumption is that economic growth and environmental protection are incompatible with one another, as efforts to grow the economy must take resources away from helping the environment. Such a presumption suggests an "either the economy or the environment" dichotomy.

The novel coronavirus pandemic and the economic upheaval in the United States in 2020 offer a natural experiment to test both theories by exploring the impact of the dual crises on Americans' climate change opinions. Does such a sudden and devastating decline in the satisfaction of needs—loss of jobs, diminished feelings of safety, reduced economic security—affect American concern about the natural environment, public support for efforts to protect the environment, and even belief in the existence of global warming? If Americans perceive the trade-off between the environment and the economy as inevitable, the pandemic and economic crisis would tilt them away from supporting environmental protection.

Our survey allowed us to explore these questions in the first chapter of this report. To do so, we compared these new responses to data collected before the pandemic, in 2018. Both surveys asked a wide array of identically worded questions on the topic of climate change, including questions about its existence, causes, and impacts, who should address it, and a host of mitigation policies. Both surveys were conducted with a nationally representative probability sample using random digit dialing to landlines and cellphones with live interviews.

Comparing these two surveys allows us to assess whether the intervening economic upheaval led Americans to reduce support for ameliorative efforts to combat global warming, both generally and through specific government actions. It also allows us to assess if the crises of 2020 has reduced willingness to fund the implementation of specific policies intended to mitigate global warming, perhaps due to less available

money to make such payments. The 2018 and 2020 comparison also allows us to examine whether these economic and public health threats have reduced the number of people who believe in the existence and threat of global warming, reduced engagement on the issue of global warming, or reduced trust in scientists, all perhaps to rationalize reduced support for government action on the issue.

Amid the coronavirus pandemic and economic calamity, the year 2020 was filled with natural disasters brought about by climate change. At the end of the summer, the category 4 Hurricane Laura made landfall near the Texas-Louisiana border, two days after Tropical Storm Marco blew through the same area. Simultaneously, wildfires were raging across the American West, burning over one million acres and threatening tens of thousands of homes and other structures in California alone. From coast to coast, the threat of flood and fire has proven a real and persistent source of fear for millions of Americans.

The cost to Americans may justify local and national efforts to adapt to damage exacerbated by climate change. Whether governments should undertake such efforts—and how these efforts should be paid for—are matters on which the American public can and does express preferences. Policymakers may choose to take public sentiment into account if they have access to reliable measurements of the public's preferences. We explored this series of questions in great depth and breadth.

With our data, we also explore whether people evaluate government policies based on what they believe is best for the nation as a whole (called "sociotropic" reasoning) or whether each individual evaluates policies based on his or her own personal financial interests. A great deal of economic theory has portrayed people as rational actors pursuing their own personal material self-interests (Kiewiet 1983; Kinder and Kiewiet 1981; Lewis-Beck and Paldam 2000). Rational choice theory suggests that people will support a public policy if they perceive that it will yield greater economic benefits to them than the costs incurred (Downs 1957). However, research has shown that a person's material self-interests have little impact when forming opinions about government policies. Instead, people form their opinions based much more on "sociotropic" reasoning (Lau and Heldman 2009; Sears and Funk 1990; Sears et al. 1980). We explored the extent to which Americans' climate policy support was driven by "sociotropic" considerations or by self-interests.

Looking ahead to the climate legislation that the Biden administration and the 117th Congress may enact, we examined Americans' support for a wide range of policies to mitigate future emission, including consumer incentives that reward steps to reduce their carbon footprint; carbon pricing policies that require emitters to pay for their carbon emissions; regulations that require manufacturers to increase energy efficiency of their products, including automobiles, appliances, and buildings; and tax incentives that encourage manufacturers to increase the energy efficiency of their products.

Our data also allowed us to explore the extent to which opinions vary along political party lines. The importance of understanding the partisan divide on climate change can be gleaned from the perspective of policymakers who wish to be guided at least partly by the opinions of their constituents. If America is divided 50–50 along party

lines on the issue of global warming, then the public offers no consensual guidance for decision-makers, leaving legislators to make decisions based on other considerations. But when majorities of the major parties agree with one another and with the majority of Independents, policymakers can pursue endorsed policies knowing that many of their constituents are on the same side. We assessed the degree to which majorities of Democrats, Independents, and Republicans agree on various aspects of global warming in 2020, and we used data from prior surveys in our series to track changes in the partisan gap over the past two decades.

In the fifth chapter of this survey, we shifted away from examining the role of Americans as constituents to examine their role as potential consumers by observing how opinions on global warming may translate into openness to purchasing all-electric vehicles (EVs). According to some natural scientists and economists, one potential step to reduce emissions and mitigate climate change would be the widespread adoption of EVs, which can be powered by electricity generated by sunlight, wind, and water. Manufacturing and sales of EVs have been increasing in recent years. Still, thus far, such sales represent a small share of consumer automobile purchases in the United States.

There are various possible reasons for the slow adoption of this technology, and we explored a host of factors that may predict Americans' resistance to entering EVs. The insights from this exploration shed light on the expansion of EVs in the United States.

In the last chapter of this report, we break down American attitudes on climate and policy options to a state level. These findings may be particularly important to state-level representatives like senators, as many surveys measure national public opinion, but few measure the opinions of residents of such limited geographic areas. We implemented a new technique for generating such data, using high quality national surveys of representative samples of American adults to yield accurate assessments of opinions in the US states. Hopefully these unique results will help state-level representatives consider whether their policies indeed reflect the will of the people they have been elected to represent.

We also explored whether the behavior of elected representatives on issues related to global warming is influenced by the preferences of their constituents. According to some political theorists, democracies only function effectively if elected representatives enact the policies that their constituencies support (Dahl 1989). This is thought to lead to popular support of government and confidence in the democratic process. Public opinion can shape policymaking if elected representatives can learn about the policy preferences of all of their constituents.

One way that representatives can learn about their constituents is via public opinion surveys like this one. Representatives do sometimes consult such data (Hulland, Baumgartner, and Smith 2018; Jacobs and Shapiro 2000), yet it is hard to blame elected officials if they do not follow the will of the public if no such data are available to them. Government officials deal with numerous issues at any one time, and public opinion surveys rarely document opinions on all of those issues.

At the time of this writing in February 2021, the coronavirus pandemic continues to rage across America and has caused untold damage to lives and the economy. In this report, we look into how this unique time in our nation's history has influenced how we think about another problem with dangerous consequences. As you peruse this report, we urge you to think about climate change opinions in terms of where we've been, where we are now, and how we can proceed into the future.

Survey Methodology

1997 Ohio State University Survey. Interviews were conducted in English by telephone with a random digit dial national probability sample of 688 US adults aged 18 and older, via landlines by the Ohio State University Survey Research Unit between September 17, 1997, and October 5, 1997. The AAPOR RR3 was 30%.

1998 Ohio State University Survey. Interviews were conducted in English by telephone with a random digit dial national probability sample of 725 US adults, aged 18 and older, via landlines by the Ohio State University Survey Research Unit between December 20, 1997, and February 13, 1998. The AAPOR RR3 was 38%.

2006 Stanford/ABC News/Time Magazine Survey. Interviews were conducted in English and Spanish by telephone with a random digit dial national probability sample of 1,002 US adults aged 18 and older, via landlines by TNS of Horsham, PA, between March 9 and March 14, 2006, commissioned by ABC News, Time Magazine, and Stanford University. The sample was provided by Survey Sampling International, and interviews were conducted in English and Spanish. The AAPOR RR3 was 38%.

2007 Stanford/AB News/Washington Post Survey. Interviews were conducted in English and Spanish by telephone with a random digit dial national probability sample of 1,002 US adults aged 18 and older, via landlines by TNS of Horsham, PA, between April 5 and April 10, 2007, commissioned by ABC News, the Washington Post, and Stanford University. The sample was provided by Survey Sampling International, and interviews were conducted in English and Spanish. AAPOR RR3 was 29%.

2007 Stanford/New Scientist Survey. Interviews were conducted via the Internet between April 12 and April 18, 2007 by GfK Custom Research North America. Respondents were a nationally representative probability sample of 1,491 US adults aged 18 or older who were recruited by random digit dial telephone calls to landlines to complete regular Internet surveys. Respondents who did not have computers or Internet access were given them at no cost to them. Interviews were conducted in English. The AAPOR RR3 response rate was 26%.

2008 Stanford/ABC News/Planet Green Survey. Interviews were conducted in English and Spanish by telephone with a random digit dial national probability sample of 1,000 US adults ages 18 and older, via landlines by TNS of Horsham, PA, between July 23 and July 28, 2008, commissioned by ABC News, Planet Green, and Stanford University. The sample was provided by Survey Sampling International, and interviews were conducted in English and Spanish. AAPOR Response Rate 3 (RR3) was 29%.

2009 ABC News Survey. Interviews were conducted in English and Spanish by telephone with a random digit dial national probability sample of 1,001 US adults aged 18 or older, between November 12 and November 15, 2009, with 881 respondents on landlines and 120 respondents on cellular telephones. The samples were provided by Survey Sampling International. The AAPOR RR3 was not available.

2009 Stanford/Associated Press Survey. Interviews were conducted in English and Spanish by telephone with a random digit dial national probability sample of 1,005 U.S. adults aged 18 and older between November 17 and November 29, 2009, with 705 respondents on landlines and 300 respondents on cellular telephones by GfK Roper Public Affairs & Media, commissioned by Stanford University and the Associated Press. The samples were provided by Survey Sampling International, and interviews were conducted in English and Spanish. AAPOR Response Rate 3 (RR3) was 12%. The AAPOR RR3 was 12%.

2010 Stanford University/Associated Press Survey. Interviews were conducted in English and Spanish by telephone with a random digit dial national probability sample of 1,000 U.S. adults aged 18 and older between June 1 and June 7, 2010, with 699 respondents on landlines and 301 respondents on cellular telephones by GfK Custom Research North America. The samples were provided by Survey Sampling International. The AAPOR RR3 was 9%.

2010 Stanford University Omnibus Survey. Interviews were conducted in English and Spanish by telephone with a random digit dial national probability sample of 1,004 U.S. adults aged 18 and older between June 18 and June 20, 2010 via landlines by GfK Custom Research North America. The AAPOR RR3 was not available.

2010 Stanford University Florida Survey. Interviews were conducted by telephone with a random digit dial probability sample of 600 adults aged 18 and older living in Florida between July 9 and July 18, 2010 by Abt SRBI. Approximately 400 respondents were interviewed on a landline telephone, and approximately 200 respondents were interviewed on a cellular phone. Samples were provided by Survey Sampling International, and interviews were conducted in English and Spanish. The AAPOR RR3 was 17%.

2010 Stanford University Maine Survey. Interviews were conducted by telephone with a random digit dial probability sample of 600 adults aged 18 and older living in Maine between July 9 and July 18, 2010 by Abt SRBI. Approximately 400 respondents were interviewed on a landline telephone, and approximately 200 respondents were interviewed on a cellular phone. Samples were provided by Survey Sampling International, and interviews were conducted in English and Spanish. The AAPOR RR3 was 12%.

2010 Stanford University Massachusetts Survey. Interviews were conducted by telephone with a random digit dial probability sample of 600 adults aged 18 and older living in Massachusetts between July 9 and July 18, 2010 by Abt SRBI. Approximately 400 respondents were interviewed on a landline telephone, and approximately 200 respondents were interviewed on a cellular phone. Samples were provided by Survey Sampling International, and interviews were conducted in English and Spanish. The AAPOR RR3 was 13%.

2010 Stanford University Survey. Interviews were conducted by telephone with a random digit dial national probability sample of U.S. adults aged 18 and older conducted between November 1 and November 14, 2010, by Abt SRBI. 671 respondents

were interviewed on a landline telephone, and 330 respondents were interviewed on a cellular phone. Samples were provided by Survey Sampling International, and interviews were conducted in English and Spanish. The AAPOR RR3 was 17%.

2011 September Reuters Survey. Interviews were conducted by telephone with a random digit dial national probability sample of U.S. adults aged 18 and older between September 8 and September 12, 2011, by Ipsos Public Affairs of Washington, DC, and sponsored by Reuters. 890 respondents were interviewed on a landline phone, and 244 respondents were interviewed on a cell phone. Samples were provided by Survey Sampling International, and interviews were conducted in English and Spanish. The AAPOR RR3 was 8%.

2011 October/November Reuters Survey. Interviews were conducted by telephone with a random digit dial national probability sample of U.S. adults aged 18 and older between October 31 and November 2, 2011, by Ipsos Public Affairs of Washington, DC, and sponsored by Reuters. 867 respondents were interviewed on a landline phone, and 188 respondents were interviewed on a cell phone. Samples were provided by Survey Sampling International, and interviews were conducted in English and Spanish. The AAPOR RR3 was not available.

2012 February Omnibus Ipsos Survey. Interviewing was conducted by telephone with a random digit dial national probability sample of U.S. adults aged 18 and older between February 2 and 8, 2012, by Ipsos Public Affairs. Samples were provided by Survey Sampling International, and interviews were conducted in English and Spanish. 824 respondents were interviewed on a landline phone, and 209 respondents were interviewed on a cell phone. The AAPOR RR3 was 6%.

2012 March Ipsos Omnibus Survey. Interviewing was conducted by telephone with a random digit dial national probability sample of U.S. adults aged 18 and older between March 8 and 11, 2012, by Ipsos Public Affairs. Samples were provided by Survey Sampling International, and interviews were conducted in English and Spanish. 853 respondents were interviewed on a landline phone, and 231 respondents were interviewed on a cell phone. The AAPOR RR3 was 7%.

2012 Stanford University and USA Today Survey. Interviewing was conducted by telephone with a random digit dial national probability sample of 804 U.S. adults aged 18 and older between June 13 and 21, 2012, by Abt SRBI. Samples were provided by Survey Sampling International, and interviews were conducted in English and Spanish. 603 respondents were interviewed on a landline phone, and 201 respondents were interviewed on a cellular phone. The AAPOR RR3 was 15%.

2012 Associated Press Survey. Interviewing was conducted by telephone with a random digit dial national probability sample of 1,002 U.S. adults aged 18 and older between November 29 and December 3, 2012, by GfK Custom Research North America. Samples were provided by Survey Sampling International, and interviews were conducted in English and Spanish. 600 respondents were interviewed on landlines, and 402 respondents were interviewed on cellular telephones. The AAPOR RR3 was 15%.

2012 Stanford University/GfK Survey. Interviews were conducted via the Internet between November 10 and 27, 2012, by GfK Custom Research North America. Respondents were a nationally representative probability sample of 1,080 U.S. adults aged 18 or older who were recruited by mailed invitations to a random sample of American households and by random digit dial telephone calls to landlines and cellphones to complete regular Internet surveys. Respondents who did not have computers or Internet access were given them at no cost to them. Interviews were conducted in English. The AAPOR RR3 was not available.

2012 Stanford University/American Life Panel Survey. Interviews were conducted via the Internet between November 2 and December 13, 2012, by the RAND Corporation. Respondents were a nationally representative probability sample of 1,020 U.S. adults aged 18 or older who were recruited by random digit dial telephone calls to landlines and cellphones to complete regular Internet surveys. Respondents who did not have computers or Internet access were given them at no cost to them. Interviews were conducted in English. The AAPOR RR3 was not available.

2013 Stanford University Survey. Interviews were conducted via the Internet between March 3 and 18, 2013, by GfK Custom Research North America. Respondents were a nationally representative probability sample of 1,174 U.S. adults aged 18 or older who were recruited by mailed invitations to a random sample of American households and by random digit dial telephone calls to landlines and cellphones to complete regular Internet surveys. Respondents who did not have computers or Internet access were given them at no cost to them. Interviews were conducted in English and Spanish. The AAPOR RR3 was 2%.

2013 Stanford University & Resources for the Future Survey. Interviews were conducted in English between November 20-December 5, 2013. Interviews were conducted by Abt SRBI via landline (521 interviews) and cellphones (280). Respondents were a nationally representative probability sample of 801 U.S. adults aged 18 or older who were recruited by random digit dial telephone calls. The AAPOR RR3 was 13%.

2014 Stanford University & Resources for the Future Survey. Interviews were conducted in English and Spanish between June 4 and June 8, 2014. Interviews were conducted by SSRS via landline (512 interviews) and cellphones (511). Respondents were a nationally representative probability sample of 1,023 U.S. adults aged 18 or older who were recruited by random digit dial telephone calls. The AAPOR RR3 was 8%.

2014 Stanford University and the University of Arizona Survey. Interviews were conducted in English and Spanish between November 18 and December 9, 2014. Interviews were conducted by Abt SRBI via landline (443 interviews) and cellphones (360). Respondents were a representative probability sample of 803 Arizona adults aged 18 or older who were recruited by random digit dial telephone calls. The AAPOR RR3 was 10%.

2015 Stanford University, Resources for the Future, and *New York Times* Survey. Interviews were conducted in English and Spanish between January 7 and January 22, 2015. Interviews were conducted by SSRS via landline (483 interviews) and cellphones (523). Respondents were a nationally representative probability sample of 1,006 U.S. adults aged 18 or older who were recruited by random digit dial telephone calls. The AAPOR RR3 was 12%.

2018 Stanford University, ABC News, Resources for the Future Survey. Interviews were conducted in English and Spanish between May 7 and June 11, 2018. Interviews were conducted by ReconMR via landline (323 interviews) and cellphones (677). Respondents were a nationally representative probability sample of 1,000 U.S. adults aged 18 or older who were recruited by random digit dial telephone calls. The AAPOR RR3 was 17%.

2020 Stanford University, Resources for the Future, and ReconMR Survey. Interviews were conducted in English and Spanish between May 18 and August 16, 2020. Interviews were conducted by ReconMR via landline (310 interviews) and cellphones (689). Respondents were a nationally representative probability sample of 999 U.S. adults aged 18 or older who were recruited by random digit dial telephone calls. The AAPOR RR3 was 10%.

Section 1

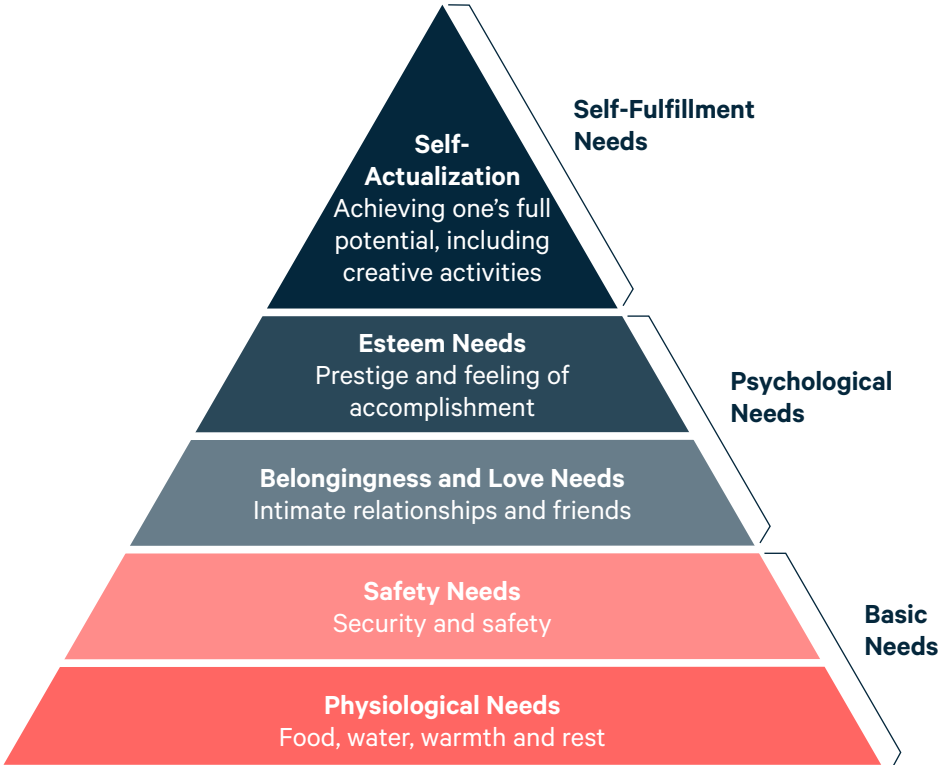
Overall Trends

Contents

Introduction

Is concern about the natural environment a "luxury good"? According to one theoretical perspective, people in contemporary societies can afford to worry about protecting the planet's natural environment only if their basic survival needs have been satisfied. A plausible foundation for such an argument is American psychologist Abraham Maslow's "hierarchy of needs" (1943; 1954).

Figure 1.01. Maslow's Hierarchy of Needs



Source: Simply Psychology

Maslow posited that people are motivated by the desire to satisfy various sorts of needs, which have often been represented by a pyramid (Figure 1.01). Maslow called the lower levels of the pyramid "deficiency needs"—the basic requirements for survival that must be satisfied for people to be happy, including having enough food to eat, a place to sleep, and the security of feeling physically safe.

According to Maslow, until those basic needs are satisfied, an individual must focus on eliminating those deficiencies. Once those needs have been met, Maslow asserted, people have the opportunity to pursue psychic contentment in the form of friendships, intimate relations with others, and feelings of self-esteem and worthwhile accomplishment.

Only after the four lower tiers of needs have been met does an individual enjoy the luxury of worrying about the greater good of societies, said Maslow. And perhaps concern about the environmental health of the planet, in the present and in the future, is a possible subject of a person's attention only if all deficiency needs have first been satisfied.

The novel coronavirus pandemic and the economic crash in the United States in 2020 offer an opportunity to explore the impact of economic change on opinions about global warming. Does a sudden decline in the satisfaction of deficiency needs—loss of a job, diminished feelings of safety, reduced economic security—affect American concern about the natural environment, public support for efforts to protect the environment, and even public belief in the existence of warming?

In 2018, researchers at Stanford University, Resources for the Future (RFF), and ABC News conducted a national survey on the topic of climate change with questions about its existence, causes, and impacts, who should take action to address it, and more (RFF et al. 2018). The same questions were posed again in a new survey conducted by researchers at Stanford University, RFF, and ReconMR, with 999 American adults interviewed between May 28, 2020, and August 16, 2020. Comparing the 2018 and 2020 surveys allows us to assess whether the intervening economic upheaval would

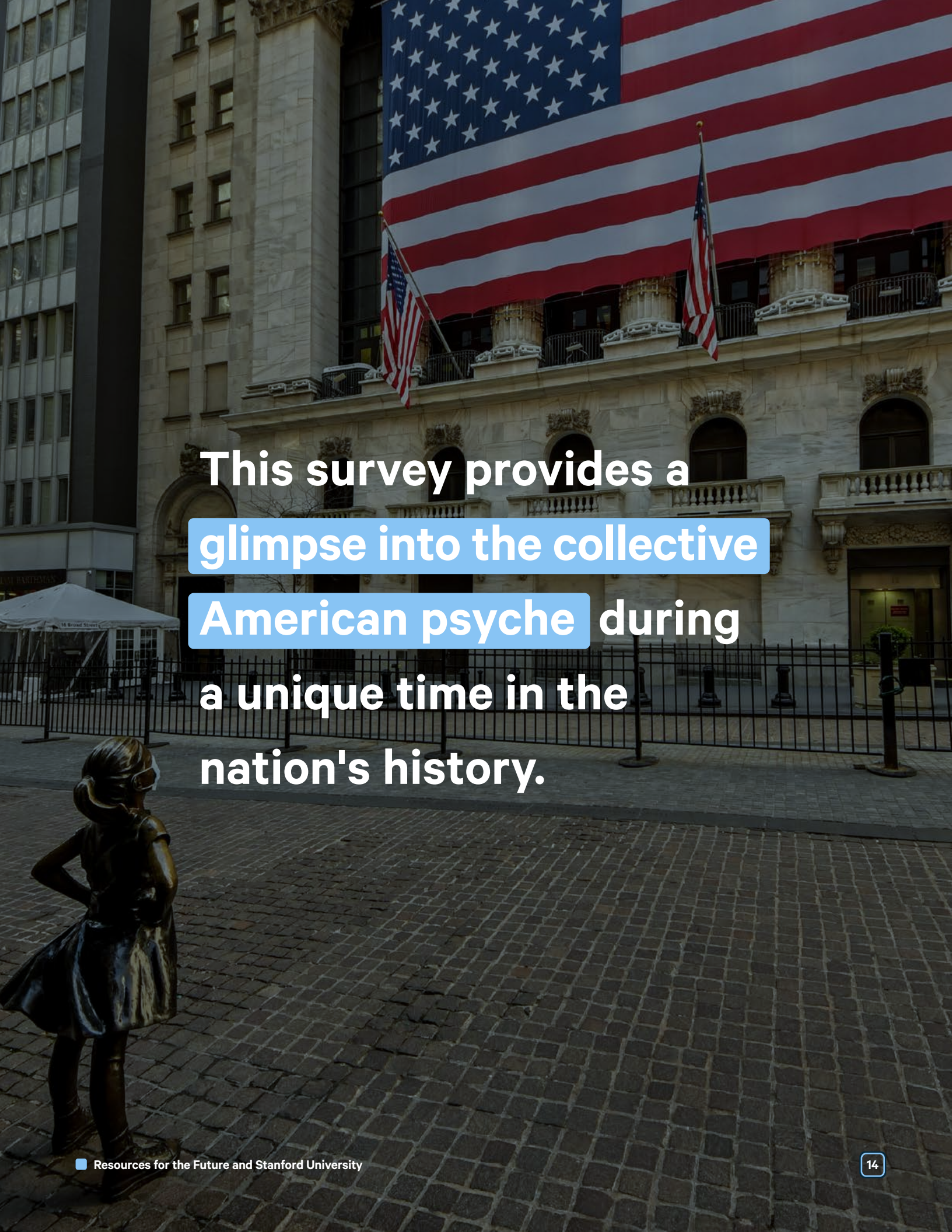
- reduce the number of people who believe in the existence and threat of global warming or the certainty with which people hold those beliefs, perhaps to rationalize reduced support for government action on the issue;
- reduce support for a government effort to combat global warming generally, in order to redirect efforts to focus on the American economy and COVID-19;
- reduce support for specific government actions that might be implemented to combat global warming; and
- reduce willingness to fund the implementation of policies intended to mitigate global warming, perhaps due to less available money to make such payments.

This survey provides a glimpse into the collective American psyche during a unique time in the nation's history. The data from this survey show that, in spite of the array of social, economic, and public health issues affecting the United States today, considerable and sometimes huge majorities of Americans believe that global warming has been happening, will continue in the future, poses a threat, and requires ameliorative action.

EXPERT INSIGHT

The COVID-19 pandemic has been a unique test for how people feel about climate change when faced with a different global crisis. The argument that we can't do anything about climate change without crashing the economy, or that we need to just focus on the pandemic and not do anything on climate right now simply doesn't resonate with Americans.

—**Ray Kopp**, RFF Vice President for Research and Policy Engagement



This survey provides a glimpse into the collective American psyche during a unique time in the nation's history.

Methodology

The Climate Insights 2020 national public opinion survey involved telephone interviews with a representative sample of 999 adults living in the United States. The Climate Insights 2020 national public opinion survey involved telephone interviews with a representative sample of 999 adults living in the United States. We conducted statistical analyses to explore these responses further. For more information on the survey methodology, including details on sample design, field procedures, data verification, weighting, and questions used to measure demographics, please see the the **Climate Insights 2020: Overall Trends Technical Report**. Question wordings for each figure can also be found in Appendix A of this report.

Background

The findings described here complement the work of several contemporary researchers who have studied the relationship between economic well-being and beliefs about global warming.

Maslow's theory, suggesting that the pursuit of economic well-being competes with advocacy for environmental protection, was the foundation of evidence offered in a 2011 paper in *Climate Change Economics* by economists Matthew Kahn and Matthew Kotchen. Their paper analyzes the frequency of Google searches between 2004 and 2010 for information about unemployment and information about global warming, on the assumption that searches on a topic reveal the extent of public concern about the topic (Kahn and Kotchen 2011). They conclude that "recessions increase concerns about unemployment at the expense of people's interest in climate change—in some cases leading them to deny its existence" (2010).

However, Google searches do not precisely quantify the proportion of Americans concerned about a national problem or the extent of their concern. Taken at face value, Google searches are simply queries to obtain information. They reveal a perceived deficiency of knowledge and a desire to enhance understanding. The same person might conduct multiple searches, which would increase the total count without indicating concern by more people. This methodology seems imprecise at best, as a way to measure public opinion.

Kahn and Kotchen (2011) also report evidence based on national survey data about the American "Great Recession" collected in 2008 and late 2009 through early 2010. Interestingly, unemployed Americans were no more or less likely than the employed to express belief in the existence of global warming, certainty about that belief, support for an American effort to combat warming, or support for more congressional action on the issue. This evidence refutes the most plausible version of the hierarchy of needs hypothesis: that economic suffering by an individual reduces his or her concern about environmental protection and reduces even the belief in the existence of environmental threats.

However, the researchers did find a correlation between state unemployment levels and residents' beliefs—respondents living in states with smaller decreases in employment levels tended to believe in global warming more than people living in states with greater decreases in employment. Thus, states with bigger increases in unemployment manifested bigger declines in belief in the existence of global warming, in certainty, and in support for ameliorative action.

This finding, which suggests that only changes in state-level macroeconomic conditions predict opinion change, might be viewed as consistent with an alternative, more sociotropic hypothesis—that people's priorities for the collectives to which they belong emphasize satisfying lower levels of Maslow's hierarchy for everyone before prioritizing the satisfaction of higher-level needs (Kinder and Kiewiet 1981).

But not all evidence is consistent with this reasoning. For example, a 2008 paper by Hanno Sandvik found that in a comparison of 46 countries, "gross domestic product is ... negatively correlated to the proportion of a population that regards global warming as a serious problem" (1). Thus, better economic conditions predicted less concern about global warming, rather than more concern. Complicating matters further, an analysis of data from the same surveys in 47 countries found that GDP per capita did not predict rated seriousness of global warming for the world (Kvaloy et al. 2012).

Another theory, the Gateway Belief Model, asserts that perceptions of agreement among climate scientists are important determinants of public attitudes and beliefs. In 2015, van der Linden and olleagues proposed this model, stating that Americans are more likely to accept climate change science if they are convinced that there is a high scientific consensus among climate researchers. convincing Americans that increased scientific consensus among scientists who study climate change leads to more acceptance of that viewpoint among the general public. However, subsequent studies have failed to confirm that claim (Kerr and Wilson 2018; Kahan 2017). The 2020 survey has offered the opportunity to test this hypothesis again.

The new survey by researchers at Stanford University, Resources for the Future, and ReconMR builds on this array of research, with recent data showing that the COVID-19 crisis has not decreased American "green" attitudes and belief in global warming's existence and threat. At odds with Maslow's hierarchy of needs, the findings in this survey offer a new perspective on how global warming fits into individual and national priorities during a time of hardship.

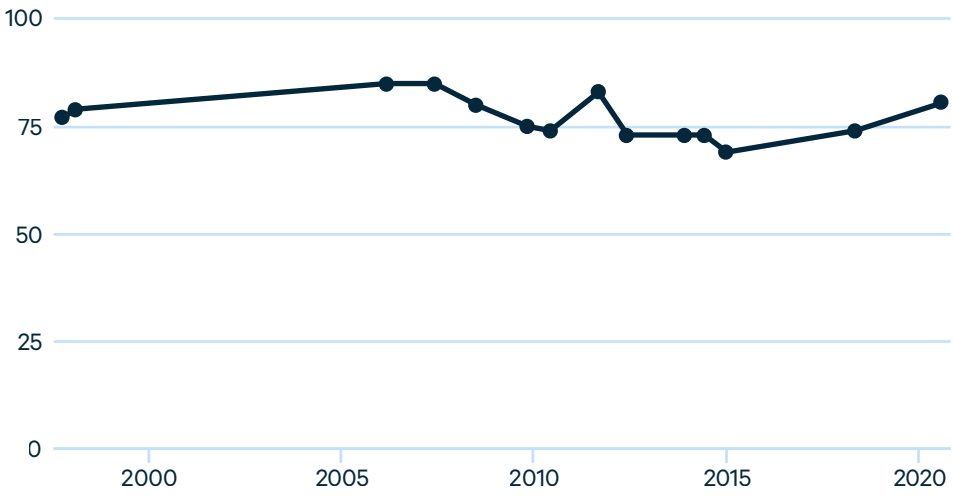
This first installment analyzes the overall trends found in the survey results. In it, we analyze attitudes towards climate change on the national stage. How many Americans believe in climate change? Who should lead the charge in mitigating its effects in the future? All these questions, and more, are answered below.

Fundamentals

Belief in the existence of global warming is near an all-time high, and people have become increasingly certain of their beliefs about whether Earth has or has not been warming in the past and will or will not warm in the future.

In 2020, 81% of Americans believed that Earth has been warming over the past 100 years—among the largest percentages observed since this surveying began in 1997, when it was 77%.

Figure 1.02. Percentage of Americans who believe Earth's temperature "has probably been increasing" over past 100 years



EXPERT INSIGHT

The COVID-19 pandemic, the cratering economy, racial injustice, and so many other pressing societal issues have captured national attention and could be expected to shift focus away from thinking and learning about climate change. Nevertheless, the fraction of the American public who believes global warming is probably happening, a broad way of gauging belief in climate change, is both high and stable over time at around 80% over two decades and 81% this year.

That this percentage is so high is indicative of bipartisan support, as the fraction of Americans who are Republicans is higher than 20%. This is good news for public support for future actions on climate change mitigation and adaptation.

—**Alan Krupnick**, RFF Senior Fellow

Certainty is on the rise, reflecting increasingly entrenched views.

Among the individuals who do and do not believe that global warming has been happening, the proportions of people who are highly certain of their beliefs about global warming's existence has increased over the past 23 years. Among people who believed that global warming has been occurring, the proportion of highly certain individuals was 45% in 1997 and has reached an all-time high of 63% in 2020. Among people who have denied that global warming has been happening over the past 100 years, certainty has also escalated, reaching 44% in 2020.

Interestingly, over the past 23 years, there have been three spikes in certainty among people who denied that Earth has been warming—all following striking declines in average global temperature. This is consistent with the hypothesis that recent changes in average global temperature are important determinants of what we call "existence beliefs" among people who do not trust scientists who study Earth's climate.

Figure 1.03. Of the Americans who believe Earth's temperature has or has not been increasing, percentage who are extremely or very sure

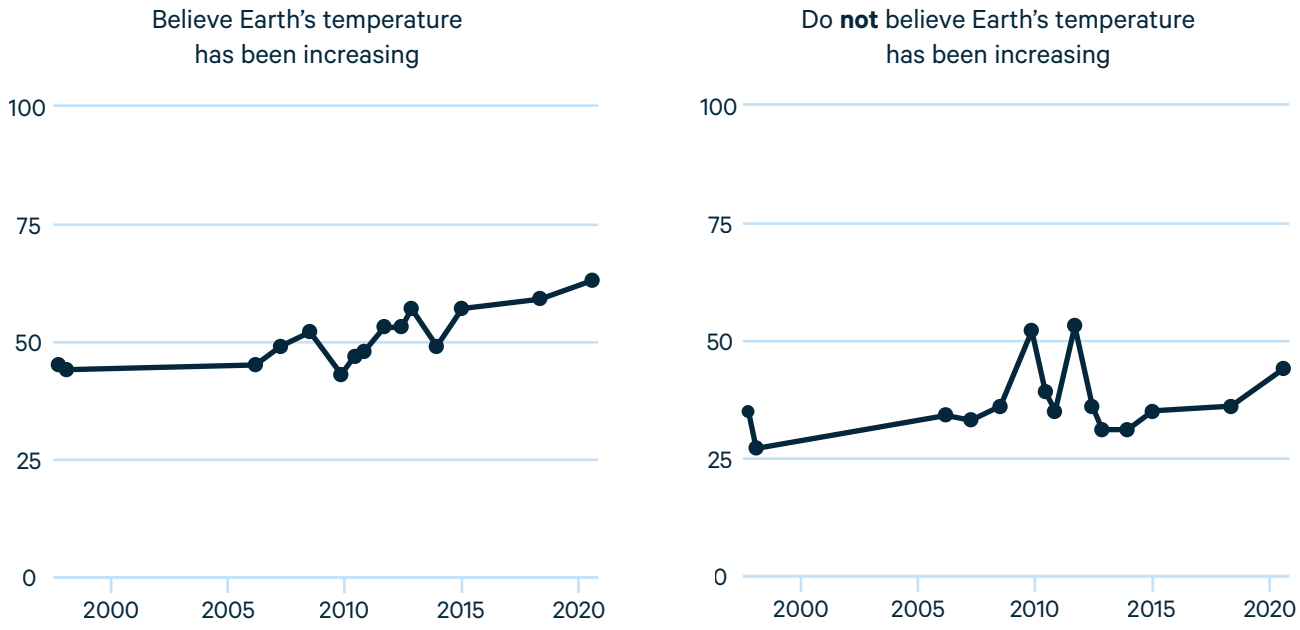
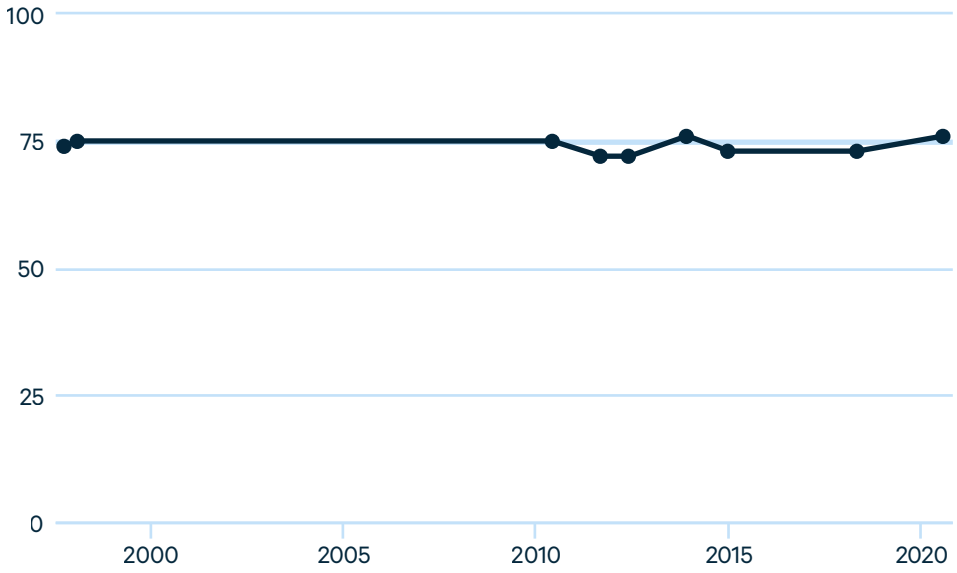


Figure 1.04. Percentage of Americans who think Earth's temperature will probably go up over the next 100 years



In 2020, 76% of Americans believe that Earth's temperature will probably go up over the next 100 years. Scientists agree—according to one "intermediate" model by the Intergovernmental Panel on Climate Change, global average temperature is likely to increase by 2.0 to 4.7°F by 2100 (IPCC 2014). Although that may not sound like much, a global temperature increase of this caliber would be accompanied by significant sea level rise, ocean acidification, and an increase in the strength and frequency of natural disasters.

It is interesting to note that more people—roughly 80% of Americans over the past two decades—believe that global temperature has been warming over the past 100 years. Global warming is not something that most Americans believe started recently.

Even if all carbon dioxide emissions ceased today, the global average temperature would continue to increase due to the greenhouse effect, in which gases such as carbon dioxide and methane trap and amplify heat in Earth's atmosphere. The gases that we released in the past, and are releasing right now, will remain in the atmosphere for up to a thousand years. But how much Earth will warm depends on a number of factors such as future population growth, energy choices, policy decisions, and deforestation rate.

Around three quarters of Americans think that Earth will warm over the next century—about the same proportion as in 1997.

In 2020, people are more sure than ever about whether temperatures will rise in the future.

76% of respondents said that they thought global temperatures will probably increase over the next 100 years if nothing is done to stop it. Among this group of Americans, 68% were very or extremely certain.

Though there have been no notable changes in the percentage of Americans who believe Earth will warm, this high level of certainty is consistent with the general increase in Americans' certainty of their opinions on this issue.

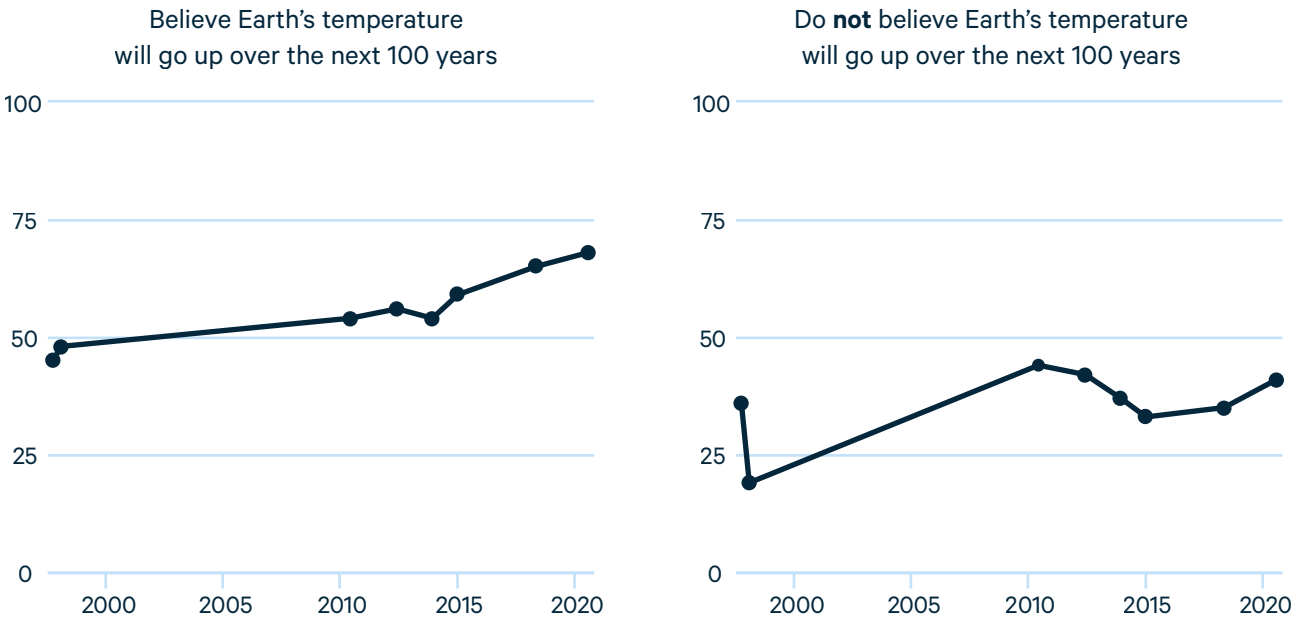
Certainty also increased slightly in 2020 among people who believed that warming will not occur over the next 100 years: 41% of these respondents were highly certain in 2020.

EXPERT INSIGHT

The percentage of Americans who think that the world's temperature will probably go up over the next 100 years has only fluctuated slightly—between 72% and 76%—from 1997 to 2020. While the certainty of those who believe the temperature will not go up has, overall, fluctuated trendlessly, the certainty of those who believe the temperature will go up is clearly trending up. The question to be answered, then, is if—and how—this increased certainty will impact voting behavior.

—**Roger Cooke**, RFF Chauncey Starr Senior Fellow

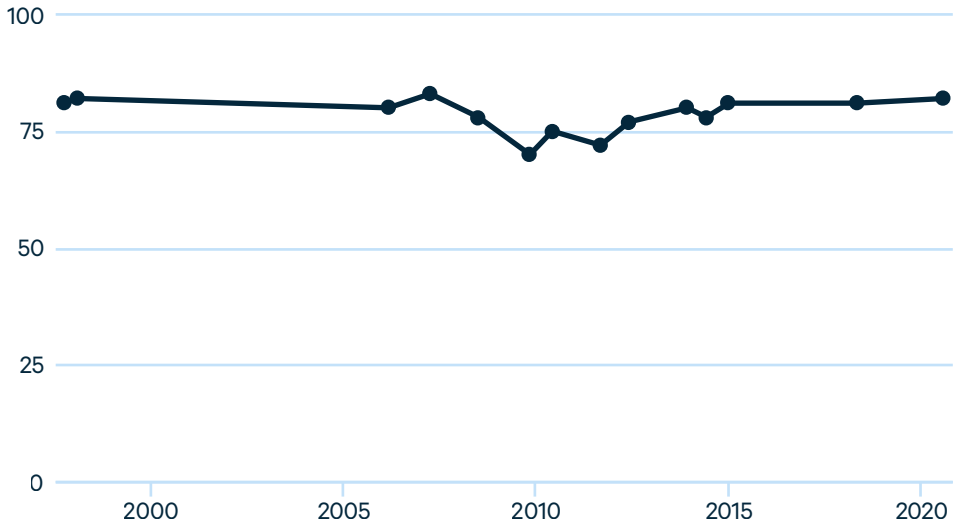
Figure 1.05. Of the Americans who think Earth's temperature will or will not go up over the next 100 years, percentage who are extremely or very sure



Cause of Warming

The percentage of Americans who believe humans have caused global warming has not changed notably during the twenty-first century. When asked whether global warming has been caused primarily by human activity, primarily by natural processes, or by both about equally, 82% of respondents pointed to human activity in 2020—nearly the same as the 81% observed in 1997.

Figure 1.06. Percentage of Americans who believe human action has been at least partly causing global warming



EXPERT INSIGHT

The percentage of Americans who believe Earth has been warming over the past 100 years, and the proportion of Americans who attribute this warming to human activity, has remained fairly steady over the last 23 years. In one sense, this consistency could be seen as a failure to inform an ever-growing share of the American public that human activities are the leading cause of global warming.

But on the other side of the coin, the consistently high percentage of Americans who understand the science can be seen as a success in the face of increasing political polarization and climate skepticism from prominent voices, including President Trump. In this light, public opinion could be seen as "weathering the storms" of increased politicization and growing climate denial.

—**Daniel Raimi**, RFF Senior Research Associate

When asked what has been causing global warming, 82% of respondents pointed to human activity.

Figure 1.07. Percentage of Americans who believe the increase in global temperatures over the past 100 years was good or bad

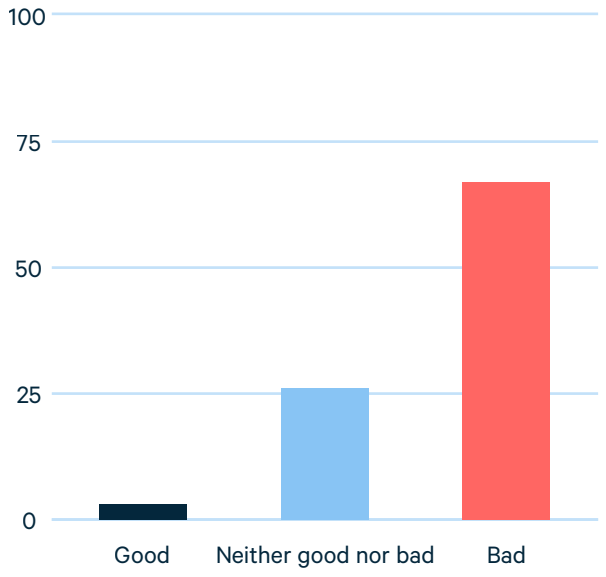
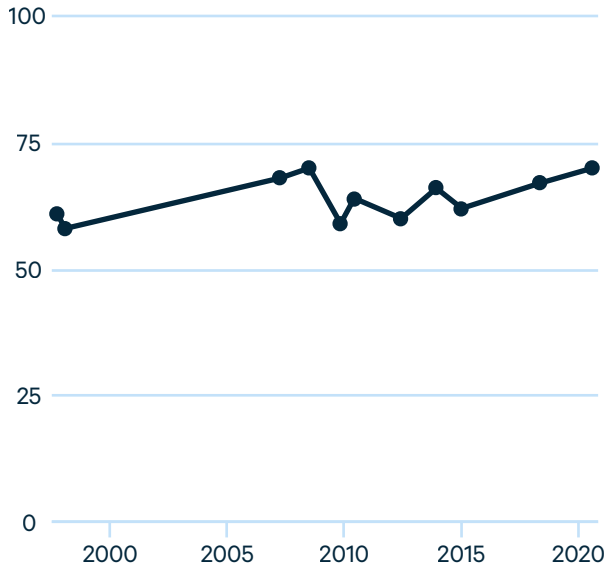


Figure 1.08. Percentage of Americans who believe a 5°F global temperature increase in 75 years would be "bad"



Is an increase in average global temperature good or bad?

Perceived threat of warming was measured in multiple ways, one of which involved asking respondents whether an increase in global temperatures over the past 100 years has been good, bad, or neither good nor bad. 67% of respondents said "bad" in 2020, compared to 51% in 2012, a notable increase.

When asked a similar question about future warming of 5°F 75 years from now, 70% of respondents said that would be "bad," up from 61% in 1997.

EXPERT INSIGHT

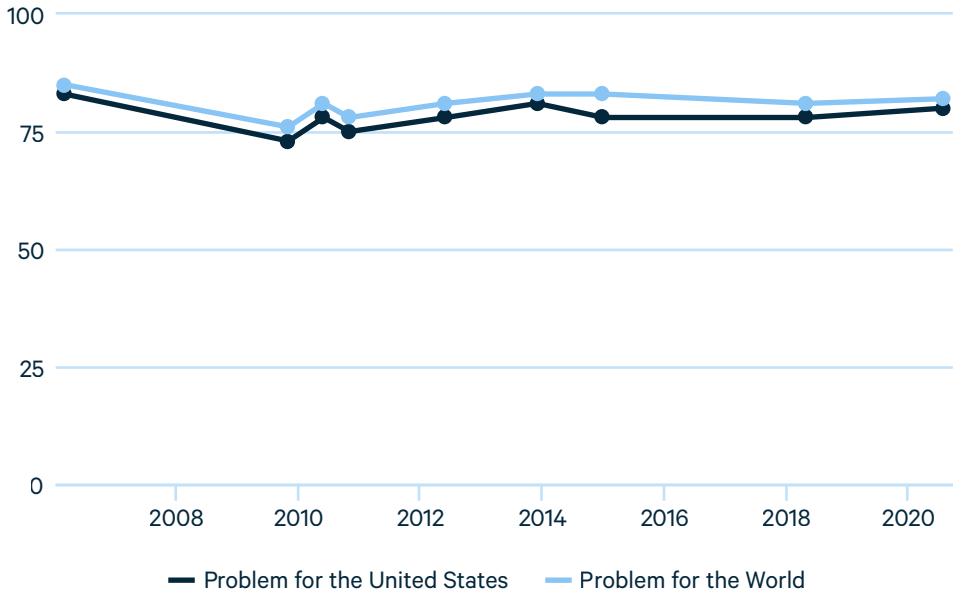
A 5°F change on a summer day may not be very noticeable to us, but on a global scale, a 5°F (2.8°C) average temperature increase would have myriad detrimental effects on both people and wildlife. Ecosystems would become disassembled as species' climatic ranges shift, with many species losing a significant amount of their current ranges. A warming climate and resulting sea level rise will have massive impacts on natural, rural, and urban coastal areas worldwide from increased inundation, storm surge, and salinity effects. An increase of 5°F—especially in a period as relatively short as 75 years—would expose much of humanity to life-altering problems such as heatwaves, droughts, and more frequent extreme weather.

—**Rebecca Epanchin-Niell**, RFF Senior Fellow

Is climate change a serious problem for people, the country, and the world?

The proportion of Americans who believe that global warming will be a very or somewhat serious problem for the United States in the future if nothing is done to stop it was 80% in 2020, slightly down from the all-time high of 83% in 2006. More Americans said that global warming will be a very or somewhat serious problem for the world if nothing is done to stop it: 82% in 2020, also down slightly from the all-time high of 85% in 2006.

Figure 1.09. Percentage of Americans who believe global warming will be a very or somewhat serious problem for the US or the world

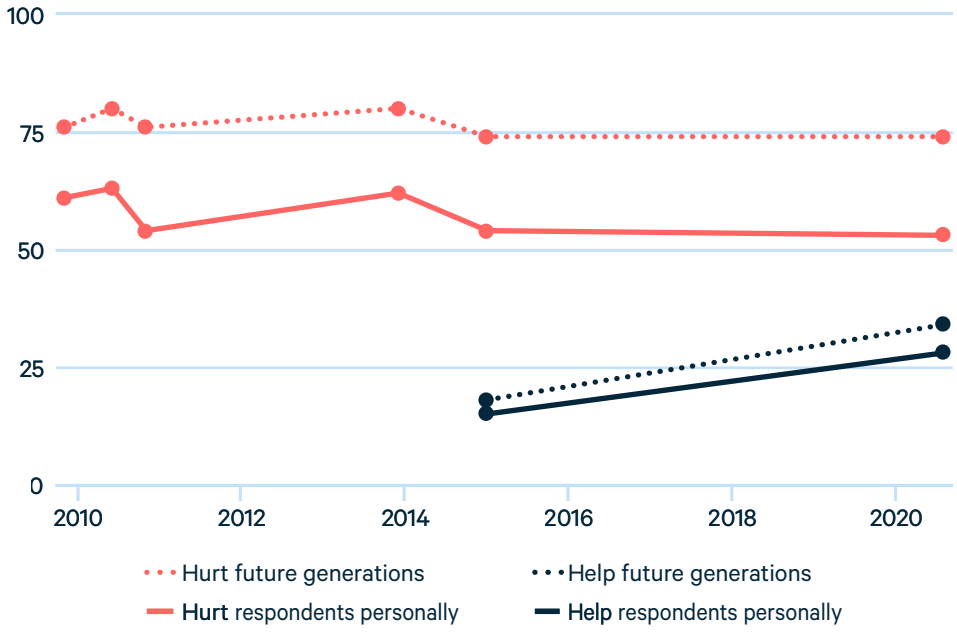


EXPERT INSIGHT

Americans consistently state that climate change will be a problem for the United States and the world. They also consistently state that the problem will be more substantial for the world as a whole than just the United States. This perception is consistent with the large body of research demonstrating that while the bulk of the problem has been caused by high-income nations, the bulk of the suffering will be borne by low-income nations, particularly low-income individuals in the global south. While the effects of climate change will be substantial here at home, it's important to remember that climate change is, among many other things, an enormous injustice.

—**Daniel Raimi**, RFF Senior Research Associate

Figure 1.10. Percentage of Americans who think that global warming will hurt/help future generations or hurt/help them personally at least a moderate amount



In 2020, only 53% of respondents said that they believe warming will hurt them at least a moderate amount, down from the all-time high of 63% observed in June 2010. And 28% of respondents in 2020 said that they expect global warming to help them personally at least a moderate amount, up from 15% in 2015.

Consistent with the notion that people expect the effects of warming to appear gradually over coming decades, more people believe that warming will affect future generations more than it will affect them personally. In 2020, 74% of respondents said they expect warming to hurt future generations at least a moderate amount, down from 80% in June 2010 and 2013. And the proportion of respondents who said global warming will help future generations at least a moderate amount rose from 18% in 2015 to 34% in 2020.

EXPERT INSIGHT

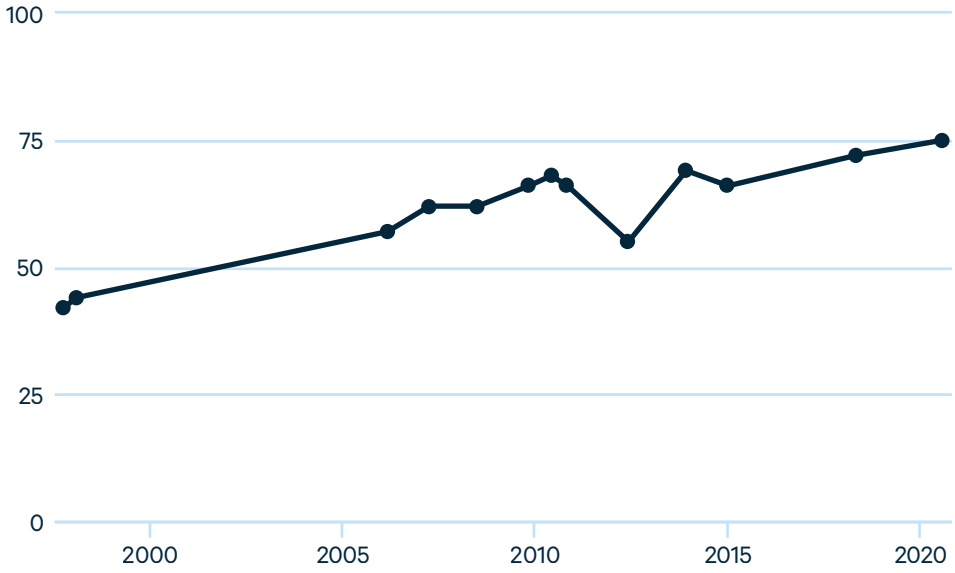
The percentage of Americans who consider global warming "extremely personally important" has risen over the past 10 years, peaking today at 25 percent. But at the same time, 74 percentage of Americans believe that global warming would hurt future generations at least a moderate amount. There is an obvious conclusion here about the size of the American soul and our drive to help those who come after us.

—**Roger Cooke**, RFF Chauncey Starr Senior Fellow

Issue Engagement

From 1997 to 2020, Americans believe they have become more and more knowledgeable about global warming. In 1997, 42% of respondents said they knew at least a moderate amount about the issue, and that figure rose to an all-time high of 75% in 2020.

Figure 1.11. Percentage of Americans who feel they know at least a moderate amount about global warming



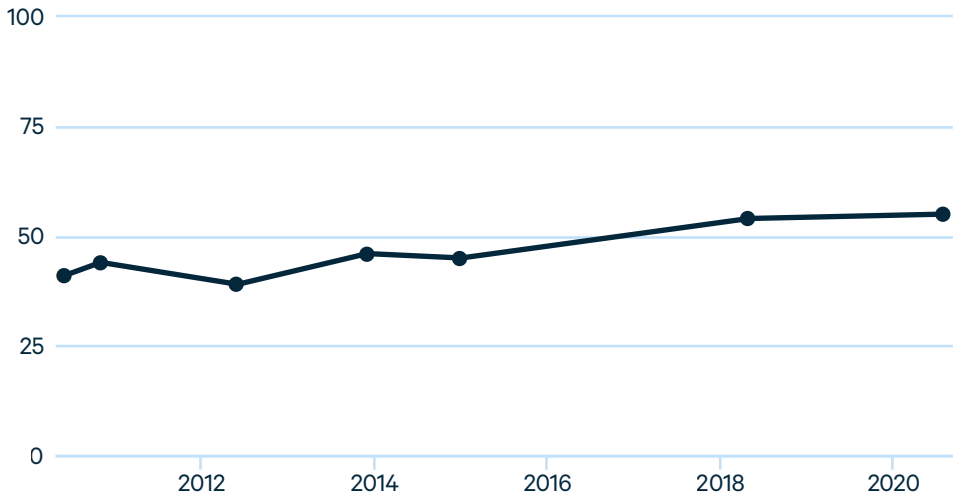
EXPERT INSIGHT

A record-high number of Americans believe that they know at least a moderate amount about global warming. Interestingly, it appears that increased knowledge—which has grown by almost 79% since 1997—has not been accompanied by a similar increase in the number of Americans who believe that climate change is happening.

One potential theory is that this increase in perceived knowledge is the result of confirmation bias. As people are increasingly able to seek out information that aligns with their beliefs, climate believers and deniers alike are able to find information that confirms their views. Therefore, people believe they know more about climate change without actually changing their opinions.

—**Kristin Hayes**, RFF Senior Director for Research and Policy Engagement

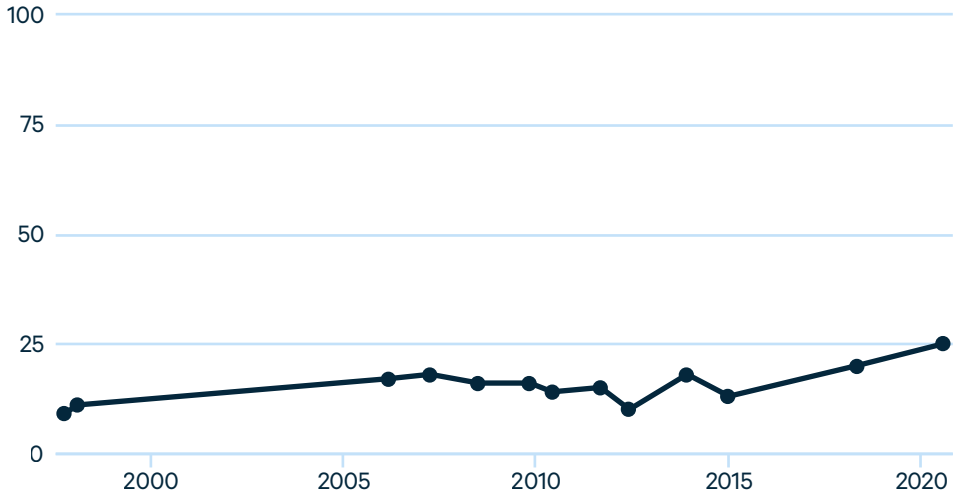
Figure 1.12. Percentage of Americans who have very or extremely strong opinions on global warming

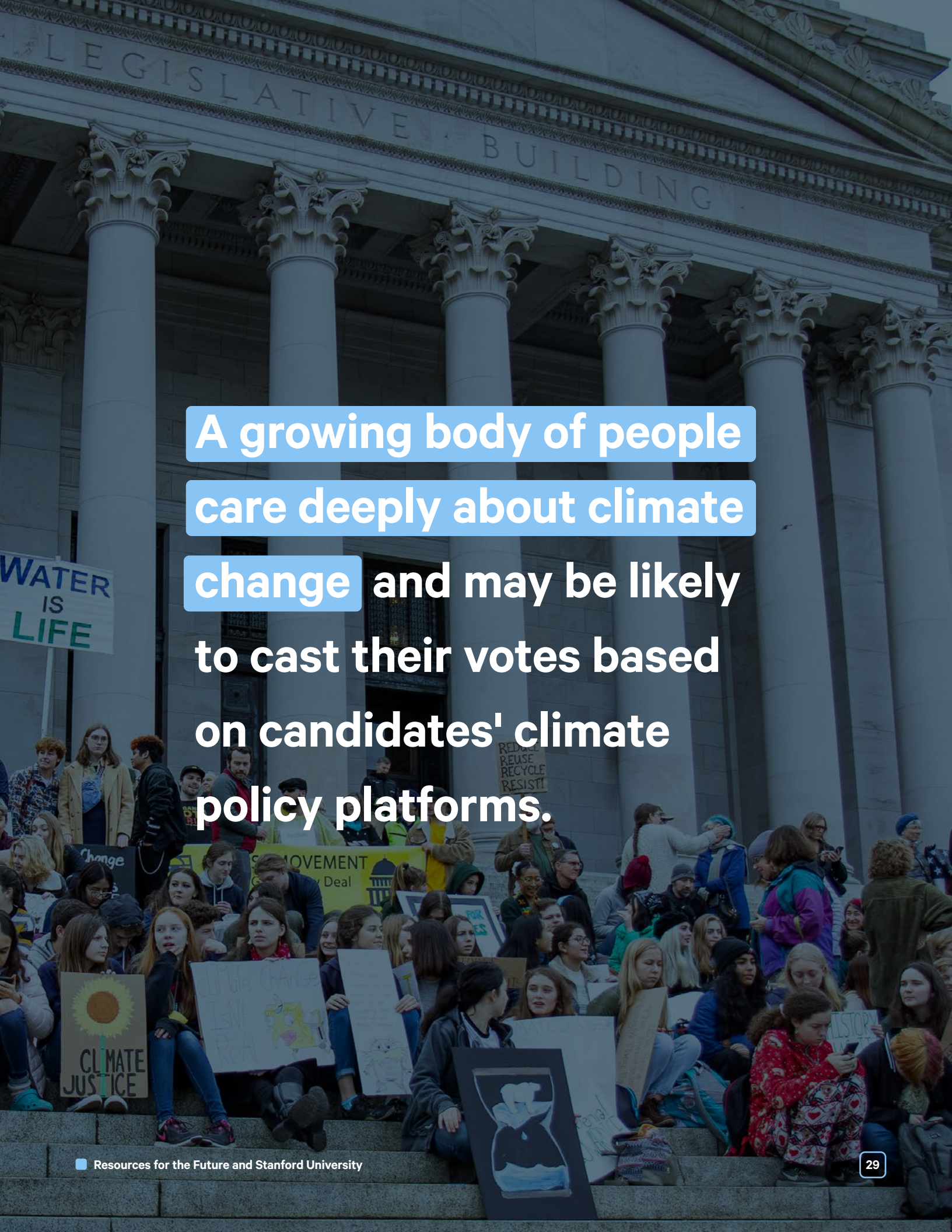


One indicator of the crystallization and, consequently, the impact of people's opinions on an issue, is the strength with which people say they hold those opinions. The proportion of people who said their opinions on global warming were extremely or very strong was 55% in 2020, up from 41% in June 2010.

For most policy issues, there is a small group of people known as the "issue public" who consider the matter to be of great personal importance (Krosnick 1990). These are the people who pay careful attention to news on the subject, think and talk a lot about it, and give money to lobbying groups to influence policy. In 2020, the global warming issue public made up an all-time high of 25% of Americans, up from 9% in 1997, showing that a growing body of people care deeply about climate change and may be likely to cast their votes based on candidates' climate policy platforms.

Figure 1.13. Percentage of Americans who think global warming is extremely personally important (the global warming "issue public")



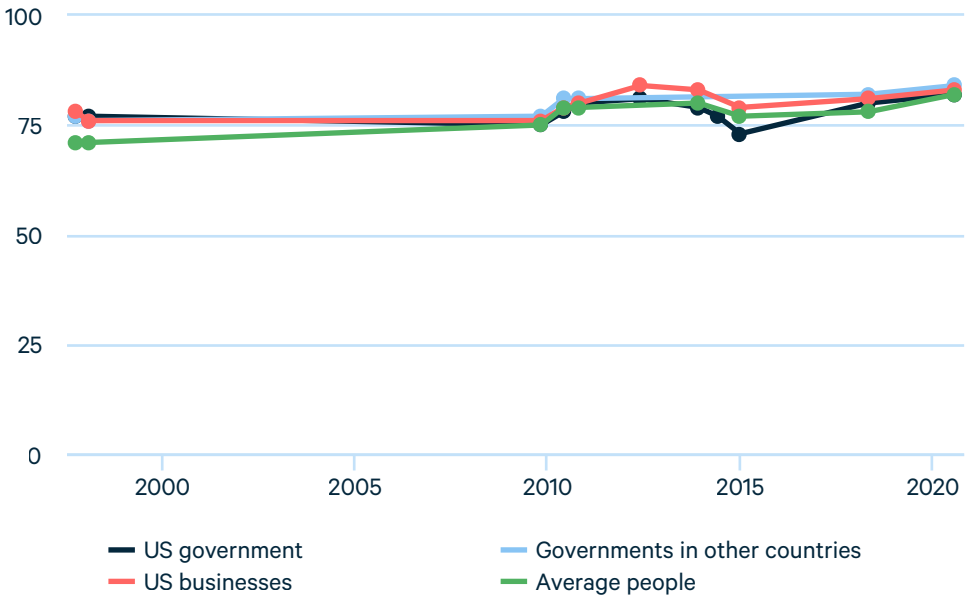


A growing body of people care deeply about climate change and may be likely to cast their votes based on candidates' climate policy platforms.

Desired Effort to Deal with Global Warming

In 2020, 82% of respondents said that the US government should do at least a moderate amount about global warming—an all-time high for public opinion on the issue. The proportions of respondents who believe that governments in other countries, businesses, and individuals should do at least a moderate amount to deal with climate change are similar. For all groups, more respondents expect at least a moderate amount of action than in 1997. The increase is most notable for expectations of the US government and of average people.

Figure 1.14. Percentage of Americans who believe governments, businesses, or average people should do "at least a moderate amount" to deal with global warming



EXPERT INSIGHT

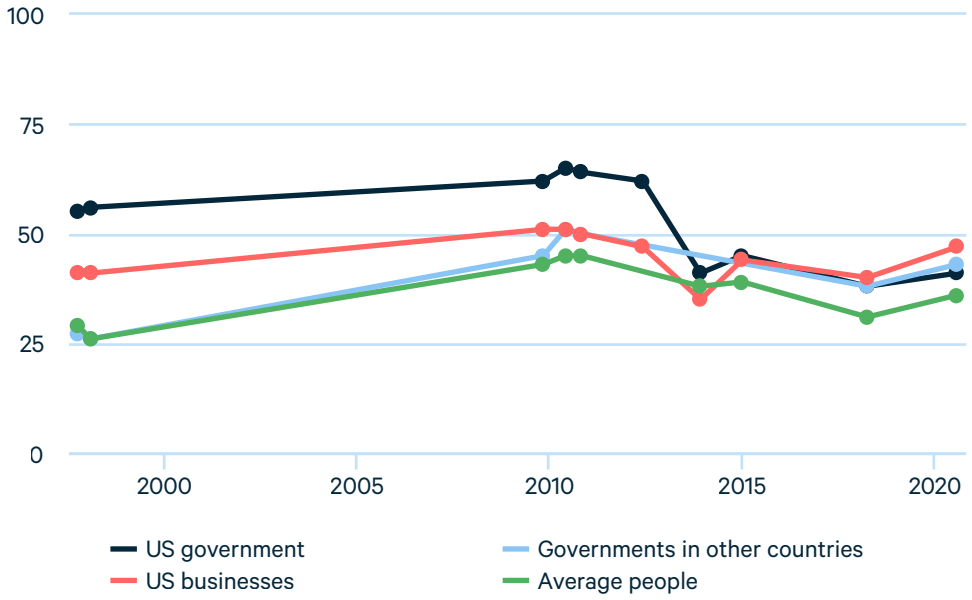
The results show that the vast majority of Americans (over 80%) understand that dealing with global warming requires actions by individuals, by businesses, and by government—both in the US and internationally. They understand that it is not just one of these stakeholders or decisionmakers that needs to play a role in cutting emissions and mitigating climate change, but rather multiple levels of society.

—**Richard Newell**, RFF President and CEO

Many people want more action on climate than they think they're getting.

Whereas more than 80% of people think governments, businesses, and people should be doing at least a moderate amount to deal with climate change, far fewer believe that these groups are actually doing that much—between 35% and 45% of people think these groups are currently doing at least a moderate amount to deal with climate change.

Figure 1.15. Percentage of Americans who believe that governments, businesses, or average people are currently doing "at least a moderate amount" to deal with global warming

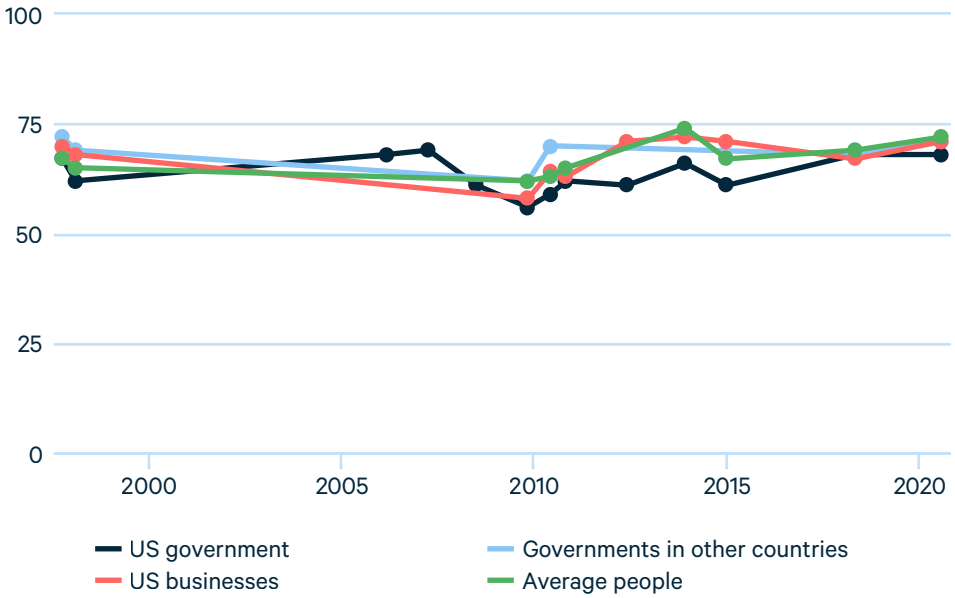


EXPERT INSIGHT

In a business climate awash with new information and ideas, companies are always looking for ways to stand out in the field. As new digital platforms have created unique environments for fostering conversation between firms and their audiences, American businesses have placed a growing emphasis on corporate social responsibility. Potential consumers want to know—what does this company stand for? Does it hold itself accountable for its actions? From brands donating to support local and national causes, to businesses advocating for climate justice, Americans increasingly expect the companies they patronize to not only supply goods, but to work toward the common good.

—**Justine Sullivan**, RFF Director of Communications

Figure 1.16. Percentage of Americans who believe that governments, businesses, or average people should do more to deal with global warming



Most people want more action on climate change from each of the four groups mentioned. When analyzed person by person, the proportion of people who believe that the US government, governments in other countries, businesses, or average people should do more to deal with climate change was approximately 70% in all categories. This desire for increased effort remains about what it was in 1997.

EXPERT INSIGHT

We have seen a dramatic example of how sudden action by multiple stakeholders can have a significant impact on emissions over the last six months. The COVID-19 pandemic has created an unprecedented global scenario for energy use and emissions, as examined in our 2020 **Global Energy Outlook** (GEO), which provides a review of energy market projections.

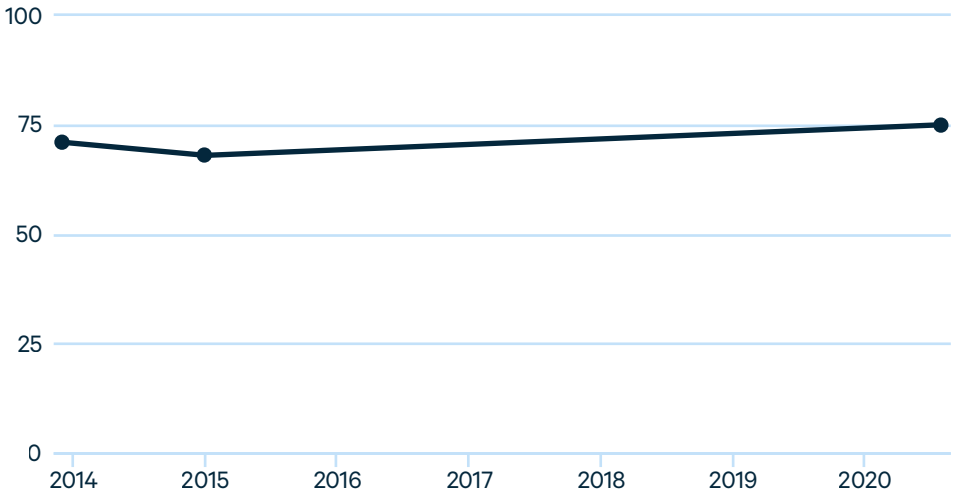
As our report explains, as businesses were shuttered due to COVID-19 and individuals restricted travel, energy demand has contracted sharply, with some projections estimating that emissions could fall by roughly 8% this year, returning to their 2010 levels. However, absent substantial changes in public policies to address climate change, a return to economic growth likely means a return to emissions growth. Projections suggest that the world may be on the cusp of its first true energy transition, but more ambitious government policies and technological innovations are needed to satisfy the energy demands of a growing world while also achieving long-term environmental goals.

—**Richard Newell**, RFF President and CEO

Personal Observations of Recent Weather

When asked in 2020 whether they had personally observed any effects of global warming, 75% of respondents said they had—about the same as in 2013 (71%).

Figure 1.17. Percentage of Americans who believe that they have seen effects of global warming



Climate-related events close to home have the potential to change local opinions on climate change. For example, in 2018, Hurricane Florence hit the Southeastern United States in mid-September, leaving a path of destruction in its wake. In eastern North Carolina, 30 inches of rain fell and major highways were turned into rivers. After the storm, a poll from Elon University noted that 52% of North Carolinians believed that a negative impact to coastal communities from climate change was "very likely." This increased from 45% the year prior, in 2017 (Husser et al, 2018).

EXPERT INSIGHT

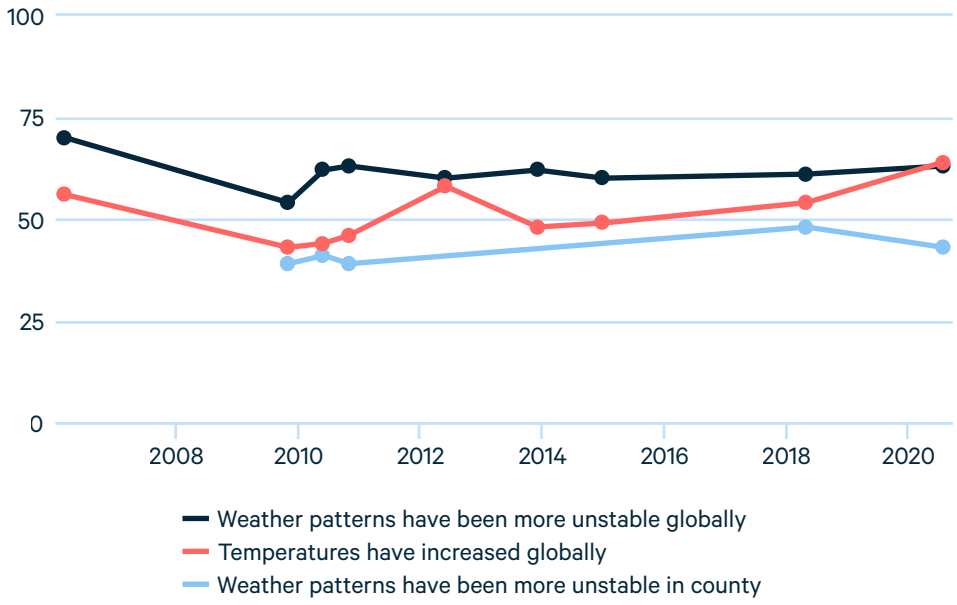
Californians have been seeing the effects of climate change through, among other things, wildfires that have grown in both size and number. Even accounting for trends in wildfire activity over the past 30 to 40 years, California's recent wildfires are far outside the norm. In August 2020, two of the three largest wildfires in California history burned in separate parts of the state. And five of the ten most destructive fires in California history have taken place in just the last four years.

—**Matthew Wibbenmeyer**, RFF Fellow

Three in four Americans say they have personally observed effects of global warming.

More people are noticing more changes in global weather and temperature than in local weather.

Figure 1.18. Percentage of Americans who think weather patterns or average world temperatures have been more unstable or temperatures have increased over the last three years



Global Weather Patterns

In 2020, 63% of respondents said that weather patterns around the world had been more unstable over the last three years than before that, down from the 70% observed in 2006.

Global Temperatures

In 2020, 64% of respondents said that world temperatures had been higher during the past three years than before—an all-time high and a 10 percentage point increase from two years before.

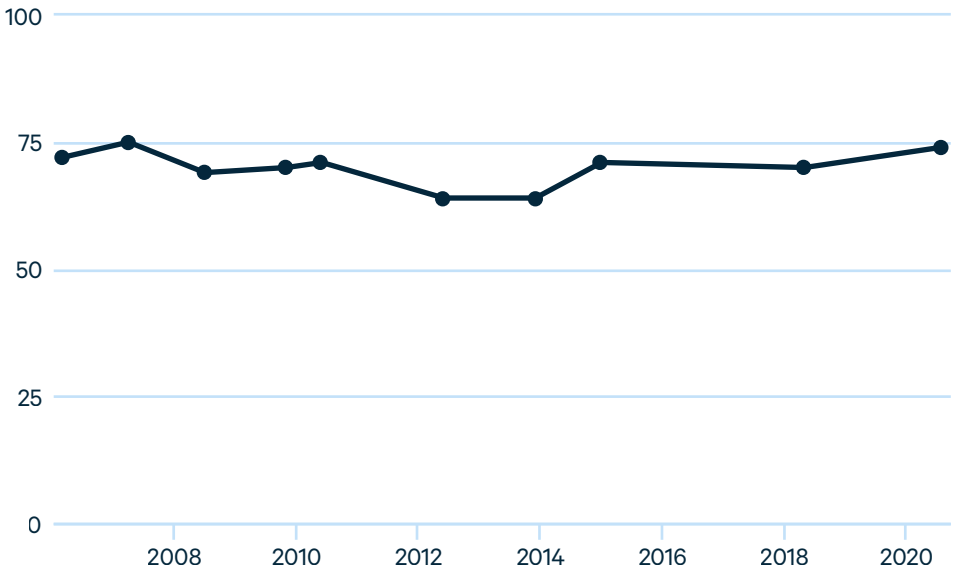
Weather Patterns in the Respondent's County

In 2020, 43% of respondents said that weather patterns in the county where they lived were more unstable during the last three years than before that—about the same as the 39% observed in 2009.

Trust In and Agreement among Climate Scientists

In 2020, 74% of respondents said they trust what scientists say about the environment at least a moderate amount—about the same as the 73% observed in 2006. In fact, no notable or sustained change in trust in environmental scientists occurred over the interim period, despite visible efforts to discredit scientists.

Figure 1.19. Percentage of Americans who trust what scientists say about the environment at least a moderate amount



EXPERT INSIGHT

Rather than providing what the public might consider "definitive answers," scientists regularly couch findings with uncertainty. This uncertainty is often perceived by non-scientists as a lack of clarity and agreement, feeding the idea that disagreement among scientists should raise questions of trust.

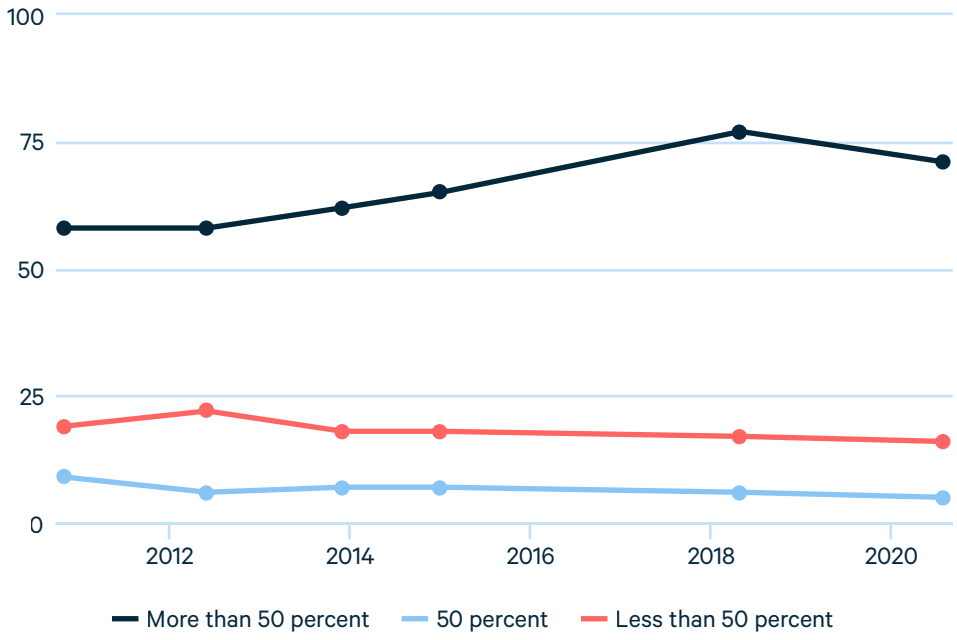
In addition, climate science doesn't happen in a vacuum. The public is also confronting disagreements around the coronavirus, vaccines, pesticides, and any number of issues where the scientific findings should drive the conclusions. But whose science?

—**Ann Bartuska**, RFF Senior Advisor

More people think scientists agree, but that is not reflected in the number of people who believe in climate change.

Perceptions of agreement among climate scientists have been increasing steadily since 2010. In 2020, 71% of respondents said that more than 50% of climate scientists agree that the planet has been warming, up from 58% in 2010. If this is indeed a gateway belief, we would expect to have seen dramatic increases in the opinions explored in this report. But no such dramatic increases appeared, adding further disconfirmatory evidence to the literature.

Figure 1.20. Percentage of Americans who believe that more than, less than, or exactly 50% of climate scientists believe that global warming has been happening



Conclusion

The results from this survey illustrate that, despite numerous efforts over the past two decades to change public opinion, Americans' views on climate change have been remarkably consistent. This finding is congruous with a pattern characterized in Page and Shapiro's landmark book, *The Rational Public* (1992). These researchers showed that, for numerous important issues in American politics, public opinion has changed extraordinarily slowly through the decades—if at all. As we see here, attitudes toward climate change have the same inertia.

As in 1997, the 2020 survey results show considerable and sometimes huge majorities expressing what might be called "green" views on climate change and related issues. These high levels of agreement are not often seen in American politics these days, and the coherent response identifies an arena that crosses party lines. This is the sort of public opinion that policymakers hope for, so that they can move forward with policymaking with the support of a large swath of their constituents. But although the majority of Americans believe that something should be done about climate change—whether it be by the federal government, world leaders, businesses or individuals—the details of how that something should be done have proven themselves to be a point of continued political contention.

Even with so much evidence of continuity over time, we see signs of change in this survey. In particular, we see Americans believing that they know more about this issue and are more certain of their opinions than in the past. And strikingly, more Americans than ever before consider this issue to be extremely important to them personally.

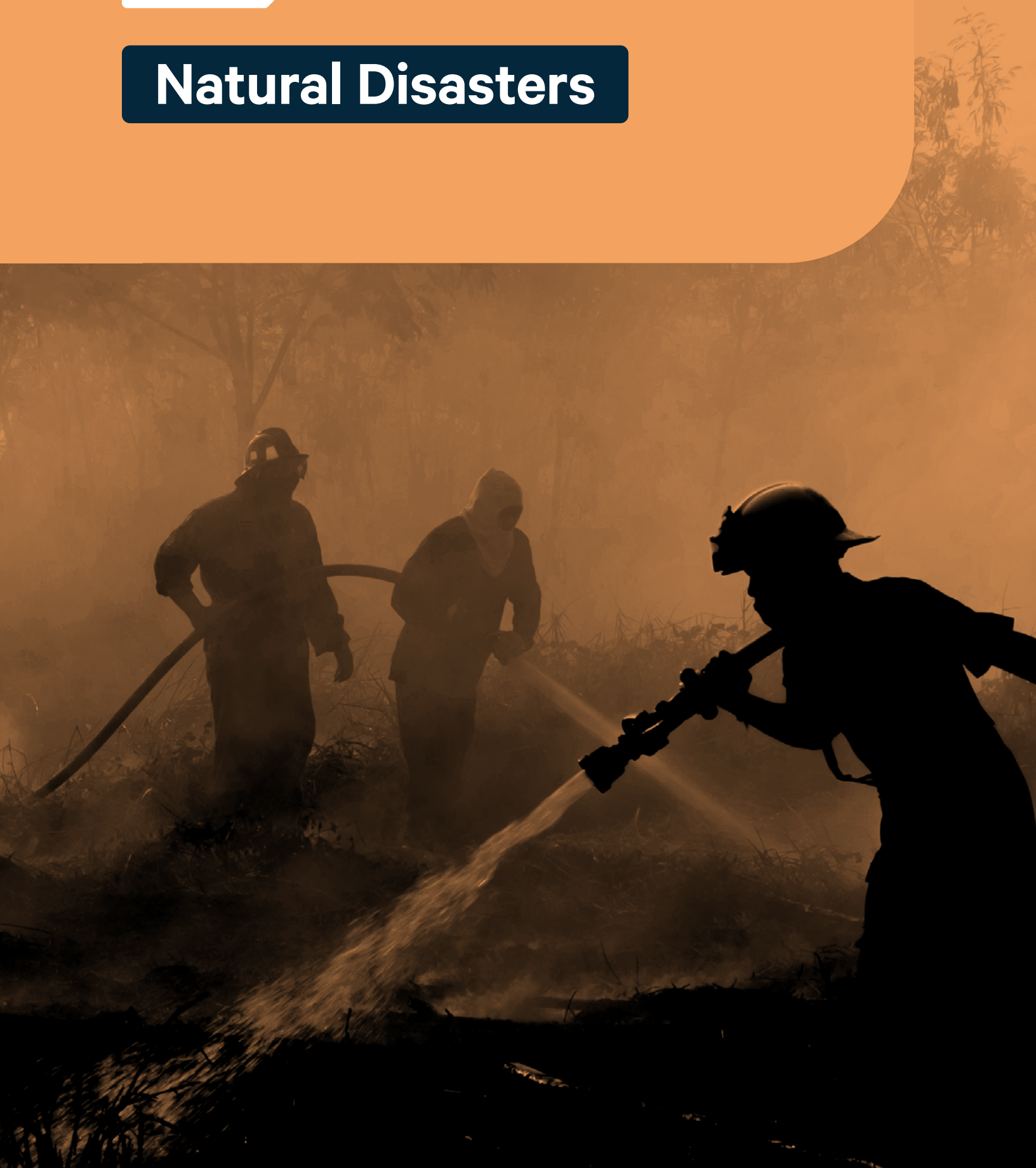
Nearly all the responses shown by the graphs in this section of the report show an increase in concern about climate change and the need for action over the past two years, with only two graphs showing a decrease in concern. This is clear disconfirmation of the expectation that 2020's economic downturn would cause declines in these percentages. Thus, concern about the environment seems not to be a luxury good.

Furthermore, the results here refute the theory that perceptions of agreement among climate scientists about the existence of global warming are important determinants of public attitudes and beliefs. Between 2012 and 2018, when perceptions of agreement among scientists rose, no notable corresponding changes in public opinion occurred. And between 2018 and 2020, when perceptions of agreement among scientists fell slightly, other climate-related opinions actually rose.

This sort of evidence helps scholars of public opinion to better understand the American public—and helps Americans to better understand themselves. We hope as well that this evidence helps inform policymakers about American public opinion when leading the nation into the future.

Section 2

Natural Disasters



Contents

Introduction

At the time of this writing, the Category 4 Hurricane Laura recently made landfall near the Texas-Louisiana border, two days after Tropical Storm Marco blew through the same area. Simultaneously, wildfires are raging across the American West, burning over one million acres and threatening tens of thousands of homes and other structures in California alone. From coast to coast, the threat of flood and fire is a real and persistent source of fear for millions of Americans.

According to natural scientists, climate change is intensifying natural disasters like wildfires and floods, making them increasingly devastating. In its Fifth Assessment Report, the Intergovernmental Panel on Climate Change (IPCC) detailed current and projected impacts of anthropogenic activity on climate changes and extreme weather events. In the executive summary of its region-specific examinations of North America, the IPCC Working Group 2 stated:

> North America's climate has changed and some societally relevant changes have been attributed to anthropogenic causes *(very high confidence)*. Recent climate changes and individual extreme events demonstrate both impacts of climate related stresses and vulnerabilities of exposed systems *(very high confidence)*... Many climate stresses that carry risk—particularly related to severe heat, heavy precipitation, and declining snowpack—will increase in frequency and/or severity in North America in the next decades *(very high confidence)*.
>
> Global warming of approximately 2°C (above the preindustrial baseline) is very likely to lead to more frequent extreme heat events and daily precipitation extremes over most areas of North America, more frequent low-snow years, and shifts toward earlier snowmelt runoff over much of the western USA and Canada. Together with climate hazards such as higher sea levels and associated storm surges, more intense droughts, and increased precipitation variability, these changes are projected to lead to increased stresses to water, agriculture, economic activities, and urban and rural settlements.

As the world warms, the cost to Americans may also justify local and national efforts to adapt to damage exacerbated by climate change. For example, the spread of fire can be limited by reducing the amount of burnable materials in forests, whether it be through controlled burns or mechanical thinning (Scott et al. 2012). Federal and state governments could expand firefighting personnel to increase capacity to effectively limit the spread of fires. In flood-prone areas, governments can discourage or prevent people from building houses or other structures. After fires or floods, governments can help victims to recover through financial assistance or recovery programs. The government can implement these efforts and more through the use of taxpayer dollars.

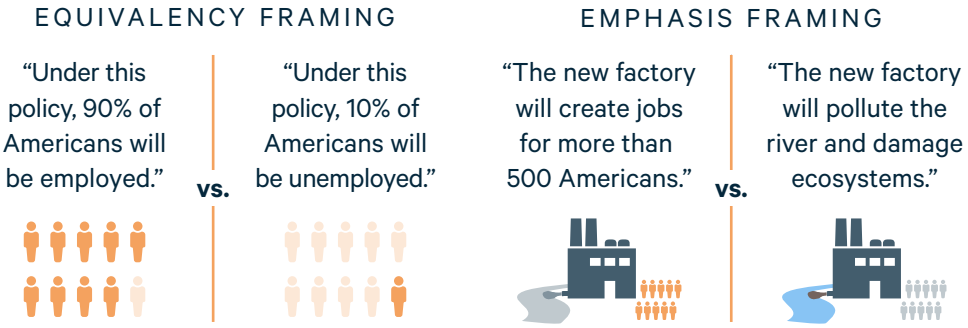
The majority of these proposed policies are considered "adaptation policies," as they seek to change human behavior in response to climate change, instead of "mitigation policies" which would focus on curbing the effects of climate change itself. Although a few policies could be considered as mitigation—namely expanding firefighting personnel or removing dead vegetation—this report will use "adaptation policies" as a blanket term for proposed government action.

Whether governments should undertake such efforts—and how these efforts should be paid for—are matters on which the American public can and does express preferences. Policymakers may choose to take public sentiment into account if they have access to reliable measurements of the public's preferences, and this section of our report describes new evidence gathered for exactly this purpose.

Americans have been living with the consequences of natural disasters for generations, and, as shown above in Figure 1.16, three in four Americans say they have personally observed effects of climate change. It is fully plausible that they may have policy preferences shaped by historical responses and their own experiences. But climate change puts a new spin on these disasters, because its existence, unchecked, foretells increases in both the frequency and severity of damaging events. This added dynamic raises the interesting possibility that Americans might be more supportive of government efforts to prevent damage from wildfires and floods and to assist people after a disaster if the question is framed in terms of the likely impact of climate change. We tested that possibility in the survey described in this section.

The hypothesis is in the spirit of social science research on "framing." Policies may be contextualized in various ways, and public reactions to the policy may be influenced by the choice of context. To date, the literature points to two types of framing: equivalency framing (Tversky and Kahneman 1981) and emphasis framing (Chong and Druckman 2007).

Figure 2.01. Equivalency Framing and Emphasis Framing



Through equivalency framing, the same fact can be described in two different, equally true ways that emphasize different aspects of reality. For example, if a disease is expected to kill 600 people and administering a drug to those people will save 200 of those lives, it would be equally true to say that 400 people will not be saved by the drug (Tversky and Kahneman 1981). Such changes in framing have been shown to alter public opinion on an issue.

As the world warms, the cost to Americans may also justify local and national efforts to adapt to damage exacerbated by climate change.

Emphasis framing effects occur when a policy or situation is described in ways that focus on different attributes (Kinder and Sanders 1990). For example, if a state government revokes the permit of a company that is producing an unlawful amount of methane, one legislator could say that the state is protecting public health and the environment. Meanwhile, a legislator who is against the revocation might argue that the state is interfering with production and putting jobs at risk. Two very different arguments can be made, and they differ in emphasis framing. Past work has shown that such emphasis framing can also alter people's opinions toward a policy (Kinder and Sanders 1990).

The survey experiment described here explored whether framing government policies regarding wildfires and floods in terms of climate change alters public support for those policies. Respondents were randomly assigned either to evaluate policies with no mention of climate change, or they were first told that natural scientists believe that climate change will make the damage from wildfires and floods more frequent and more profound. In reviewing these responses, we examined whether this emphasis framing increased the public's preferences for government policies to adapt to and mitigate the effects of these events on people and property.

In the context of this survey, we also sought to identify groups of people who may be more or less favorable toward such government policies. In addition to traditional demographic predictors of policy support and the role of respondents' belief about the existence of climate change, we looked closely at how respondents' support for policy was affected by their material self-interest. A great deal of theory, especially in economics, has portrayed people as rational actors pursuing their material self-interests (Kiewiet 1983; Kinder and Kiewiet 1981; Lewis-Beck and Paldam 2000). Rational choice theory suggests that people will support a public policy if they perceive that it will yield more economic benefits than costs to themselves (Downs 1957). However, research has shown that a person's material self-interests have little impact when forming opinions about government policies. Instead, people focus on what they think is best for the most people affected by the policy—a style of reasoning called "sociotropic" (Lau and Heldman 2009; Sears and Funk 1990; Sears et al. 1980). We explored this notion by examining whether Americans' support for policies to reduce wildfire and flood damage is affected by their perceptions of the effects they think climate change will have on them personally and on future generations.

We also explored another hypothesis previously discussed in this report—that concern about the environment is a "luxury good" that people can only afford if they have taken care of their basic life needs (Maslow 1970). Princeton University psychology professor Elke Weber's theory of a "finite pool of worry" (2015)—which posits that if people are fully consumed by worry about other issues, they will have little or no capacity to worry about climate change—is also particularly relevant to this discussion, particularly as worries about COVID-19, racial inequity, and countless other issues have surged in 2020.

We explored this issue by examining whether support for government policies to adapt to wildfires and floods might be diminished in social groups that are forced to focus on satisfying basic needs in Maslow's hierarchy, such as lower-income individuals.

Likewise, long-term political suppression and economic deprivation resulting from the social stratification are thought to have subjected people of color to substantial challenges in day-to-day living. These marginalized communities often face many different immediate worries, and if climate change is a far-off concern of less immediate relevance, Weber's theory suggests that we will see less support in these groups for government focus on preventing effects of what might be perceived as relatively rare events. Instead, these groups might be more supportive of government efforts to assist them in the course of ordinary daily life on other, more immediate threats.

Methodology

Respondents were randomly assigned to be asked a series of eight policy questions on wildfires (N=505) or seven policy questions on floods (N=495). Responses to the questions were combined, yielding an index that represents the average of the answers to the fires or floods questions. The policy support index ranged from 0 (meaning the least support) to 1 (meaning the most support) and was the primary dependent variable that we sought to explain.

Details about the methodology for collecting and analyzing the data are described in the **Climate Insights 2020: Natural Disasters Technical Report**. Question wordings can be found in the **Natural Disasters Survey Methodology Report** or in Appendix A of this report.

We conducted statistical analyses to explore whether adding short phrases about climate change altered support for government action to address the effects of wildfires and floods.

Public Support for Adaptation Policies

Seven out of the eight wildfires policies were favored by a majority of respondents. The least popular policy was payment by the federal government to move people to safer places, with 47% of people favoring it. Nearly six in ten Americans favored prohibiting development near fire-prone areas (58%), and a similar number favored requiring people to purchase fire insurance (60%). More than three-quarters favored the following other policies: removing dead vegetation in forests (76%), helping Americans who lose their homes due to fires (79%), increasing the number of firefighters (85%), and requiring use of fire-resistant building materials (87%).

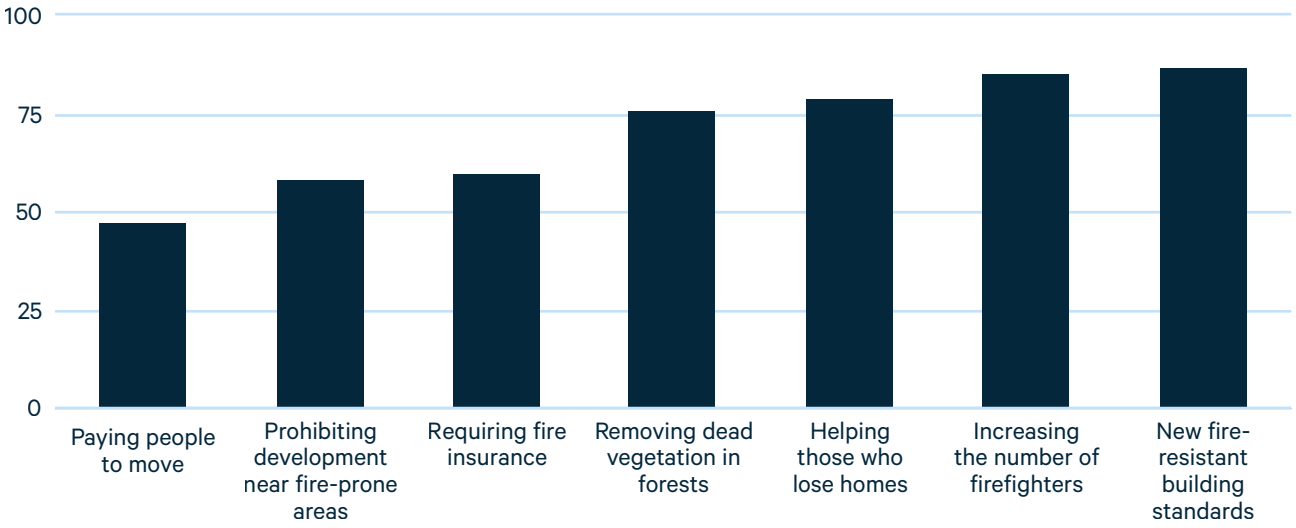
> **"People have an aversion to the government telling them where to live, or even giving incentives to move."**

EXPERT INSIGHT

We can see from these results that people have an aversion to the government telling them where to live, even when it's proposed as an incentive rather than a requirement. People have more interest in government intervention to encourage fire prevention and help fight fires, but fewer people are interested in requirements that could place a burden on homeowners or restrict where people can live and work. Yet we still see that close to half of people support measures that would fundamentally change where humans spend time, like incentives to move or restrictions on development in disaster-prone areas. It's clear that people are worried and deeply affected by these disasters.

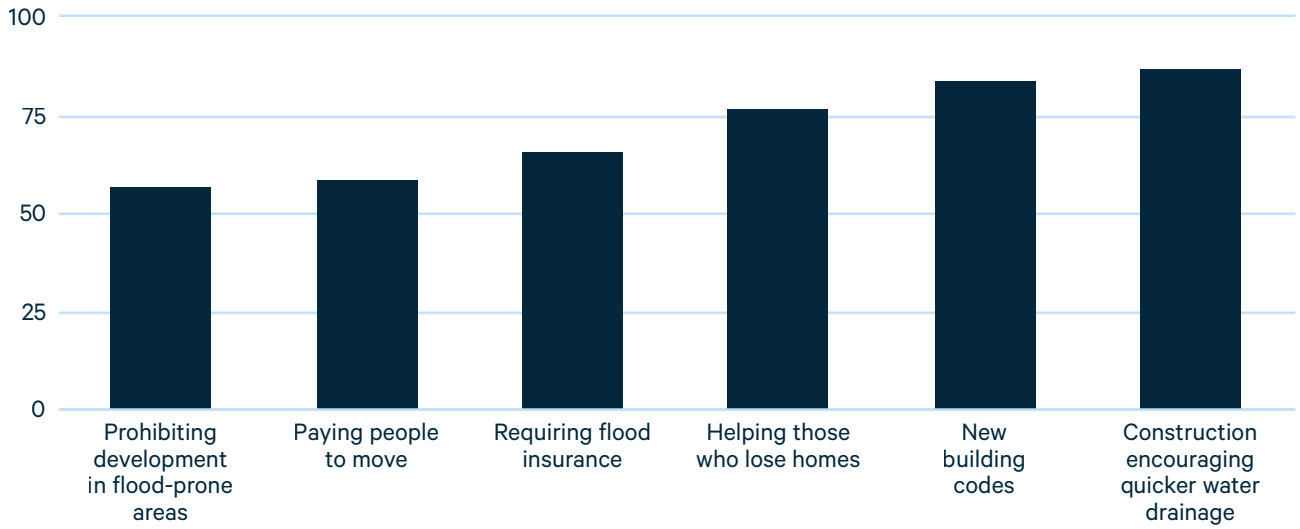
—**Ray Kopp**, RFF Vice President for Research and Policy Engagement

Figure 2.02. Percentage of Americans who favor wildfire adaptation policies



All of the six policies related to floods were favored by a majority of respondents. Nearly six in ten Americans supported prohibiting development in flood-prone areas (57%). A similar number supported paying people to move to live in safer places (59%). Two-thirds supported requiring flood insurance (66%). More than three-quarters favored the following other policies: helping Americans who lose homes due to floods (77%), requiring new building codes to minimize flood damage (84%), and doing construction to encourage quicker water drainage (87%).

Figure 2.03. Percentage of Americans who favor flood adaptation policies



EXPERT INSIGHT

Public policies often involve a tradeoff between fairness and cost-effectiveness. This is particularly true of natural disaster policies (including insurance programs and public investments to avoid future damage). Moreover, judgments about what is "fair" depend on the eye of the beholder. For example, a flood and fire insurance safety net to protect Americans from random acts of God and nature seems "fair" to most. On the other hand, that same policy is a subsidy to property owners (many of whom are relatively wealthy) who chose to build and live in high-risk areas, which may strike some as unfair. It is also not cost-effective since it, in effect, encourages increased property damage risks. But what about poor communities who may have little or no choice but to live in high-risk areas?

One interpretation of these survey results is that Americans' views on natural disaster policy reflect both an appreciation of these "fairness options" and a desire to balance fairness and cost-effectiveness. The most striking result is the preference for those living in dangerous areas to pay for their own costs of preventing damage, rather than the US public as a whole (Figures 2.09 and 2.10). This is mirrored by very weak support for the federal government taking primary responsibility for reducing damages (Figures 2.06 and 2.07). Notably, mandatory fire and flood insurance requirements are favored by 60% and 66% of respondents, respectively. This option is likely to be particularly cost-effective, as it does not subsidize risk-taking, but rather allows insurance markets to price risks into the costs of property ownership.

—**James Boyd**, RFF Senior Fellow and Thomas Klutznick Chair in Environmental Policy

Overall, Democrats and Republicans support many of the same policies, with few instances of large gaps in support between the parties.

The figures below show that, while Democrats and Republicans support many of the same policies, Democrats tend to be more supportive of government intervention than Republicans, with Independents falling in the middle. Among the policy options presented, fire adaptation policy to remove dead vegetation in forests had near-equal support from all parties. Meanwhile, paying people to move away from fire-prone areas has the largest support gap across Democrats and Republicans.

Figure 2.04. Percentage of Americans who favor fire adaptation policies, by political party

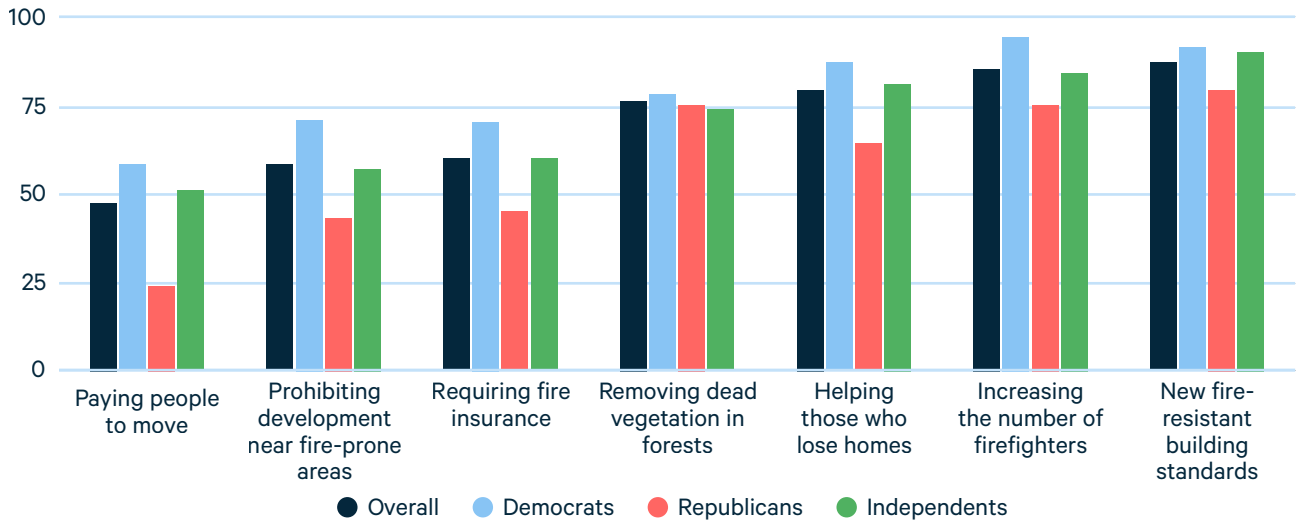
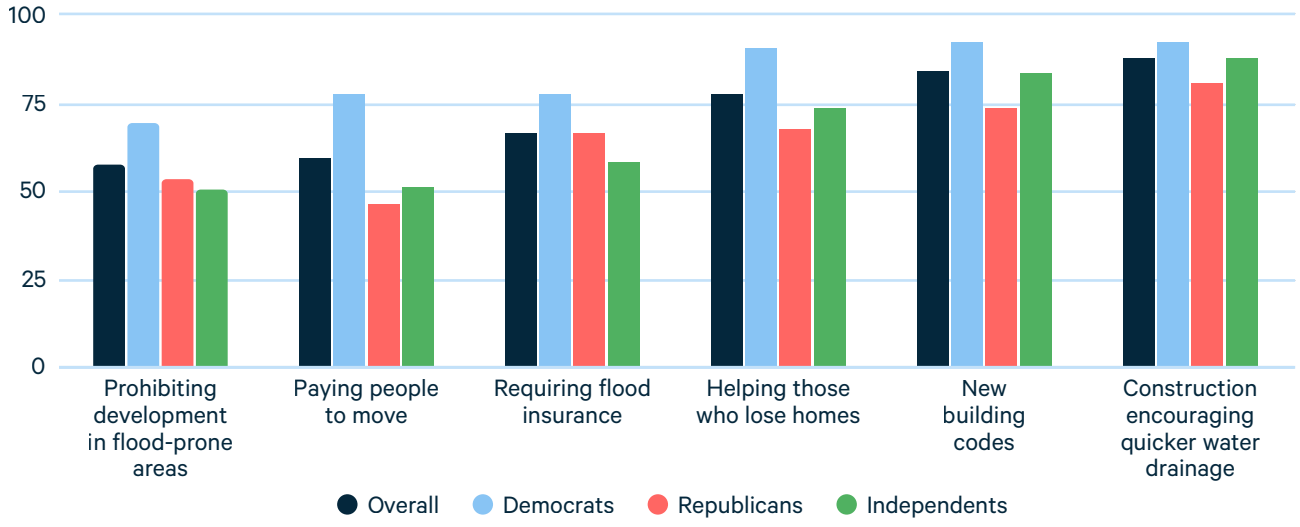


Figure 2.05. Percentage of Americans who favor flood adaptation policies, by political party



Who Should Be Responsible?

A majority of Americans say that both the federal government and governments in wildfire-prone states should work together to reduce fire damage. More than two thirds of Americans (71%) believe that the federal government should be involved at some level, whether it be through sole action or through collaboration with state governments. Only 2% of Americans want the federal government to take sole responsibility, while 28% of Americans think affected states should be primarily responsible for preventative action.

People have similar opinions about responsibility for managing risk from floods. 72% of Americans want both federal and state governments to work together to reduce flood damage. Three-quarters of Americans (75%) believe that the federal government should be involved while 95% believe that flood-prone states should take responsibility. Only 3% of Americans believe that the federal government should be the primary actor, while 23% believe that the affected state should be the primary actor.

Figure 2.06. Americans' opinions on who should take action to reduce wildfire damage

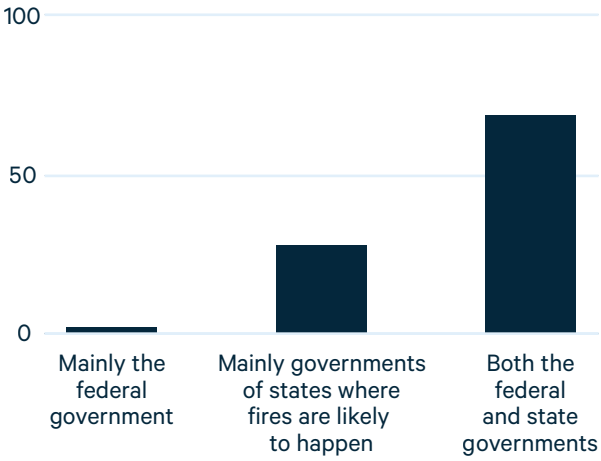
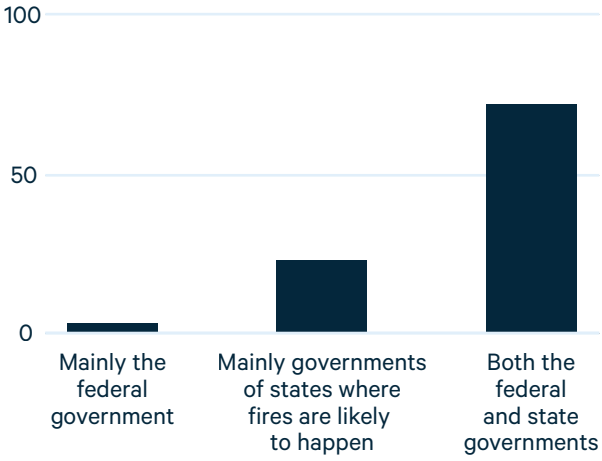
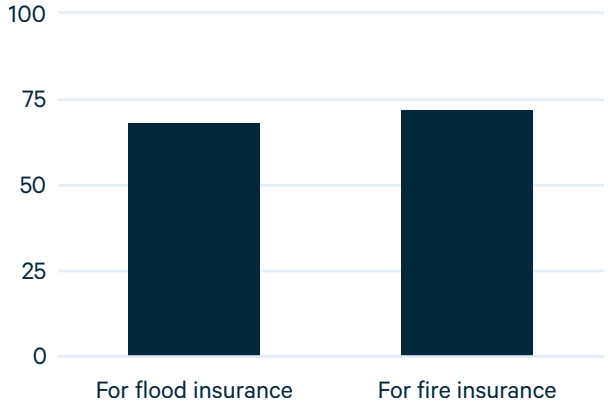


Figure 2.07. Americans' opinions on who should take action to reduce flood damage



Most people favor federal government involvement in reducing wildfire and flood damage.

Figure 2.08. Percentage of Americans who think the US government should pay for part of the cost of natural disaster insurance for poor families living in risky areas



More than two-thirds of Americans say that the federal government should subsidize the cost of natural disaster insurance for impoverished families. 72% of respondents said that the government should provide funding for fire insurance while 68% said the same for flood insurance.

EXPERT INSIGHT

The preference (68% in favor for floods, and 72% in favor for fires) to subsidize mandatory insurance for the poor is worthy of note, as it runs counter to the preference for those living in dangerous areas to pay their own way (Figures 2.09 and 2.10). Instead, it reflects an understanding and concern that poor communities often have fewer real estate choices and less ability to bear damage and insurance costs.

For the interested reader, RFF researchers have produced **a variety of studies** that provide deeper insight on the need to reform US flood and fire risks policies to make them both fairer and more cost-effective.

—**James Boyd**, RFF Senior Fellow and Thomas Klutznick Chair in Environmental Policy

Most Americans believe that the government should help low-income families pay for disaster insurance.

EXPERT INSIGHT

The survey's finding of support for disaster insurance subsidies for poor families suggests that fairness concerns prompted by these policies may be on respondents' minds. A recent RFF research project investigated how wildfire risk affects households across the income distribution, to better understand to what degree the burden of wildfires is borne by poorer households.

As wildfires and flood impacts worsen under climate change, it will be important to find support for effective disaster policies that decrease damages in fair ways. Adaptation to climate change will come with a cost, but it is important that these costs be spent on effective and equitable strategies.

—**Matthew Wibbenmeyer**, RFF Fellow

The majority of Americans believe that people living in dangerous areas should foot the bill for preventing damage from fires and floods. More Americans (69%) believe that people living in wildfire-prone areas should pay for preventative measures, while fewer (62%) support the same for those at risk of flooding.

By comparison, 27% of Americans believe that all taxpayers should contribute to fire prevention, while 34% believe the same for flood prevention. '

Figure 2.09. Americans' opinions on which taxpayers should pay for the cost of preventing damage from fires

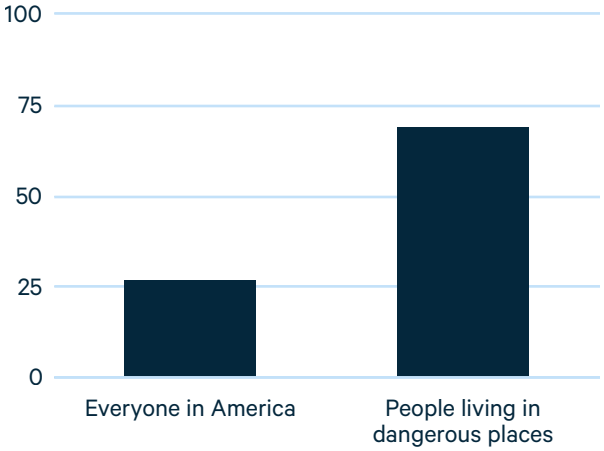
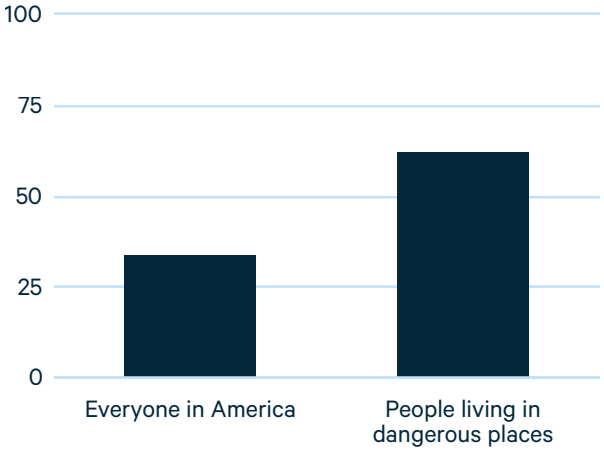


Figure 2.10. Americans' opinions on which taxpayers should pay for the cost of preventing damage from floods



EXPERT INSIGHT

The survey results show that most Americans agree that federal and state governments should play a role in helping to adapt to and mitigate costly consequences of climate change such as wildfire and floods. However, they appear to be of two minds about who should bear the costs of these policies.

On the one hand, when asked whether people living in dangerous areas or all Americans should pay higher taxes to cover the cost of preventing damage from wildfires or floods, respondents overwhelmingly indicated that costs should be borne by people living in dangerous areas. On the other hand, the policies that earned the most support were not those that require action on the part of households, such as requiring homeowners to purchase fire or flood insurance or prohibiting development in risky areas. Rather, policies such as new building codes that make homes more fire or flood-resistant and government actions that lower risks, such as tree-thinning and removal of brush and investments in drainage improvements, garnered the highest levels of support.

Actions by homeowners, including policies that incentivize or restrict where they live, reduce exposure to disaster events—i.e. lower the number of people and properties located in harm's way—and are the most effective way to reduce damages. But policies that affect where people live garnered the least support from survey respondents, especially paying people to move away from dangerous fire- or flood-prone areas. Only 41% of the survey respondents supported such a policy for fire and 52% for flood.

—**Margaret Walls**, RFF Senior Fellow

The majority of Americans believe that people living in dangerous areas should foot the bill for preventing damage from natural disasters.

Predicting Who Will Support Adaptation Policies

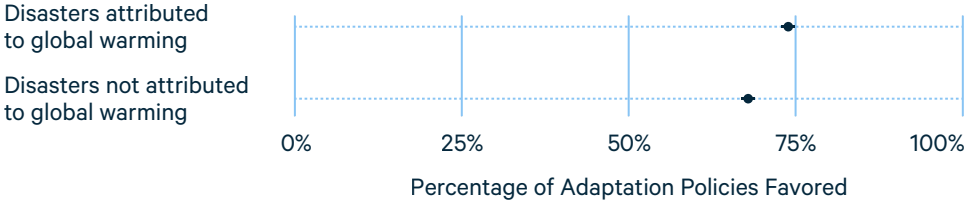
Next, we turn to the experiment exploring whether framing fires and floods as tied to climate change altered public support for government intervention. We also look at other variables to determine which factors influence adaptation policy support. To analyze these data, we estimated the parameters of an ordinary least squares regression equation predicting the percent of adaptation policies that each respondent favored.

Global Warming Attribution

As a preface to the questions posed to respondents about fires and floods, some respondents were told that climate change is responsible for increasing the frequency and intensity of fires and floods. Those asked about wildfires were told the following: "Scientists who study wildfires believe that in the coming years, those fires will happen more often and will be more damaging because global warming has been causing the land and the air to be drier for long periods of time, so they burn more easily." Those asked about floods were told the following: "Scientists who study flooding believe that in the coming years, those floods will happen more often and will be more damaging because global warming is causing storms to be bigger, to last longer, and to do more damage." Other respondents were not told that natural scientists believe that climate change was affecting these disasters.

Compared to other respondents, individuals who were told that more severe fires or floods are linked to climate change reported increased support for adaptation policies.

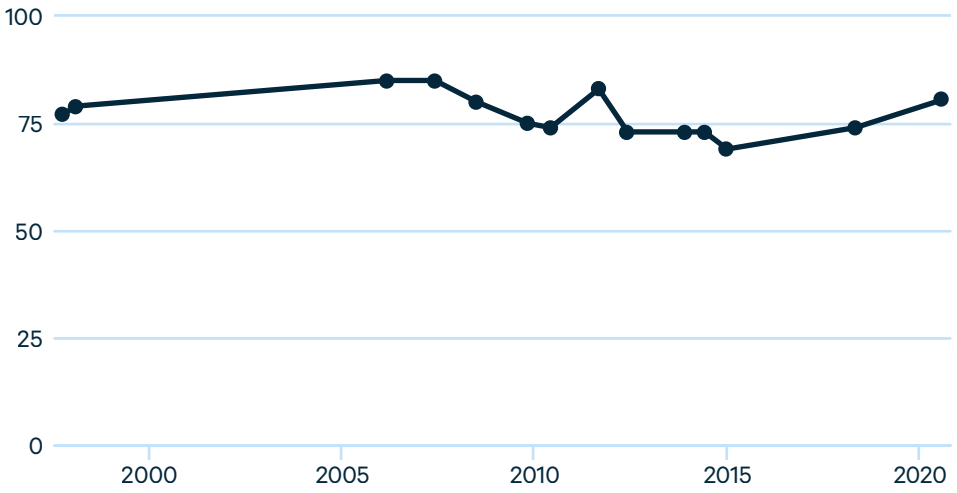
Figure 2.11. Support for adaptation policies among people who were and were not told that disasters could be attributed to global warming



> **People who were told that climate change is causing more severe fires or floods were more likely to support adaptation policies.**

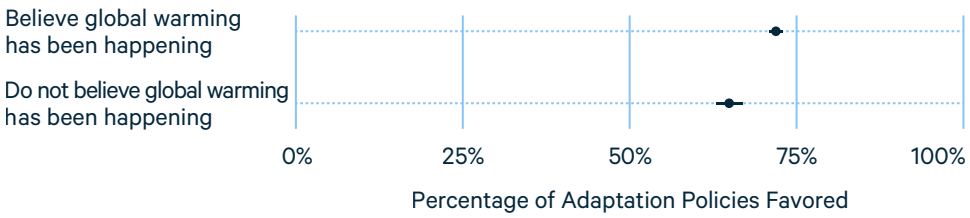
Global Warming Beliefs

Figure 2.12. Percentage of Americans who believe Earth's temperature "has probably been increasing" over past 100 years



Belief in the existence of climate change was also a predictor of support for adaptation policies. Respondents who believed that Earth has been warming over the past 100 years were more likely to support government adaptation efforts than were others, including among the individuals who were not told that global warming will make fires and floods more common and more devastating.

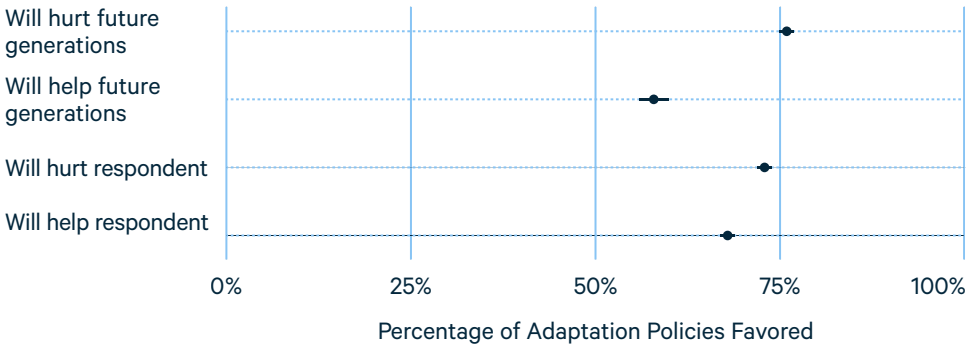
Figure 2.13. Support for adaptation policies among Americans who do and do not believe that Earth's temperature "has probably been increasing" over past 100 years



> **People who believe that global warming is happening are more likely to favor natural disaster adaptation policies.**

Sociotropic vs. Self-Interest-Focused Reasoning

Figure 2.14. Effect of self-interest and sociotropic beliefs on policy support, as shown by belief in who global warming will hurt or help



To explore the impact of pocketbook considerations vs. sociotropic considerations, we assessed respondents' beliefs about how much climate change will hurt or help them personally and will hurt or help future generations. We assessed the degree to which these perceptions influenced policy support.

As expected, sociotropic considerations shaped the public's support for government adaptation efforts. Perceived high threat to future generations posed by climate change strongly and positively predicted policy support.

In addition, the belief that the respondent will be hurt by climate change also increased support for government adaptation efforts, but less strongly.

The difference between the impact of sociotropic vs. self-interest perceptions of harm was statistically significant.

Interestingly, perceiving that global warming will help future generations reduced support for adaptation policies marginally, whereas perceiving that global warming will help the respondent had no impact on policy support.

> **Those who think climate change poses a high threat to future generations tend to be more supportive of adaptation policy measures.**

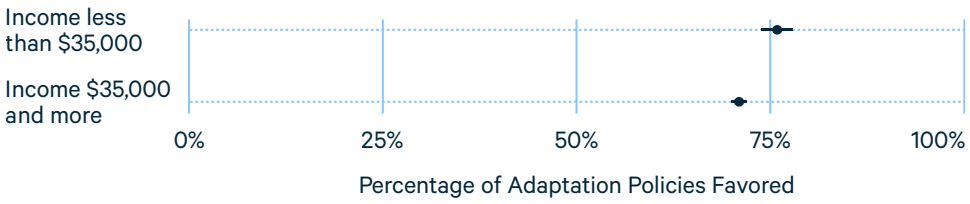
Believing that climate change will hurt future generations makes people far more likely to support adaptation policies.

In fact, it's the single biggest predictor of support tested by this survey.

Household Income

Contrary to the luxury goods hypothesis, lower-income people (with income less than $35,000) were more likely to support government adaptation policies than people with incomes of $35,000 and more.

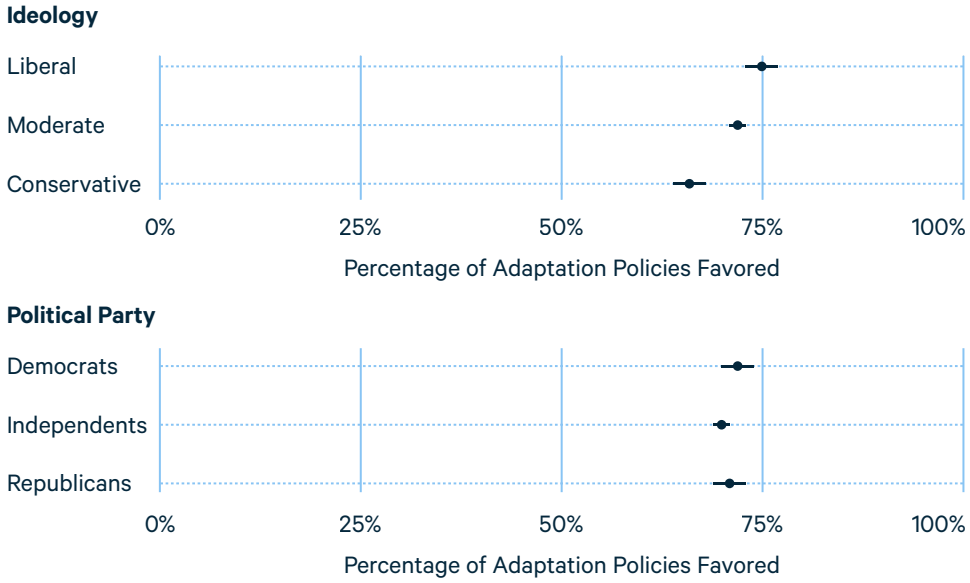
Figure 2.15. Effect of household income on support for adaptation policies



Political Ideology and Party

When it comes to political ideology, the survey shows that conservatives are more likely to oppose government efforts to adapt to the effects of wildfires and floods than were moderates and liberals. Interestingly, after accounting for ideology, political party identification had no impact.

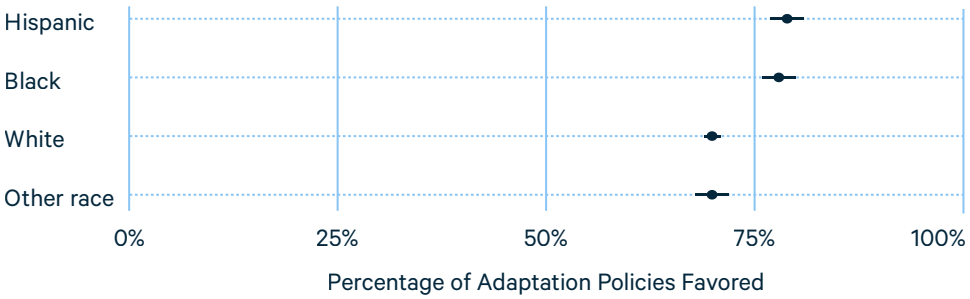
Figure 2.17. Effect of political ideology and party on support for adaptation policies



Race and Ethnicity

Support for adaptation policies on wildfires and floods was markedly higher among people of color than among others. Hispanic and Black Americans were more likely than non-Hispanic, white Americans to favor government adaptation policies.

Figure 2.16. Effect of race and ethnicity on support for adaptation policies



EXPERT INSIGHT

Natural disasters do not affect everyone equally. The concept of environmental racism outlines the idea that environmental burdens, whether it be pollution exposure or inadequate infrastructure, disproportionately affects communities of color. In many cases, these groups have been pushed into undesirable and vulnerable locations across the country.

In the United States, perhaps one of the most stark examples of inequality in the face of a natural disaster is Hurricane Katrina. When the storm hit New Orleans in late August 2005, communities of color made up nearly 80% of the population in flooded neighborhoods (Allen 2007). The extensive damage in predominantly Black neighborhoods led to economic, health, and social repercussions that were felt for years after the storm.

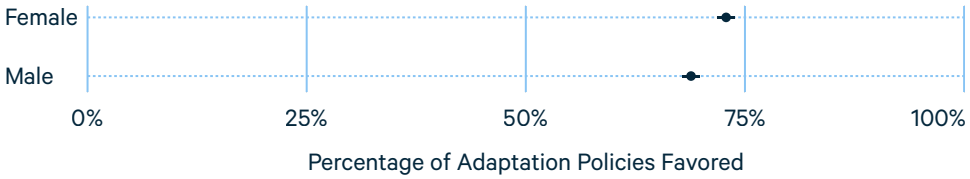
Federal disaster policy often exacerbates environmental justice problems. For example, FEMA's Individual Assistance Program, which provides aid to households after a disaster, **has been shown** to benefit wealthier households relatively more than poor households. Similar problems exist with government infrastructure investments, property buyouts, and other policies designed to lessen the impact of floods and other disasters—often the poor benefit less from these government programs.

—**Margaret Walls**, RFF Senior Fellow

Male/Female

Respondents who said they were female were more likely than respondents who said they were male to support adaptation efforts.*

Figure 2.18. Effect of male/female response on support for adaptation policies



**Respondents were asked, "Are you male or female?"*

Age, Education, and Region

No differences were observed across age groups, education groups, or regions of the country in support for adaptation policies.

The Federal Government's Role

When asked which level of government should enact adaptation policies for fires and floods, a majority of respondents said that the federal government should play a role: 71% thought that wildfire adaptation policies should be done in part at the federal level (with 2% saying mainly the federal government, and 69% saying both the federal government and the state government) (Figure 2.06). Three-quarters of Americans (75%) wanted flood adaptation policies to be done at least partly by the federal government (with 3% wanting mainly the federal government, and 72% wanting both the federal government and the state government) (Figure 2.07).

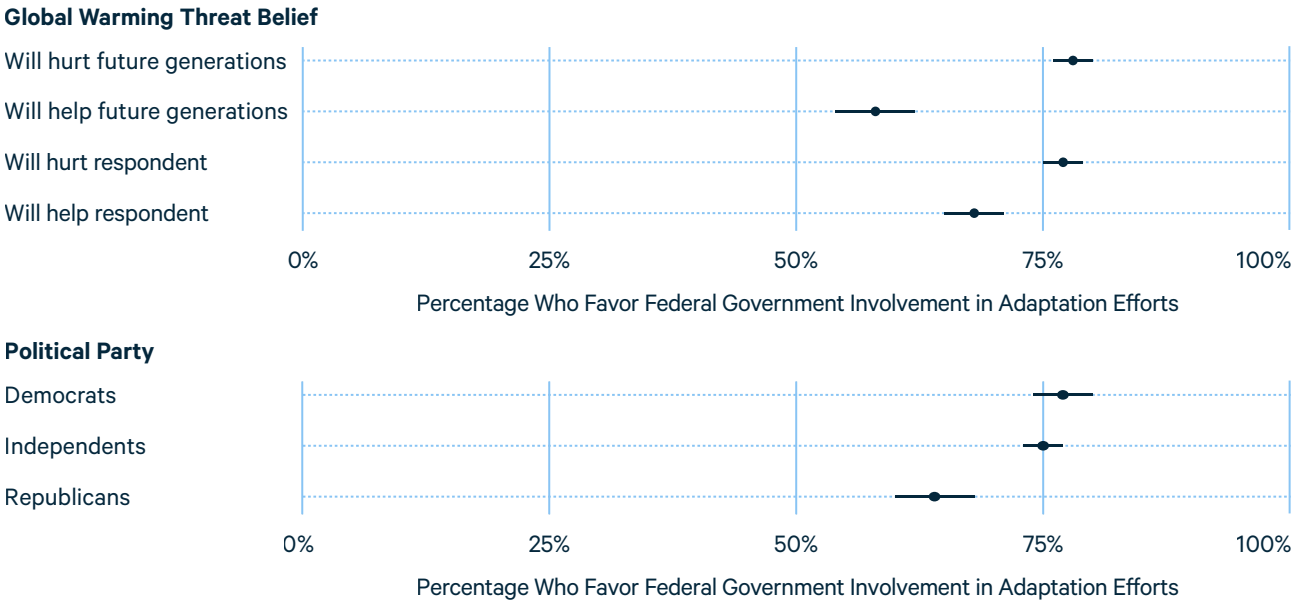
People who saw climate change as a threat were more likely to support federal government involvement in adaptation policies, especially if they saw climate change as a high threat to future generations. Republicans were less likely than Independents and Democrats to endorse the federal government's role in these policies Although there were some significant differences, Americans in different demographic groups were quite similar in their levels of support for how the federal government should enact those adaptation policies.

EXPERT INSIGHT

The federal government can play an important role in the aftermath of a natural disaster, which a majority of Americans acknowledge. Due to the federal government's size and budget, it has the ability to provide necessary resources, funding, and personnel to an overwhelmed state already reeling from the economic and social damages of a wildfire or flood. The federal government can also help prevent damages via, for example, infrastructure investments in levees and coastal barriers by the US Army Corps of Engineers, or via advance warning systems like the predictive models produced by NOAA's National Hurricane Center.

—**James Boyd**, RFF Senior Fellow and Thomas Klutznick Chair in Environmental Policy

Figure 2.19. Percentage who favor federal government involvement in adaptation efforts by subgroup

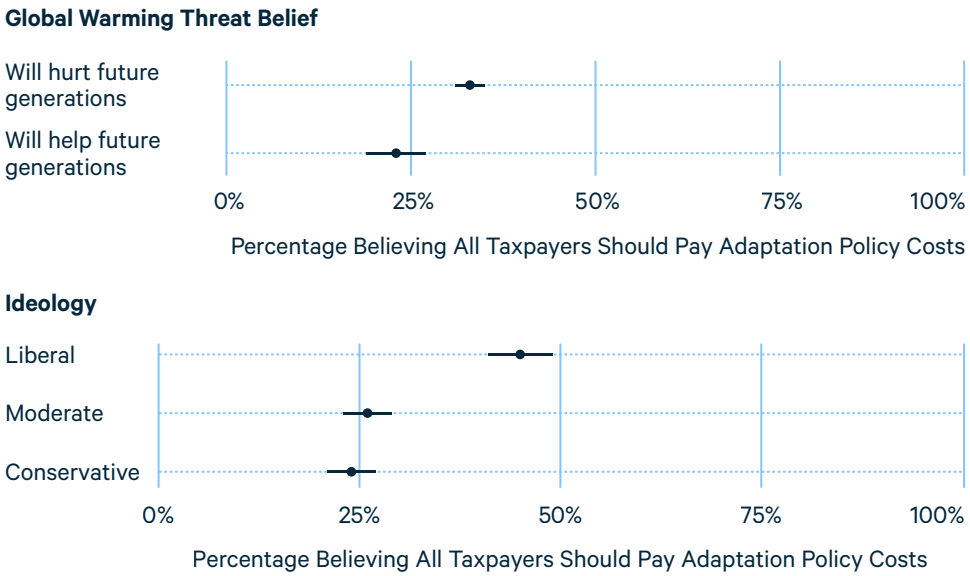


The Role of Taxpayers

When asked who should pay for the costs of fire and flood adaptation policies, a minority of respondents said that all taxpayers should foot a portion of these bills: 27% said the costs of fire adaptation policies should be borne by everyone in America, and 69% said that only the people living in fire-prone areas should bear the costs (Figure 2.09); 34% said the costs of floods adaptations policies should be paid for by everyone in America, and 62% said that people living in fire-prone areas should pay for the costs (Figure 2.10).

People who saw global warming as a threat to future generations were more likely to support all Americans being responsible to pay for adaptation policies. Liberals were more likely than moderates and conservatives to say that all Americans should pay for implementing these policies. Similar patterns appeared when examining public funding responsibility separately for fire policies and flood policies. Notably, respondents living in flood-prone areas did not prefer payment by the general public any more than people who do not live in such areas.

Figure 2.20. Percentage Favoring All Taxpayers to Pay for the Costs of Adaptation Policies by Subgroup



Conclusion

This analysis yielded six main findings:

First, majorities, and sometimes large majorities of Americans, favor government efforts to protect people from future wildfire and flood damage through prevention and adaptation policies. This constitutes a strong signal to lawmakers that the public would be supportive of legislation passed along those lines.

Second, the survey's framing experiment showed that informing respondents about the links of fires and floods to climate change increased public support for adaptation efforts by government. Respondents who believed in the existence of climate change were also more likely to support adaptation policies. Thus, public education about the existence of climate change and the role that it plays in intensifying wildfires and floods is likely to yield more support for adaptation efforts.

Third, the responses provide evidence that reinforces the broad conclusion that Americans are more driven by sociotropic reasoning than by the desire to protect their own pocketbooks when it comes to public policy. Although self-interest was a driver of public support for government adaptation policies, sociotropic beliefs were more consequential.

Fourth, people of color are no less supportive of government efforts focused on addressing the effects of wildfires and floods than white, non-Hispanic Americans. In fact, Black and Hispanic Americans were more supportive of such efforts than others. This appears to conflict with Weber's "finite pool of worry" theory, which might predict lower support for climate-related actions and a preference for government to focus on other social issues faced by marginalized communities. But it may be because people in marginalized racial and ethnic groups disproportionately live in areas that are and will be more affected by climate change than others. Climate change may be a threatening issue to many of these groups—not a "luxury" concern. Support for adaptation policies appears to be greater among groups who may feel especially vulnerable to the impact of disasters.

Fifth, support for adaptation policies is stronger among lower-income individuals. Maslow suggests that only once all other needs are met can someone focus on "luxuries" like the greater good of society. The results of this survey suggest otherwise: lower income is a predictive marker for more support for government efforts to protect people from destructive wildfires and floods.

Lastly, Americans overwhelmingly favor the federal government to be involved in enacting fire and flood adaptation policies. However, most Americans prefer the people who live in fire and flood-prone areas to shoulder the costs of these policies.

Section 3

Policies and Politics

Contents

Introduction

In the "Overall Trends" section of this report, we showed that huge majorities of Americans believe that Earth has been warming, that the warming has been caused by human activity, that warming poses a significant threat to the nation and the world—especially to future generations—and that governments, businesses, and individuals should be taking steps to address it.

In this section, we turn to specific government opportunities to reduce future greenhouse gas emissions, often referred to as climate change mitigation. Policies to accomplish this goal fall into multiple categories, including:

1. **Consumer incentives** that reward people for taking steps that reduce their use of fossil fuels and, by extension, reduce their carbon footprint
2. **Carbon pricing policies** that require emitters to pay for their carbon emissions, such as a **carbon tax** (which would require carbon emitters to pay a tax for each ton of carbon they emit), or a **cap-and-trade program** (which would require businesses to have a permit for each ton of carbon they emit)
3. **Regulations** that require manufacturers to increase energy efficiency of their products, including automobiles, appliances, and buildings
4. **Tax incentives** that encourage manufacturers to increase the energy efficiency of their products

The 2020 survey asked Americans about their opinions on a wide array of such policies, which allows us to not only assess current attitudes, but also to track changes in those attitudes over the past two decades through comparisons with responses to comparable questions asked in earlier national surveys. As we outlined above, one might imagine that the current public health, economic, and social crises facing the nation may have caused Americans to be less willing to support government climate mitigation efforts in favor of addressing more immediate problems. As we shall see, that did not happen.

We also took this opportunity to explore whether people evaluate government policies based on what they believe is best for the nation as a whole (called "sociotropic" reasoning) or whether each individual evaluates policies based on their own personal financial interests (called "pocketbook" reasoning). As we explored in previous sections of the report, a great deal of economic theory has portrayed people as rational actors pursuing their own personal material self-interests (Kiewiet 1983; Kinder and Kiewiet 1981; Lewis-Beck and Paldam 2000). Rational choice theory suggests that people will support a public policy if they perceive that it will yield greater economic benefits to them than the costs incurred (Downs 1957). However, research has shown that a person's material self-interests have little impact when forming opinions about government policies. Instead, people form their opinions based much more on "sociotropic" reasoning (Lau and Heldman 2009; Sears and Funk 1990; Sears et al. 1980).

To test these competing hypotheses, we explore the extent to which support for mitigation policies is driven by beliefs that unchecked global warming will either hurt (or help) the respondent personally or hurt (or help) society as a whole, and whether efforts to mitigate global warming will have unintentional side-effects that will either hurt (or help) the respondent economically or hurt (or help) society economically.

Methodology

The Climate Insights 2020 national public opinion survey involved telephone interviews with a representative sample of 999 adults living in the United States. The Climate Insights 2020 national public opinion survey involved telephone interviews with a representative sample of 999 adults living in the United States. We conducted statistical analyses to explore these responses further. For more information on the survey methodology, including details on sample design, field procedures, data verification, weighting, and questions used to measure demographics, please see the **Policies and Politics Survey Methodology Report** and the **Climate Insights 2020: Policies and Politics Technical Report**. Question wordings for each figure can also be found in Appendix A of this report.

Greenhouse Gas Emissions Reduction Policies

Extremely Popular Policies

Shifting Electricity Generation to Renewable Power

A number of policies are extremely popular with Americans in 2020 and have been consistently popular across past surveys as well. For example, huge numbers of Americans favor government effort to shift electricity generation away from fossil fuels and toward renewable energy sources.

In 2020, 83% of Americans believe that the government should offer tax breaks to utilities in exchange for making more electricity from water, wind, and solar power. This percentage has been steady since 2006.

Slight changes to the question wording yielded similar results: 81% of Americans in 2020 favor either requiring or offering tax breaks to utilities to reduce greenhouse gas emissions from power plants. This number is about the same as it has been since 2009. Before that, it was slightly higher: 86% and 88% in 2006 and 2007, respectively.

> **The vast majority of Americans favor government effort to shift power generation away from fossil fuels and toward renewable energy sources.**

Figure 3.01. Percentage of Americans who think the US government should give utilities tax breaks to produce electricity from water, wind, and solar power

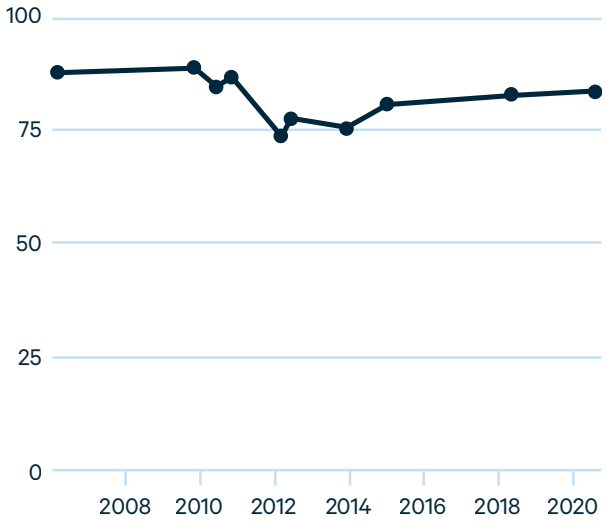
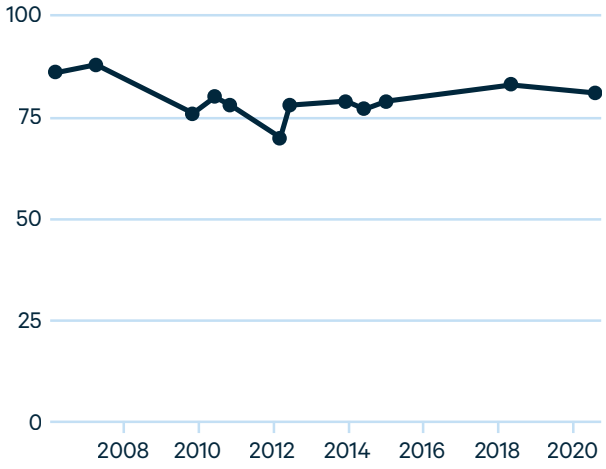


Figure 3.02. Percentage of Americans who think the US government should either require or give tax breaks to lower greenhouse gas emissions from power plants




83% of Americans believe the government should offer tax breaks to utilities to produce more electricity from water, wind, and solar power.

Increasing Energy Efficiency of Products

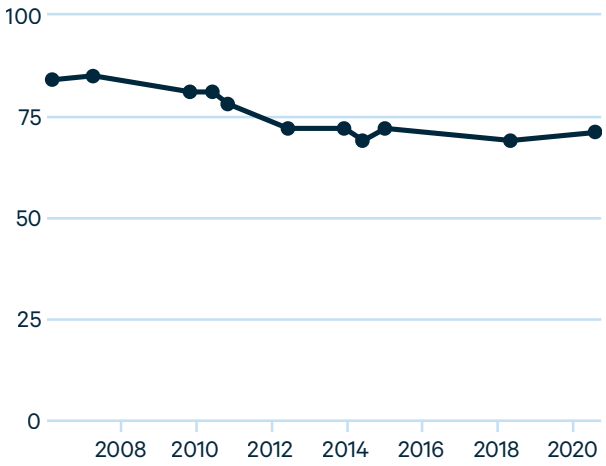
Energy efficiency improvements are often considered to be easy to attain, but they do require consumers to spend more when buying products.

About three-quarters of Americans favor government efforts through tax breaks or mandates to improve the energy efficiency of various consumer products.

Specifically, 71% of Americans favor increasing the fuel efficiency of automobiles, 71% favor increasing the energy efficiency of appliances, and 75% favor increasing the energy efficiency of new buildings.

Public support for all of these policies has been steady since 2012, peaking in 2006 and 2007, and dipping to its lowest levels in March 2012, but not for long.

Figure 3.03. Percentage of Americans who think the US government should either require or give tax breaks to construct more energy-efficient cars



Most Americans think the government should encourage or require better energy efficiency.

Figure 3.04. Percentage of Americans who think the US government should either require or give tax breaks to develop more energy-efficient appliances

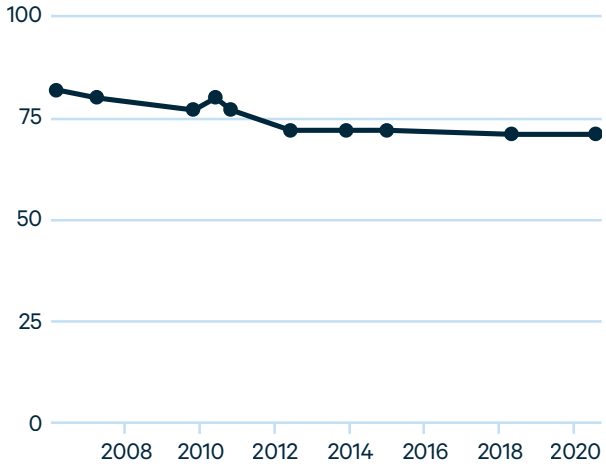
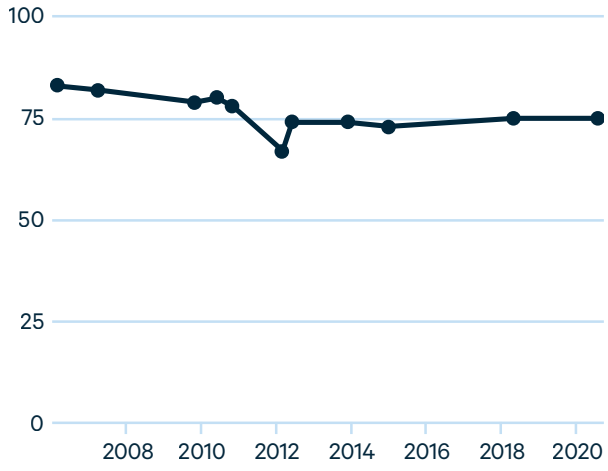


Figure 3.05. Percentage of Americans who think the US government should either require or give tax breaks to have more energy-efficient buildings



Moderately Popular Policies

Carbon pricing and carbon sequestration policies are a bit less popular than energy efficiency and renewable energy policies, but are still favored by majorities of Americans.

Carbon Pricing Policies

Carbon pricing policies hold businesses financially responsible for their greenhouse gas emissions. These policies generally fall into two categories: carbon taxes (which charge businesses for each ton of greenhouse gases they emit) and cap-and-trade programs (which limit businesses' total emissions by requiring them to have a permit for each ton they emit, which may also be traded to other businesses). These policies can generate revenue for the government, which can be used in **a number of ways**, including replacing other taxes, spending on government programs, and returning the money to consumers as a payment called a dividend.

EXPERT INSIGHT

In the electricity sector, a **clean energy standard** (CES) is a market-based policy alternative to carbon pricing that requires that a certain percentage of electricity generation comes from "clean" resources, which are defined as low- or zero-carbon-emitting resources. The percentage requirement typically increases over time to encourage greater investment in cleaner generators and thus lead to higher emissions reductions. RFF **analysis** of proposed legislation for a national clean energy standard indicates that the impacts on electricity prices to consumers will be small (Picciano et al. 2019).

—**Kathryne Cleary**, RFF Research Associate

EXPERT INSIGHT

As outlined in the first section of this report, a majority of survey respondents over the past 23 years have consistently agreed with the statement that the US government should do more to deal with global warming. Economists typically agree that the most economically efficient way to fight global warming is with a carbon price, which places a price on each ton of carbon dioxide emitted.

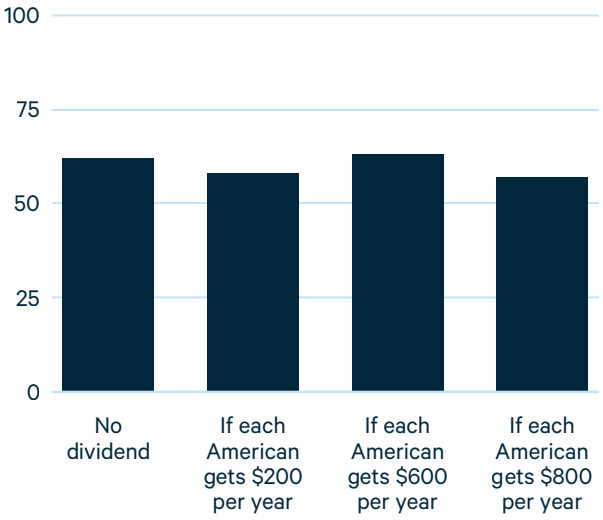
Historically, however, these policies have not been politically attractive, and, with a few exceptions, carbon pricing proposals at both the federal and state levels have not been adopted to date. Alternative policy options do exist for the electricity, transportation, and buildings sectors and can reduce emissions without pricing carbon directly, albeit less efficiently.

—**Karen Palmer**, RFF Senior Fellow and Director of RFF's Future of Power Initiative

Carbon Taxes

When asked whether companies should be charged a tax for every ton of greenhouse gases they emit 62% of respondents were in favor. To explore whether returning the tax revenue to respondents in the form of a dividend, we randomly assigned groups of respondents to be told that each American would receive $200 annually, $600 annually, or $800 annually. Providing this information did not significantly increase support for a carbon tax: 58% of Americans favored a carbon tax with a $200 annual per-person dividend, 63% with a $600 dividend, and 57% with an $800 dividend. None of these are significantly different from the 62% in favor of carbon taxes with an unspecified dividend, meaning that the value of a dividend had no impact on opinions.

Figure 3.06. Percentage of Americans who think the government should charge companies a tax for every ton of greenhouse gases they emit (2020)



Although economists generally assert that a carbon tax incentivizes companies to reduce emissions, it does not guarantee that such emissions reductions will happen. Supporting a carbon tax as a way to reduce future global warming requires Americans to accept the assertion that economic incentives will be sufficiently effective to drive down emissions—and perhaps not everyone does.

EXPERT INSIGHT

Two categories of adverse economic impacts from carbon taxation have been widely discussed: 1) the impacts from higher energy prices on consumers in different income groups/geographical areas of the country; and 2) the impacts on energy-intensive, trade- exposed industries in terms of lost production and jobs. Although recent polling suggests that Americans are not overly concerned about these adverse economic impacts, and research by myself and colleagues has shown that the impacts can be substantially reduced or eliminated for most income and industry groups, the issue remains alive in political circles. Future polling should try to better understand the cause of these differences. Is the general public truly unconcerned about adverse impacts or is their response based on a lack of information? Is there a threshold where concern about adverse impacts might influence public perception?

—**Richard Morgenstern**, RFF Senior Fellow

EXPERT INSIGHT

Under a carbon price, one can generally be certain about either the amount of emissions reductions (under cap and trade) or the cost of emissions reductions (under a carbon tax). My **research** shows that a tax adjustment mechanism may make it possible to gain certainty about the emissions results of a carbon tax. Future polling may be able to tease out whether Americans think economic incentives can reduce emissions and if their support for a tax would increase if it could guarantee reductions through a tax adjustment mechanism.

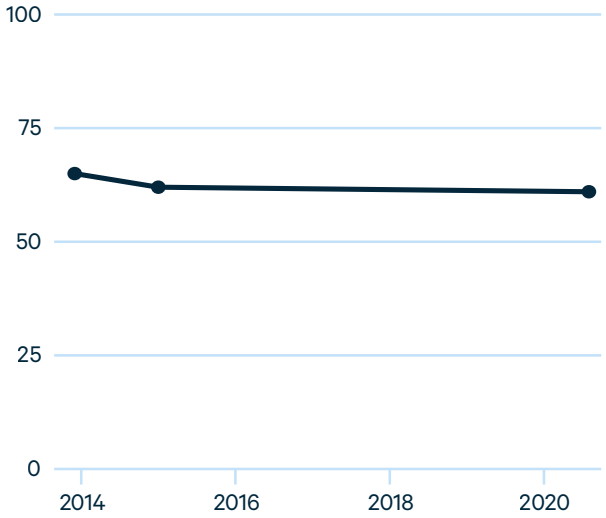
—**Marc Hafstead**, RFF Fellow

Cap and Trade

The logic that Americans would support a carbon tax more if assured that it would result in emissions reductions is challenged by the fact that cap-and-trade and cap-and-dividend policies are also only moderately popular with Americans. Cap and trade involves imposing a cap on greenhouse gas emissions by businesses, thus assuring emissions reduction. The cap is imposed by government-issued permits to limit emissions, and the government gives, sells, or auctions the permits to companies, which can generate revenue. Cap and dividend returns this revenue to consumers, giving each household a rebate.

In 2020, 61% of Americans favored a cap-and-dividend policy, which is slightly lower than in 2013 (65%) and about the same as in 2015 (62%).

Figure 3.07. Percentage of Americans who favored a cap-and-dividend policy



EXPERT INSIGHT

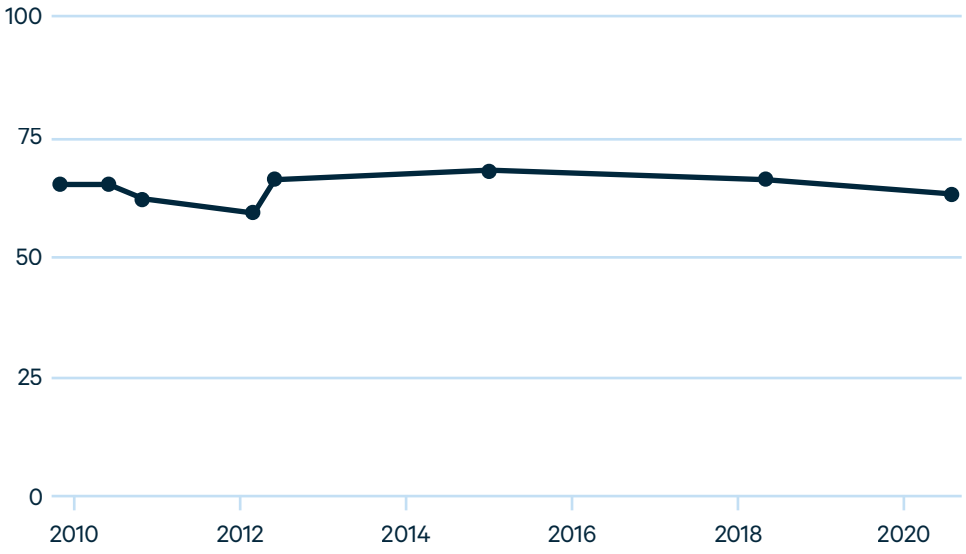
I was happy to see that this survey reports that 64% of Americans believe the US government should do more to address global warming, even during the COVID-19 pandemic. But what types of policies would the public support? 60% would support a carbon tax and dividend approach (though interestingly support falls if respondents are told how much money they would receive back) and 58% would support a cap-and-trade program that used revenues to cut income taxes. Both policies are similar and would raise the prices of electricity and gasoline for consumers, yet only 24% and 42% of respondents favored increasing taxes on electricity and gasoline, respectively, to cause people to use less. This signals to me that more public education on how carbon pricing works and how it can bring down emissions, such as our **carbon pricing explainer series**, is necessary.

—**Marc Hafstead**, RFF Fellow

Carbon Sequestration

In 2020, 63% of Americans favor reducing emissions by sequestering (i.e., capturing and storing) carbon released by burning coal. This level of support has been steady over the past 11 years.

Figure 3.08. Percentage of Americans who favor the US government giving tax breaks to companies to reduce air pollution from burning coal

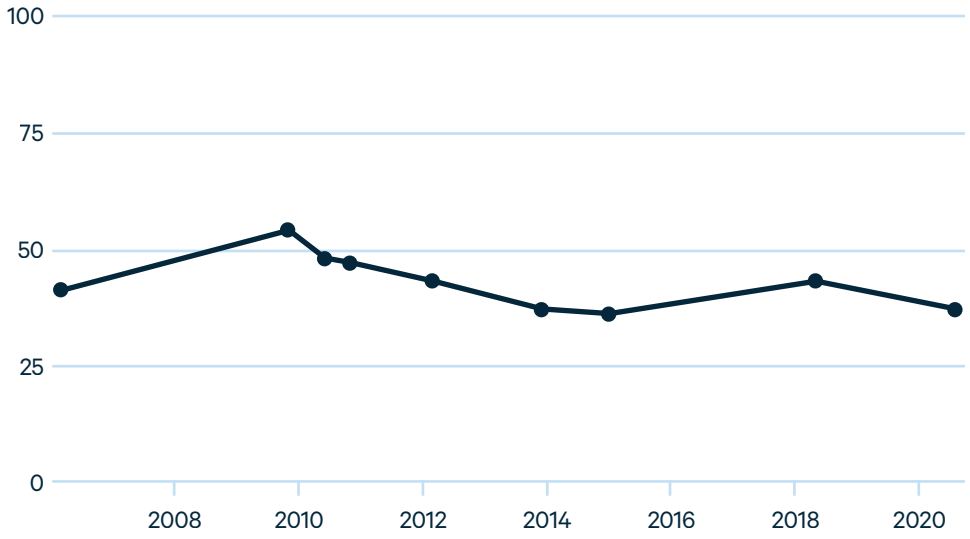


Least Popular Policies

Nuclear Power Tax Breaks

Although nuclear power plants do not emit greenhouse gases, tax breaks for the construction of new nuclear power plants is among the least popular policies in 2020. Only 37% of Americans favor this policy—a near record low. This is down slightly from 41% in early 2006 and is significantly lower than the peak support of 54% in 2009.

Figure 3.09. Percentage of Americans who favor the US government giving tax breaks to companies to build nuclear power plants



EXPERT INSIGHT

Tax credits for new nuclear power plants leave many Americans feeling conflicted. On the one hand, people are concerned about radiation releases and sky-high construction costs. On the other hand, nuclear power is a low-emissions way to produce a steady supply of power.

The drop in support for tax credits for new nuclear plants after 2010 may be explained by the disaster at the Fukushima Daiichi nuclear power plant in March 2011. More recently, support among those surveyed went back up somewhat from 2015 to 2018 then back down again by this year. Some possible reasons for the decline since 2018 are that the one US nuclear plant under construction has continued to get more expensive, other low-emitting generation technologies have continued to get cheaper, and electricity demand is down.

—**Daniel Shawhan**, RFF Fellow

Consumer Incentives

The least popular policies impose new taxes on consumers to incentivize them to consume less fossil fuels. Only a minority of Americans approved of increased taxes on retail gasoline and electricity purchases for this purpose, with no stated use of the generated revenue: 28% approved increasing taxes on electricity, and 43% approved increasing taxes on gasoline. Both approval numbers are at an all-time high for the history of this survey, but neither policy has received majority support.

Figure 3.10. Percentage of Americans who believe that the US government should increase taxes on electricity to cause people to use less

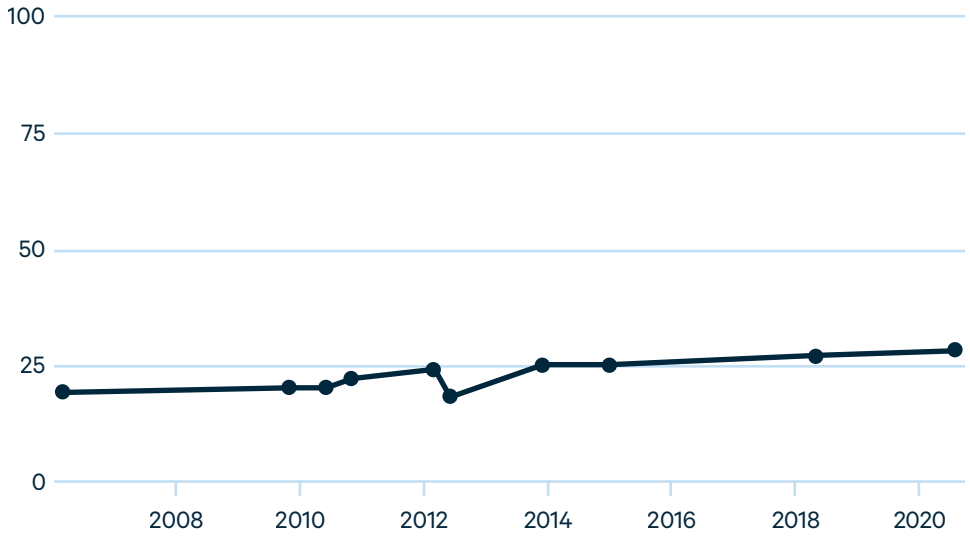
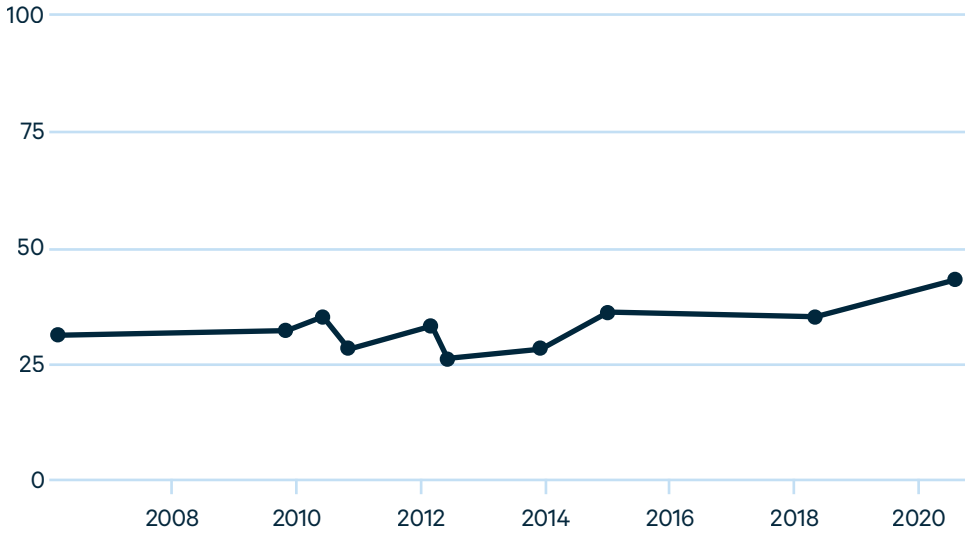


Figure 3.11. Percentage of Americans who believe that the US government should increase taxes on gasoline to cause people to use less



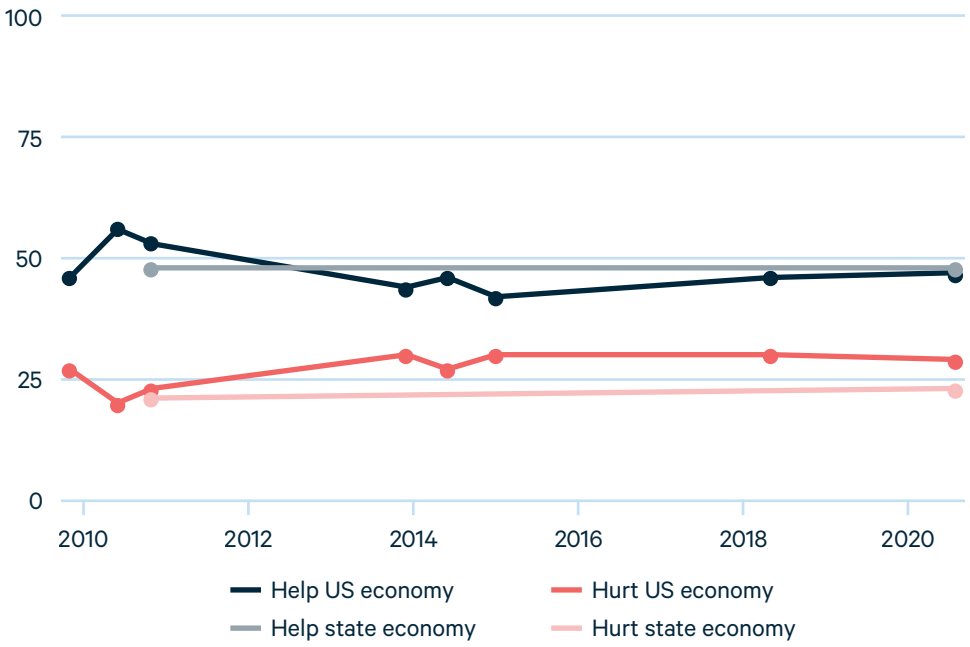

63% of Americans favor
reducing emissions by
sequestering carbon
released by burning coal.

Economic Effects of Mitigation Policies

Implementing many policies to reduce greenhouse gas emissions will cost consumers and companies in the short term, and implementing such policies may increase the cost of American-made goods and services relative to the costs of those goods and services produced elsewhere. This has led some observers to urge caution about implementing greenhouse gas emissions policies, because they may result in undesirable economic side-effects.

However, this argument does not appear to have taken hold with majorities of Americans, even at times over the past 20 years when the American economy was weaker. For example, only 29% of Americans in 2020 believe that taking action to address global warming will hurt the US economy, a number that's just about the same as it was in 2009 (27%). In 2010, only about one in five Americans (21%) believed that these efforts will hurt their state economy, which remains similar in 2020 at 23%. Conversely, belief about how climate action will affect the economy has remained unshaken over the last decade. In fact, 47% of Americans believe efforts to address global warming will actually help the national economy—about the same as 11 years ago (46%).

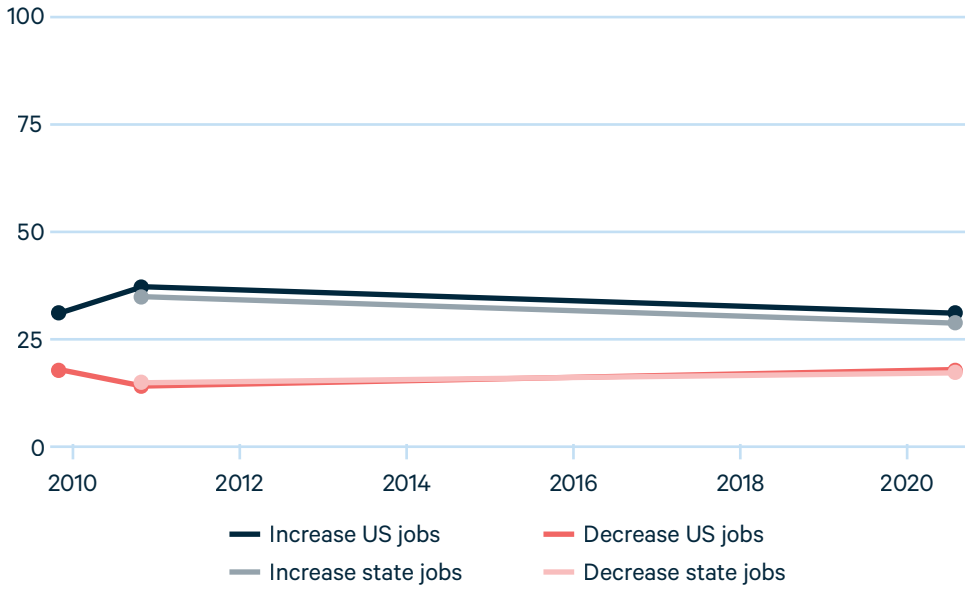
Figure 3.12. Percentage of Americans who believe that the US government taking action on global warming will help or hurt the US economy or the respondent's state's economy



A similar picture emerged regarding impressions of how climate change action would affect job availability. Only 23% of Americans believe that efforts to reduce emissions will reduce the number of jobs in the nation—the same as in 2009 during the height of the global recession. And in both 2009 and 2020, 40% of Americans believe that climate change action would increase the number of jobs in the country.

A minority of Americans believe that climate change action would reduce the amount of jobs in their state—19% believed this to be the case in 2010, and 22% said so in 2020. On the contrary, 37% of Americans in 2020 believe that climate action would increase the number of jobs in their state, down from 45% of Americans in 2010.

Figure 3.13. Percentage of Americans who believe that the government taking action on global warming will decrease the number of jobs in the country or the respondent's state



EXPERT INSIGHT

When climate policies are proposed, proponents often cite the potential for new green jobs while opponents attack the policies as job killers. The polling results suggest that neither of these arguments truly resonate with the public, as only 40% of respondents believe government action on global warming would increase jobs and 23% believe action would decrease jobs. These views are consistent **with my research** that suggests that overall employment levels are not likely to be significantly impacted by environmental policies as new jobs in some industries offset job losses in other industries (Hafstead 2019).

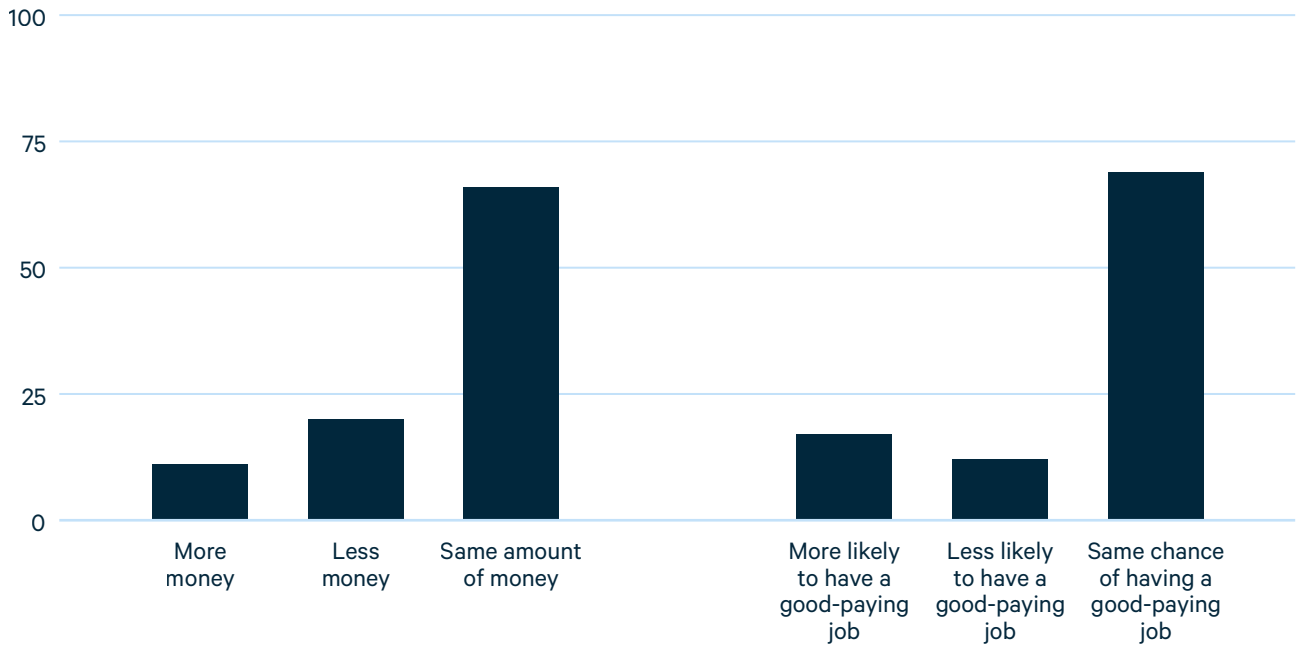
—**Marc Hafstead**, RFF Fellow

Most Americans do not think climate action will affect the amount of money they have or their job prospects.

In 2020, we asked respondents for the first time about the likely impact of mitigation efforts on their own personal economic situations. Large majorities of Americans believe that there will be no such impact, and that they will have the same amount of money regardless of mitigation efforts. 20% believe their wealth will increase, and only 11% believe that climate change mitigation will reduce their wealth.

When it comes to the impact of mitigation efforts on the respondent's own ability to get a good-paying job, a large majority believe that mitigation efforts will have no impact on them in this regard. On the other hand, 17% believe that mitigation efforts will make them more likely to get a good-paying job, whereas 12% believe it will reduce their ability to secure a good-paying job.

Figure 3.14. Percentage of Americans who believe that the US government taking action on global warming will affect the amount of money they have or their chances of having a good-paying job

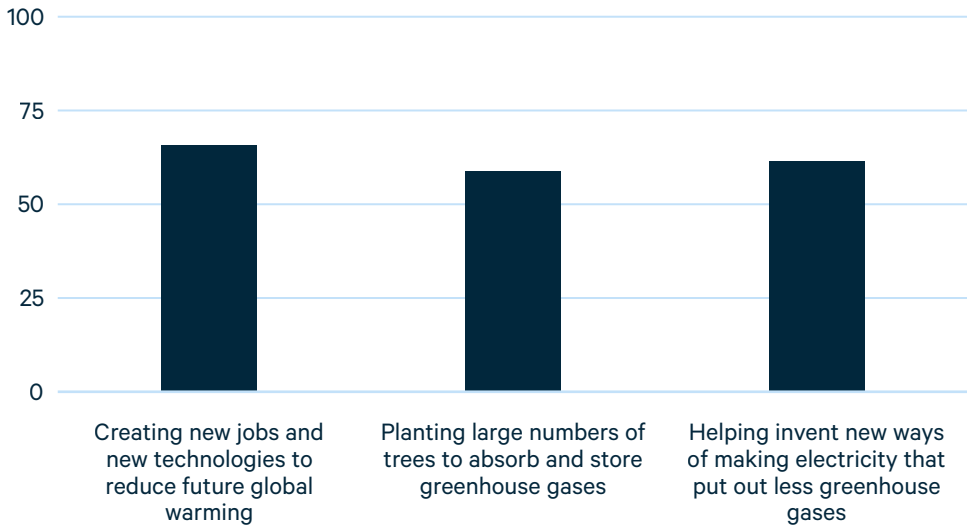


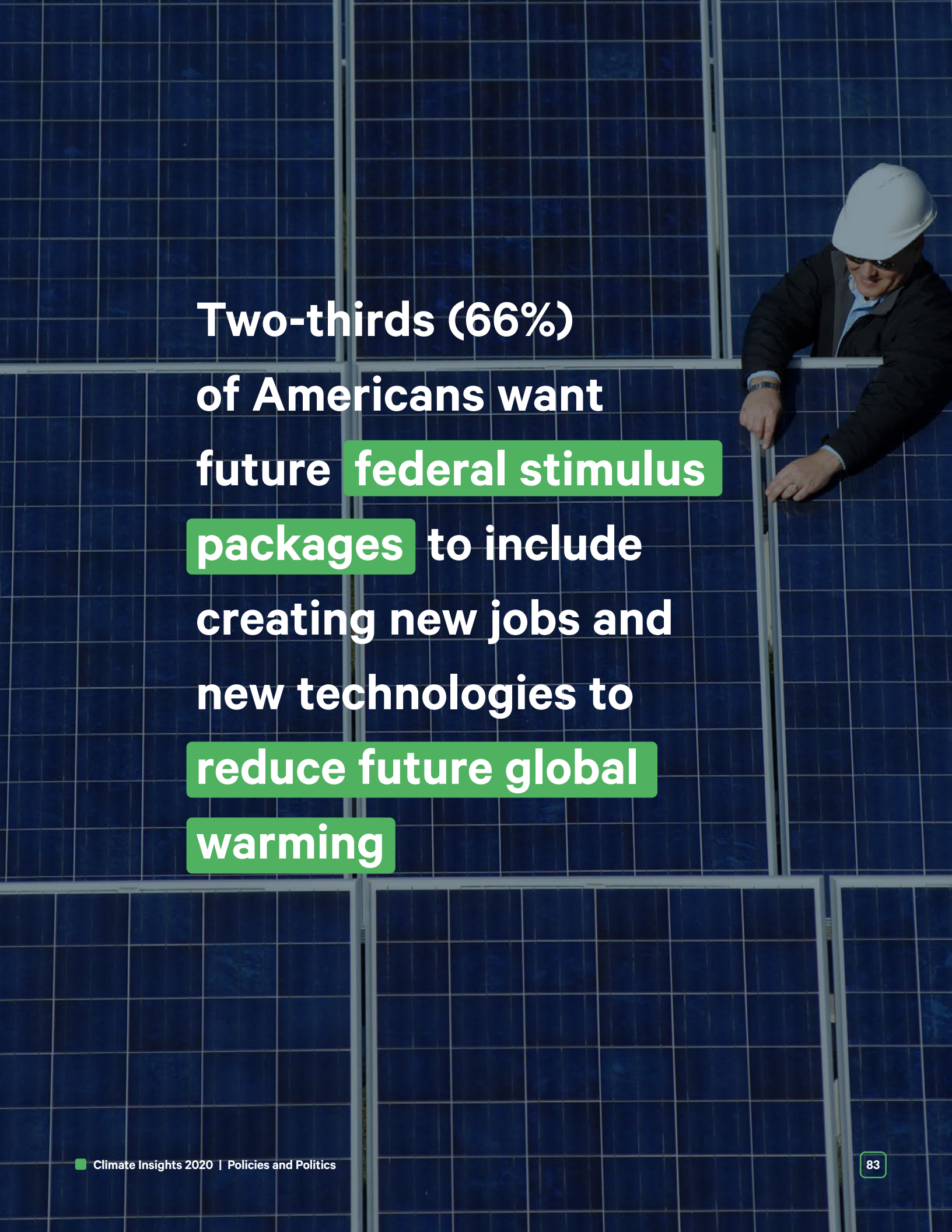
2020 Federal Economic Stimulus Packages

Since March 2020, the federal government has spent trillions of dollars to help American businesses and workers get through the economic crisis brought on by the coronavirus pandemic. In the past, the government has sometimes spent stimulus funds to strategically create jobs that serve the public good, such as infrastructure construction and clean energy deployment (White House 2016). In the coronavirus-related economic crisis, green stimulus investments could be strategically made to reduce future global warming. In this survey, we asked a series of questions to explore whether Americans support such spending of federal dollars.

Two-thirds (66%) of Americans want future federal stimulus packages to include creating new jobs and new technologies to reduce future global warming.

Figure 3.15. Percentage of Americans who believe the federal stimulus packages should include creating new jobs and new technologies to reduce future global warming (2020)





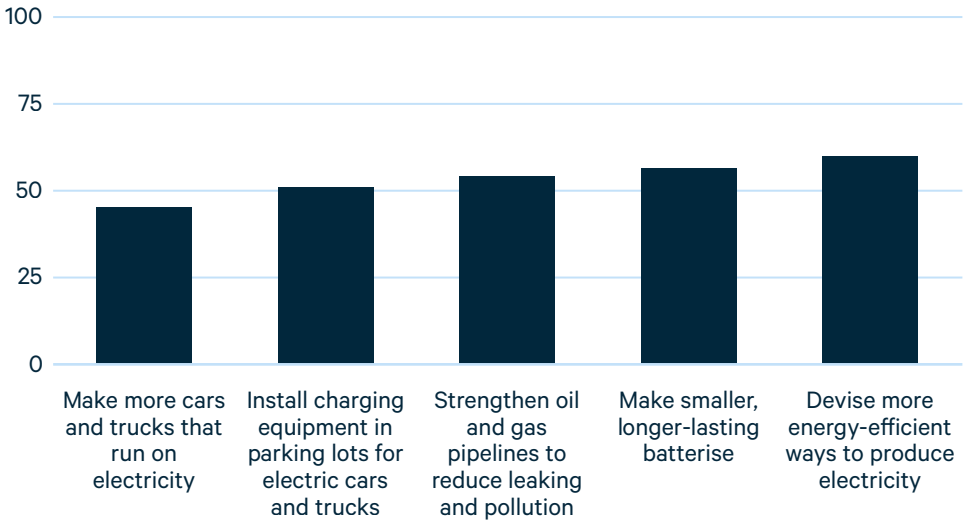
Two-thirds (66%) of Americans want future federal stimulus packages to include creating new jobs and new technologies to reduce future global warming

When these people were asked what specific goals should be advanced by such strategic investments, the most popular was investing in new inventions to make electricity that put out less greenhouse gases, endorsed by 61% of all surveyed Americans.

Planting large numbers of trees to absorb and store greenhouse gases was endorsed by 59% of all surveyed Americans.

Majorities of Americans favor helping companies make smaller, longer-lasting batteries (56%), strengthen oil and gas pipelines to reduce leaking and pollution (54%), and installing charging equipment in parking lots to be used by electric cars and trucks (51%). Just under half of surveyed Americans favor making cars and trucks that run entirely on electricity (45%).

Figure 3.16. Percentage of Americans who think the government should spend money during the economic crisis to help companies act in various ways to support the economy and environment (2020)

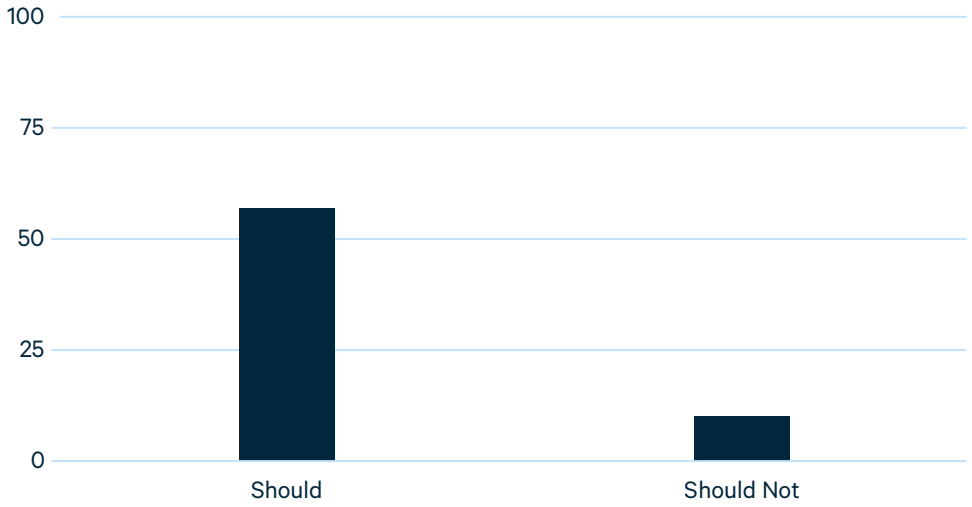


EXPERT INSIGHT

Some "green stimulus" options have the potential to not only reduce greenhouse gas emissions, but also employ fossil energy workers who are struggling right now. This includes options to speed the deployment of carbon capture, use, and sequestration; along with geothermal energy. Other measures, such as using federal funds to plug orphaned and abandoned oil and gas wells, could also provide environmental benefits while employing displaced fossil energy workers.

—**Daniel Raimi**, RFF Senior Research Associate

Figure 3.17. Percentage of Americans who think the government should spend money helping people install solar panels on the roofs of houses or apartments (August 2020)



In sum, we see majority support for various strategic spending features of stimulus packages to reduce future global warming, but none of these majorities are large.

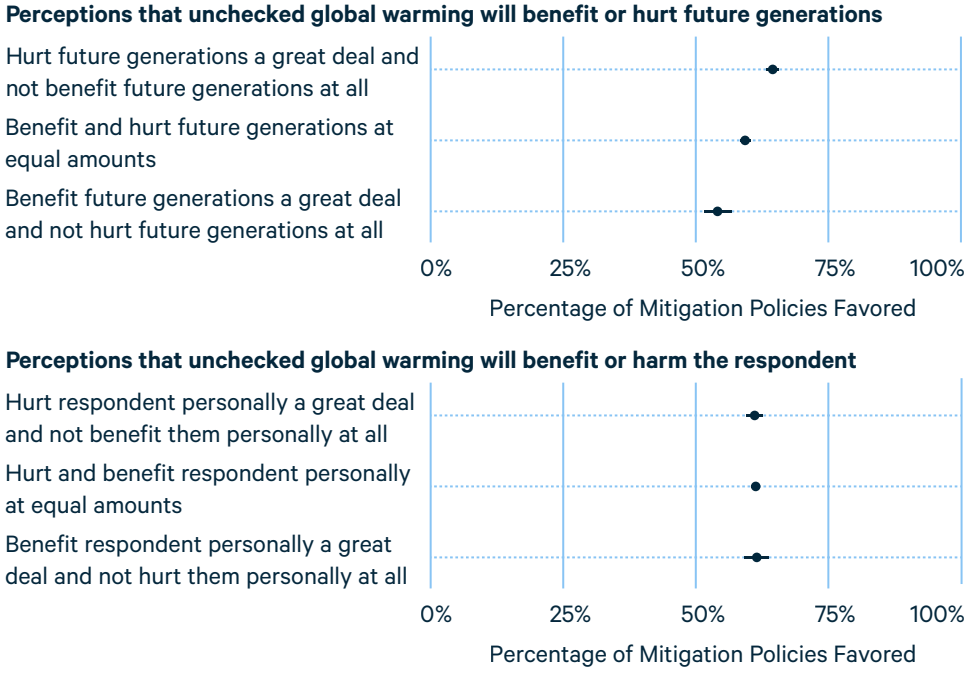
Sociotropic vs. Pocketbook Motivations

We explored the sociotropic reasoning and pocketbook reasoning hypotheses by examining the impact of perceived benefits and undesirable side effects of emission reduction efforts. We asked whether respondents' support for emissions reduction policies was driven more by perceptions of the damage that would be prevented to future generations, or to themselves personally. And we asked whether respondent support for these policies was driven more by perceptions of undesirable economic side effects for the nation, for the state where the respondent lives, or for themselves personally.

To test whether respondents' support for emissions reductions were driven by perceptions of personal or collective interests, we estimated the parameters of an ordinary least squares regression equation predicting the percentage of eleven emissions reduction policies favored by the respondent.

As expected, perceptions that unchecked global warming will hurt future generations increased support for emissions reduction policies. In contrast, perceptions that unchecked global warming will affect the respondent had no impact on policy support.

Figure 3.18. Effect of perceptions of unchecked global warming on policy support

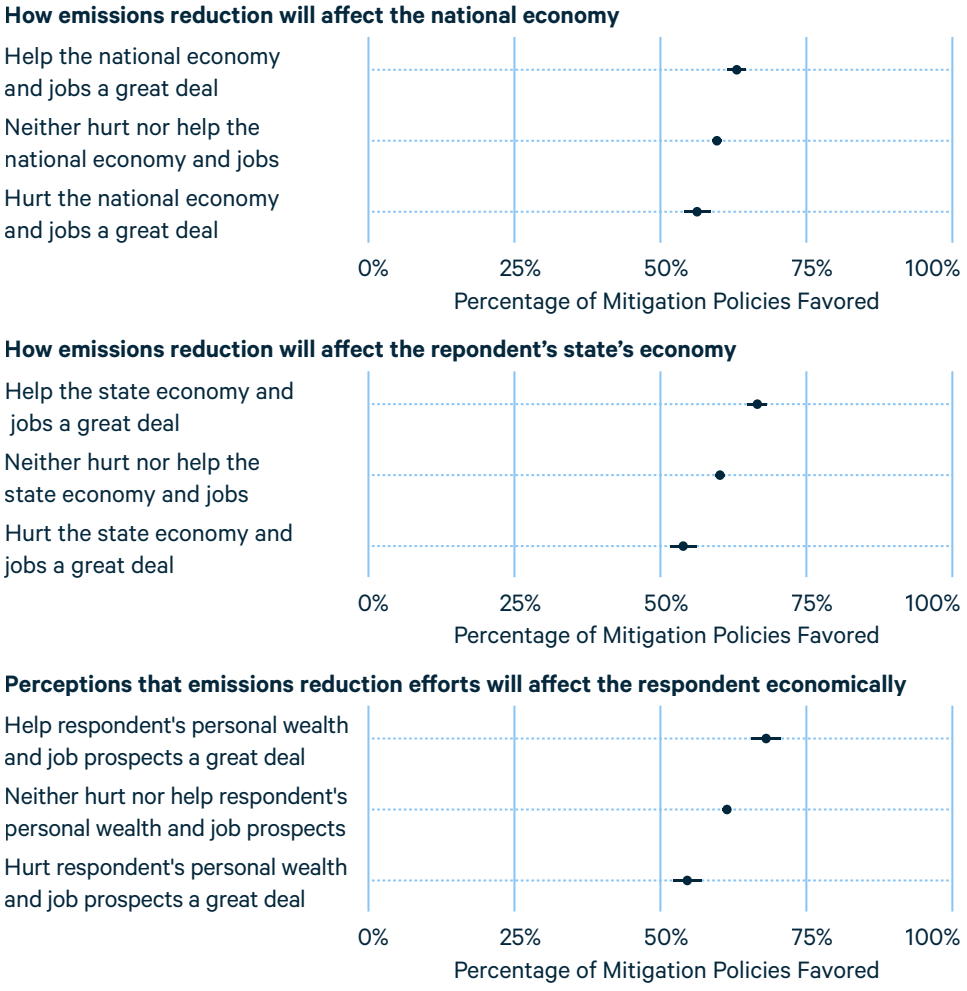


Increased policy support was also the result of perceptions that emissions reduction efforts will benefit the national economy and respondents' own state economy.

On the "pocketbook" level, perceptions that emissions reduction efforts will hurt or help the respondent personally also influenced policy support.

Thus, it appears that perceived benefits and costs to the collective are important drivers to public support for emissions reduction policies. Personal benefits and costs are also influencers, but appear to be less notable.

Figure 3.19. Effect of perceptions on the economic effects of emissions reduction on policy support



Dismantling Obama-Era Policies: Exploring the Impact of Elite Cues

In 2020, the *New York Times* **reviewed 100 environmental rules** that the Trump administration had reversed or was in the process of undoing. Many of these rules were put in place by the Obama administration, including policies on vehicle greenhouse gas standards and mercury emissions from coal power plants (Popovich et al. 2020). We selected four of these policies on which to gauge American opinions:

1. The Paris Agreement, an agreement between more than 190 countries, in which the United States pledged to produce 25% less greenhouse gas emissions in 2025 than it put out in 2005
2. The Clean Power Plan, which states that, by 2030, power plants must put out 30% less greenhouse gas emissions than they did in 2005
3. An executive order to cut federal greenhouse gas emissions by 40% by 2025
4. An increase to the Corporate Average Fuel Economy (CAFE) standards, requiring American-made vehicles to have an average gas mileage of 55 miles per gallon by 2025

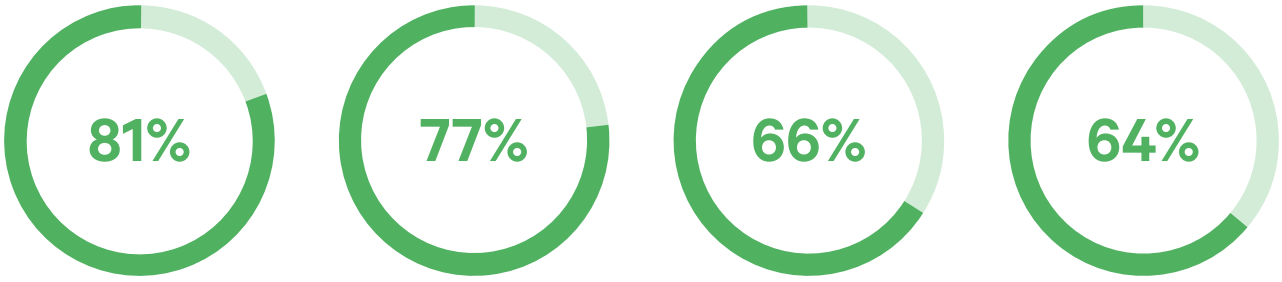
Randomly-selected survey respondents were told about the policies and were asked whether they favored or opposed each one. Rather than using the name of each policy, respondents were given the policy details; without prior knowledge, they would not necessarily have been aware that these four specific policies were those mentioned. All of the policies received majority support, in some cases by large margins.

In 2020, 81% of respondents favor efforts by the federal government to lower US greenhouse gas emissions by 25% from 2005 levels by 2025, with no penalty for failing to achieve this goal. This was, of course, a major part of the US commitment to the Paris Agreement.

More than three-quarters of Americans (77%) favor a plan for the US government to require power plants to reduce their greenhouse gas emissions by 30% below 2005 levels by 2025—goals laid out in the Clean Power Plan.

Two in three Americans—66%—favor the federal government lowering its own greenhouse gas emissions by 40% by 2025, relative to 2015. Finally, 64% favor the government requiring that all new cars and trucks made in the United States after 2025 get at least 55 miles per gallon (as laid out by the CAFE standards under the Obama Administration).

Figure 3.20. Percentage of Americans who support various policies implemented by the Obama administration that the Trump administration rolled back or was working to roll back



The Paris Agreement

The Clean Power Plan

The federal government cutting its greenhouse gas emissions by 40% by 2025

An increase to the Corporate Average Fuel Economy (CAFE) standards

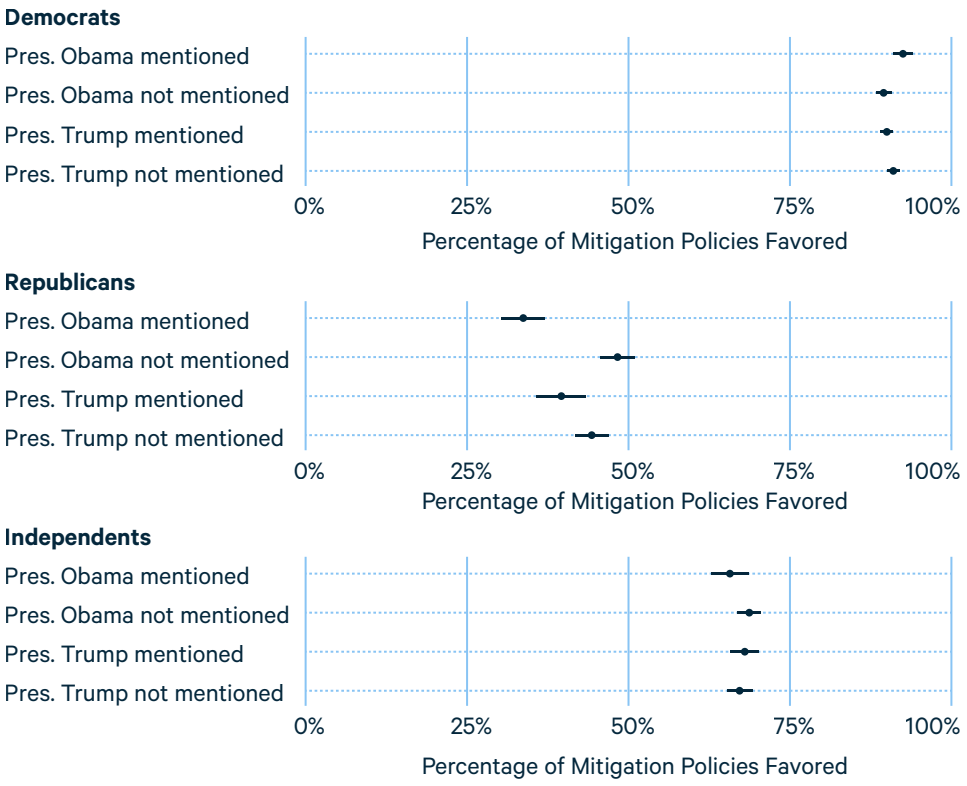
Built into the questionnaire was an experiment in which some respondents were told that President Obama had spearheaded each policy, other respondents were told that President Trump had reversed the policy, and still other respondents were told about both presidents' involvement.

This experiment was implemented to assess the malleability of American opinions regarding these policies. American professors Arthur Lupia and Mathew D. McCubbins (1998) asserted that on issues about which Americans know little or nothing, they often take cues from leaders they trust. Thus, if a policy is favored by a politician or political party whom a citizen supports, the citizen is inclined to favor the policy as well, and vice versa. We set out to gauge whether such "elite cues" would notably alter public support for these four policies that President Obama had created and President Trump reversed.

To do so, we estimated the parameters of ordinary least squares regressions predicting the number of the four policies that each respondent favored. We used variables to represent whether the respondent was told President Obama favored the policies, whether the respondent was told that President Trump reversed the policies, the respondents' liberal/conservative ideology, and demographics.

In fact, public support for these policies was generally not increased or decreased by endorsement from a politician of the respondent's party.

Figure 3.21. Effects of presidential endorsement on policy support (2020)



Among Democrats, mentioning President Obama's support of the policies did not increase policy support. Among Independents, neither mentioning President Obama's support nor mentioning President Trump's opposition to the policies altered support for them. Among Republicans, mentioning President Trump's opposition to the original policies did not decrease support either. Interestingly, the only apparent effect of cues appeared among Republicans—mentioning that President Obama had spearheaded the policies reduced support by 15 percentage points.

EXPERT INSIGHT

President Obama and President Trump are already widely associated with one or another view on each of these policies, so it is not surprising that mentioning them did not sway many respondents' views. I expect that previous research stating that Americans take cues from trusted leaders is correct in this case: as climate change has been a politically polarizing issue for several decades now, it's possible that these "elite cues" of leaders who stand for or against climate action have been internalized long ago. An unnamed policy to roll back climate action is widely expected to come from President Trump, while a policy to curb emissions is anticipated to come from a Democratic president like Obama.

Americans may not vote solely on a single issue like the Paris Agreement, hand guns, or health care, yet all these issues have overwhelming majorities of support for apparently progressive reforms. However, policy movement requires bipartisan support and that may not be easy to achieve given the role of primaries in the electoral process, which tend to nominate people at the poles of the political spectrum.

I think that a shift in climate change policies will occur and could be sudden. (An example of when no change happens, until it seems to happen all at once due to bipartisan support, is rights pertaining to sexual orientation.) Without a doubt, many Republican legislators want to make progress on climate policy. Moreover, they see it as a growing political liability if their party does not make progress.

—**Dallas Burtraw**, RFF Darius Gaskins Senior Fellow

EXPERT INSIGHT

According to this survey, 65% of Americans who report believing in climate change are extremely or very sure that the climate has been getting warmer and will get even warmer over the next 100 years (the latter percentage is 69%)—the highest percentage ever recorded by this survey. But the story is similar for the deniers, where a historically high percent (45%) are extremely or very sure that temperature will not increase over the next 100 years—and this after only 35% felt this way in 2018. **My own work** surveying populations in the United States, China, and Sweden in 2010 and 2019 finds increasing polarization as well and that the deniers are overwhelming Republicans in the US and right wing groups in Sweden (Carlsson et al. 2020). Interestingly, the Communist Party members in China are more bullish than others on the reality of climate change. Such increasing polarization can only make legislative and executive actions more difficult in the United States and Sweden. However, Sweden has already been so active that they are well ahead of the United States in addressing this issue.

—**Alan Krupnick**, RFF Senior Fellow

Are the many policy preferences outlined in this report just talk, or do they inspire action?

Voting Habits

Are the many policy preferences outlined in this report just talk, or do they inspire action? We turn to that question next and describe a test examining that possibility of these preferences affecting voting habits. Respondents were read a statement by a hypothetical candidate running for a seat in the US Senate and were asked whether hearing that statement would make the respondents more likely to vote for the candidate, less likely to vote for the candidate, or would have no impact.

One statement expressed "green views" that essentially parroted back to respondents the opinions expressed by most Americans as described above:

> *"I believe that global warming has been happening for the past 100 years, mainly because we have been burning fossil fuels and putting out greenhouse gases. Now is the time for us to be using new forms of energy that are made in America and will be renewable forever. We can manufacture better cars that use less gasoline and build better appliances that use less electricity. We need to transform the outdated ways of generating energy into new ones that create jobs and entire industries, and stop the damage we've been doing to the environment."*

The other statement was posed by a candidate committed to continuing to expand energy production of traditional fossil fuels like oil and coal:

> *"The science on global warming is a hoax and is an attempt to perpetrate a fraud on the American people. I don't buy into the whole man-caused global warming mantra. We must spend no effort to deal with something that is not a problem at all. We should not invest in windmills and solar panels as alternative energy sources. Instead we should continue to focus on our traditional sources of energy: coal, oil, and natural gas. We should expand energy production in our country, including continuing to mine our coal and doing more drilling for oil here at home."*

Nearly two-thirds of Americans (64%) report being more likely to vote for the candidate who expressed "green" views—nearly the same percentage as when the question was posed five years earlier in 2015 (66%). Democrats are significantly more likely to be driven to support a "green" candidate (87%) than Republicans (42%) and Independents (58%.)

Comparatively, 67% of respondents said that they would be less likely to vote for someone who expressed "not-green" views. This is most prominent in Democrats (88%), followed by Independents (67%) and Republicans (37%). Only a quarter of Republicans report themselves *more* likely to support a candidate with an "not-green" platform (26%). By comparison, 5% of Democrats and 14% of Independents say they would be more likely to support the "not-green" candidate.

Hearing the candidate make a green statement made nearly two-thirds of Americans (64%) more likely to vote for them—nearly the same percentage as when the question was posed five years earlier in 2015 (66%). Only 13% of Americans were made less likely to vote for the candidate.

Conversely, hearing the candidate make a not-green statement made 67% of Americans less likely to vote for him or her, whereas only 14% were made more likely to vote for the candidate. Thus, taking a green position helps a candidate's prospects notably, and taking a not-green position hurts.

Because Republican citizens almost all vote for Republican candidates, and Democratic citizens almost all vote for Democratic candidates, the most impact of candidate statements in shaping election outcomes is among Independents. And among them, the same pattern appears that appeared among all Americans: taking a green position helped, and taking a not-green position hurt. This same pattern was even apparent among Republican respondents, though more weakly, and among Democrats.

Figure 3.22. Impact on voting of hearing a candidate make a "green" or "not-green" statement (2020)

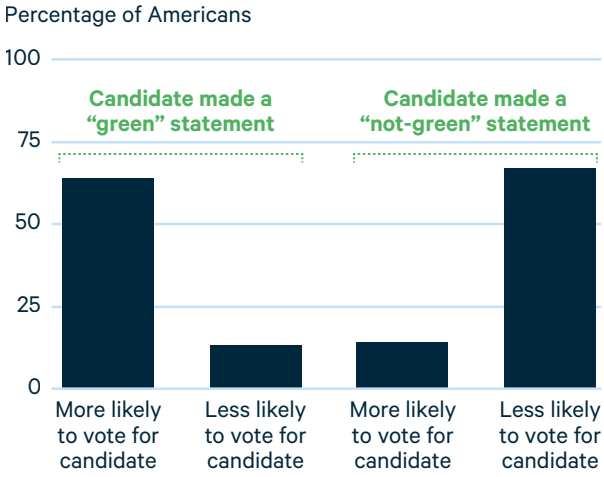
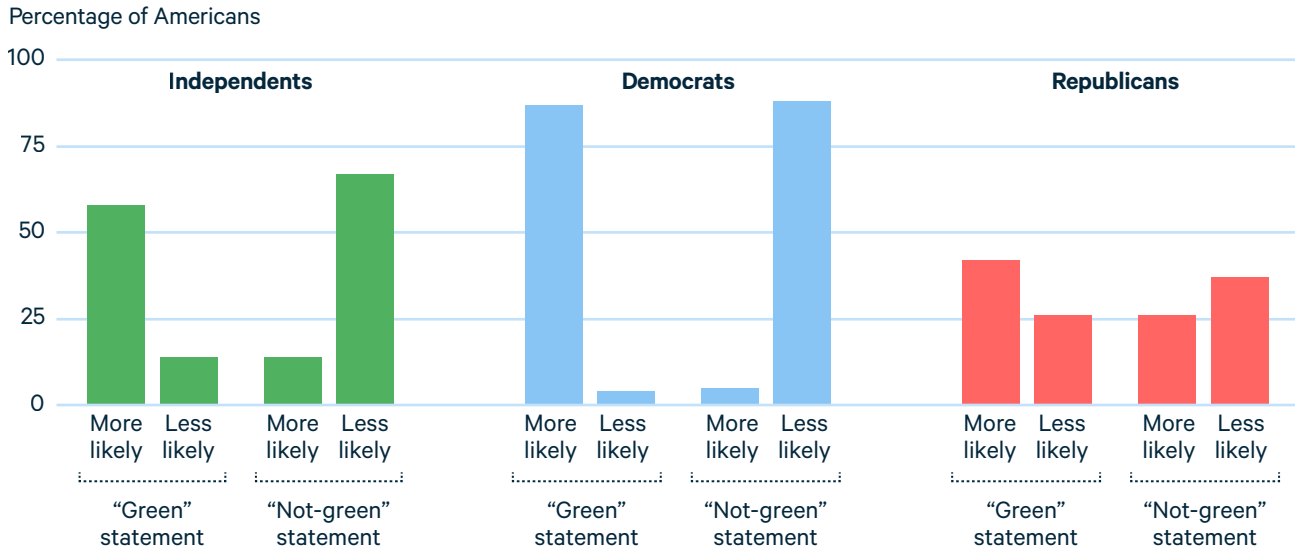


Figure 3.23. Impact on voting of hearing a candidate make a "green" or "not-green" statement, by party (2020)



Conclusion

Taken together, these results point to climate change mitigation policies that may be pursued in the future with widespread—and bipartisan—public support. What's more, these results identify policy directions that, while perhaps plausible in theory and in practice, are not well received by the American public.

The survey results also provide evidence that the COVID-19 pandemic and associated economic upheaval did not reduce the public's support for mitigation policies, as shown by the steady levels of support from previous years. Additionally, the pandemic and economic downturn have not exacerbated perceptions of unintended economic side effects of mitigation efforts.

For decades, scholars and policymakers alike have presumed that economic growth and environmental protection are incompatible and that any efforts to grow the economy must, of necessity, take resources away from helping the environment. Such a presumption creates an “either the economy or the environment" mindset. This mindset has been reinforced by survey questions asking Americans, **for example**: "With which one of these statements about the environment and the economy do you most agree? Protection of the environment should be given priority, even at the risk of curbing economic growth. **Or**, Economic growth should be given priority, even if the environment suffers to some extent."

If Americans do indeed naturally perceive this trade-off as inevitable, the current pandemic and economic crisis would presumably tilt them away from environmental protection. The present study refutes that notion resoundingly—compared to 2018 and before, we see no evidence in 2020 of reduction in the public's support for mitigation policies.

Widespread support for emissions reduction policies results from sociotropic thinking. Few people believe that taking such steps will hurt the national economy, their state's economy, or their personal finances, whereas large numbers of Americans believe such policies will help future generations substantially.

The evidence reported here that elite cues do not alter public attitudes toward policies validates the claim that these views are well-crystallized in the minds of Americans.

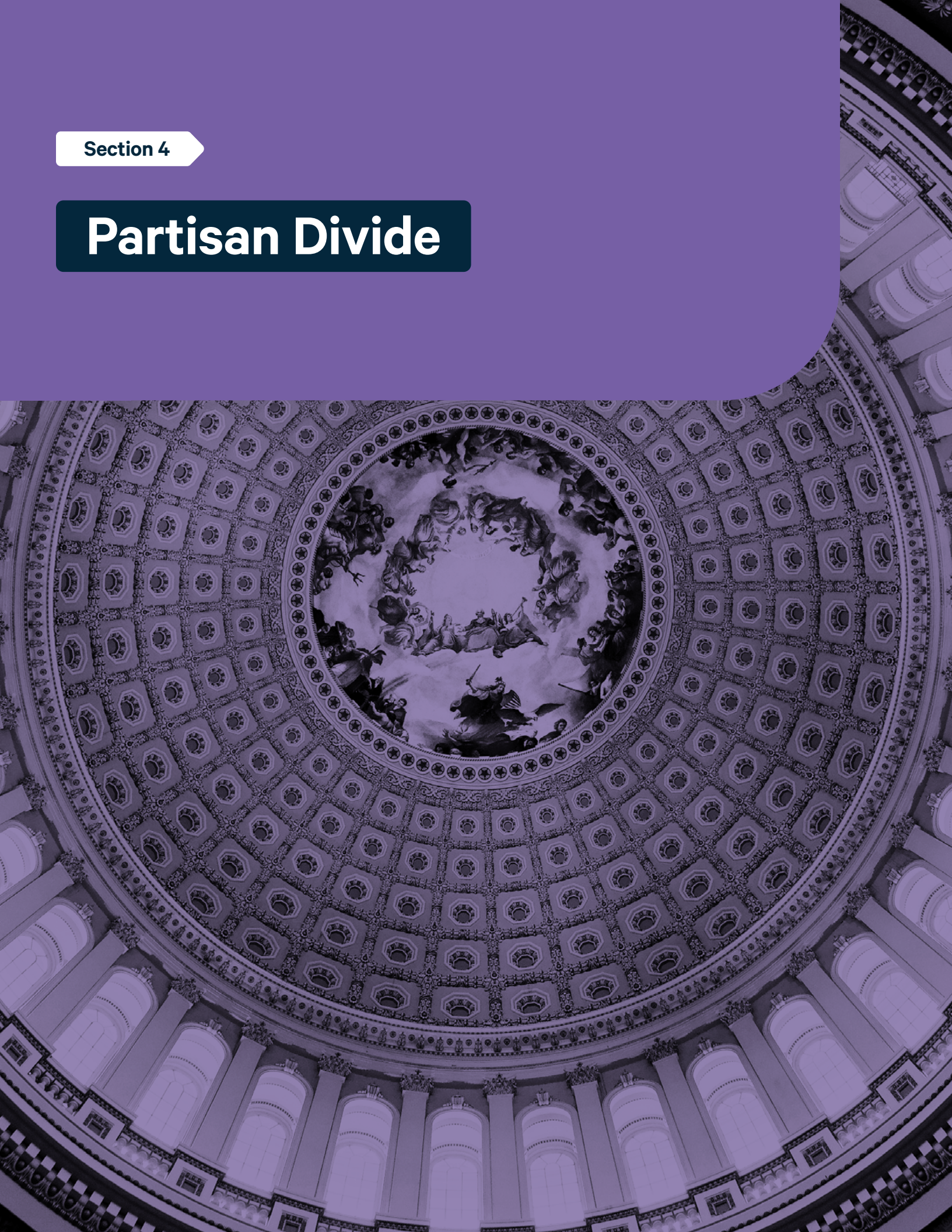
Contrary to the hopeless message of polarization of the issue along party lines, our research identified climate change mitigation measures that see favor from majorities, and sometimes vast majorities, of Americans. And although there are partisan differences in support for Obama-era policies that were later reversed by President Trump, a majority of Americans supported the underlying principles of major climate policies when divorced from politics. This suggests a significant opportunity for policymakers to introduce legislation in the future that could enjoy bipartisan support, as well as buy-in from American constituents.

Finally, we saw that the policy positions candidates take on this issue are likely to influence the votes of many Americans. Thus, policymakers and their challengers have opportunities to use these issues to help assemble the coalitions needed to accomplish electoral victories.

These results point to climate change mitigation policies that may be pursued in the future with widespread—and bipartisan—public support

Section 4

Partisan Divide



Contents

Introduction

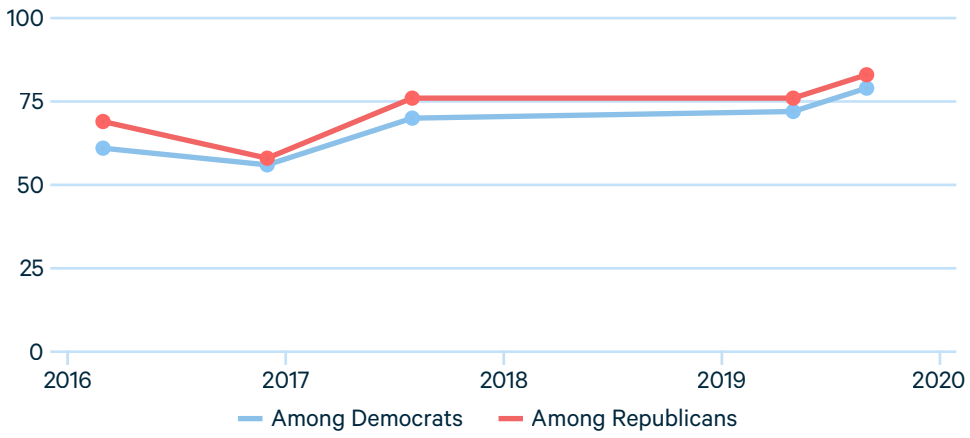
In the "Overall Trends" section of this report, we showed that huge majorities of Americans believe that the earth has been warming due to human activity and that governments, businesses, and individuals should take steps to address it. In the "Policies and Politics" section, we described how large—and sometimes huge—majorities of Americans favor various policies for mitigating future global warming. Similarly widespread support for specific government policies to reduce the risks of wildfires and floods, and to help people cope with damage from wildfires and floods, was documented in the "Natural Disasters" section of the report.

These huge majorities in favor of adaptation and mitigation policies, as documented throughout this report, cannot be achieved without many Democrats, Independents, and Republicans agreeing.

And when majorities of the major parties agree, policymakers can pursue those policies knowing that many of their constituents are on the same side. In this section, we assess the degree to which majorities of Democrats, Independents, and Republicans agree on various aspects of global warming in 2020. We then use data from prior surveys in our series to track changes in the partisan gap over the past two decades.

During the past four years, American partisans have become increasingly contemptuous of their opponents. According to national surveys conducted by the Pew Research Center between 2016 and 2019, Democrats have become increasingly likely to give Republicans a “cold” rating on a “feeling thermometer,” which is thought to reflect attitudes. And during those years, Republicans have become increasingly likely to give Democrats a cold rating (Pew 2019).

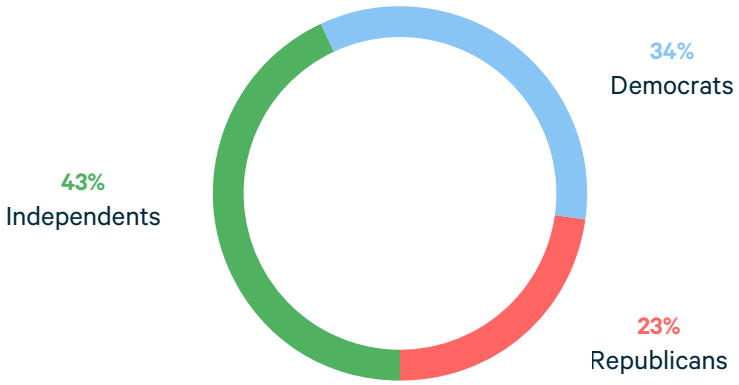
Figure 4.01. Percentage of partisans who gave members of the other party a “somewhat cold” or “very cold” rating on a “feeling thermometer”




These huge majorities in favor of adaptation and mitigation policies cannot be achieved without many Democrats, Independents, and Republicans agreeing.

One might imagine that this increasing antipathy could, in turn, create a growing gap between the parties' constituents on policy issues such as global warming. But as we shall see, that has not happened.

Figure 4.02. Party breakdown of survey respondents



A methodological note: We separated Republican, Democratic, and Independent respondents based on their answers to a question asking how they usually think of themselves. Our percentages of the three groups (23%, 34%, and 43%, respectively) closely resemble the same percentages as measured recently (July 30–August 12, 2020) by **Gallup** (26%, 31%, and 41%, respectively).

EXPERT INSIGHT

While climate may be a particularly important subject to roughly one in four Americans, it is also not the only issue that people vote on. This year, as wildfires raged in the West and the Southeast experienced a particularly active hurricane season, climate change is particularly salient to some at the moment; however, many Americans may be willing to put their climate opinions on the back burner to support candidates who champion other causes.

Whether growing bipartisan support for climate action will influence party politics remains to be seen. We have seen government action on policies ranging from the passage of the Great American Outdoors Act on the one hand to the withdrawal from the Paris Agreement on the other. But considering that the majority of Republicans and Democrats support some form of climate action, mitigating and adapting to this crisis could provide a powerful opportunity for bipartisan collaboration.

—**Ray Kopp**, RFF Vice President for Research and Policy Engagement

Methodology

The Climate Insights 2020 national public opinion survey involved telephone interviews with a representative sample of 999 adults living in the United States. The Climate Insights 2020 national public opinion survey involved telephone interviews with a representative sample of 999 adults living in the United States. We conducted statistical analyses to explore these responses further. For more information on the survey methodology, including details on sample design, field procedures, data verification, weighting, and questions used to measure demographics, please see the **Partisan Divide Survey Methodology Report** and the **Climate Insights 2020: Partisan Divide Technical Report**. Question wordings for each figure can also be found in Appendix A of this report.

Partisans' Views on Global Warming in 2020

Fundamental Beliefs and Attitudes

For 14 out of 21 survey questions (66%) posed to American respondents about fundamental beliefs and attitudes regarding global warming, majorities of Democrats and Republicans alike hold "green" opinions in 2020.

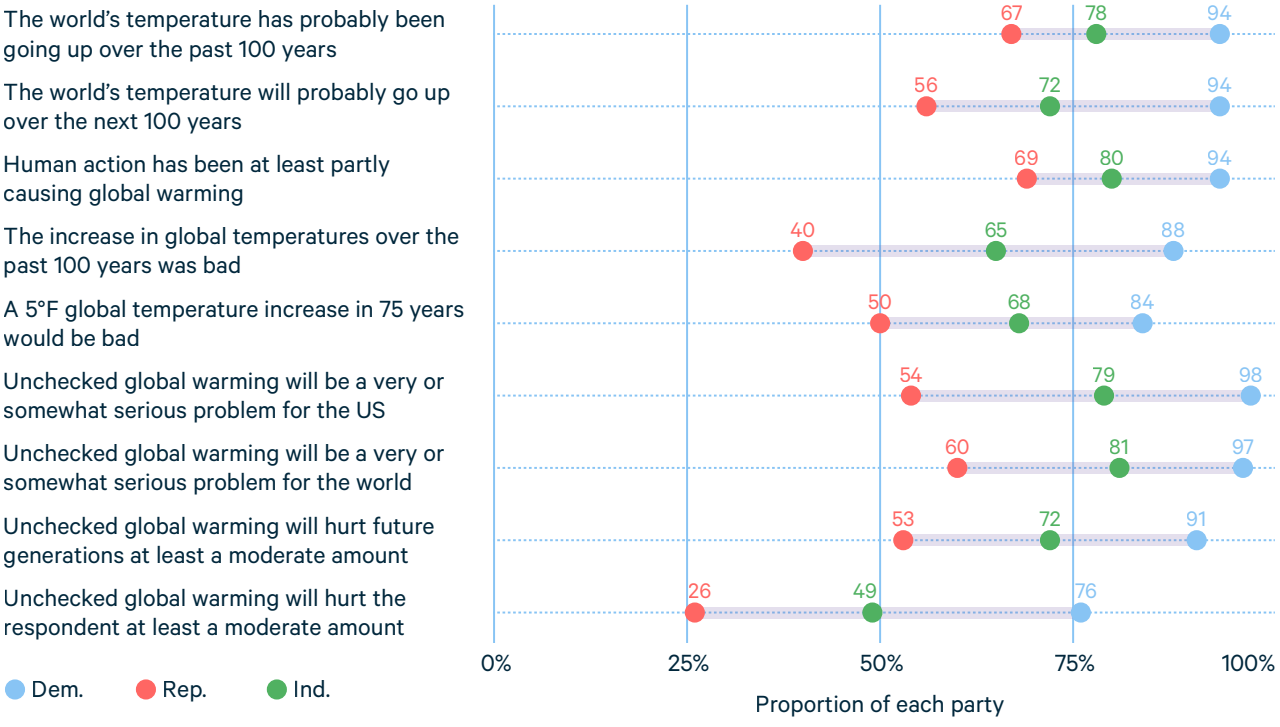
For example, 94% of Democrats believe global warming has been happening, as do 67% of Republicans. 94% of Democrats and 56% of Republicans think warming will continue in the future if nothing is done to address it. 94% of Democrats and 69% of Republicans believe that if warming has been happening, human actions have been responsible for causing it.

Majorities of Democrats and of Republicans also agree about the likely effects of global warming—98% of Democrats and 54% of Republicans believe global warming will be a very or somewhat serious problem for the US if nothing is done to address it. Some 97% of Democrats and 60% of Republicans believe that global warming will be a very or somewhat serious problem for the world if nothing is done to address it.

However, the partisans diverge on whether specific temperature changes have been or will be bad. Whereas 88% of Democrats believe that the warming that has happened over the past 100 years was bad, only 40% of Republicans believe that. And whereas 84% of Democrats believe that a 5-degree Fahrenheit increase in world temperature over the next 75 years would be bad, only 50% of Republicans agree.

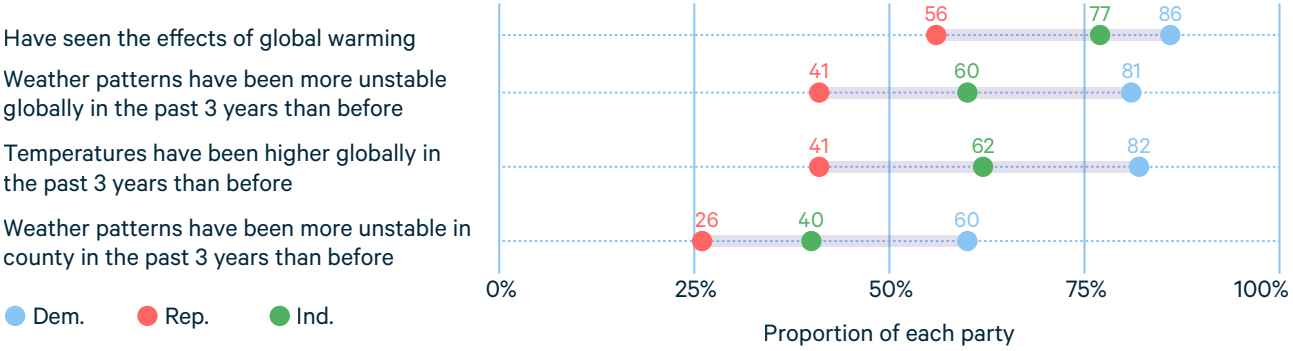
Particularly intriguing is the statistic that 76% of Democrats believe that unchecked global warming will hurt them personally at least a moderate amount, but only 26% of Republicans believe the same.

Figure 4.03. Party breakdown of beliefs about global warming and its effects



97% of Democrats and 60% of Republicans believe that global warming will be a very or somewhat serious problem for the world if nothing is done to address it.

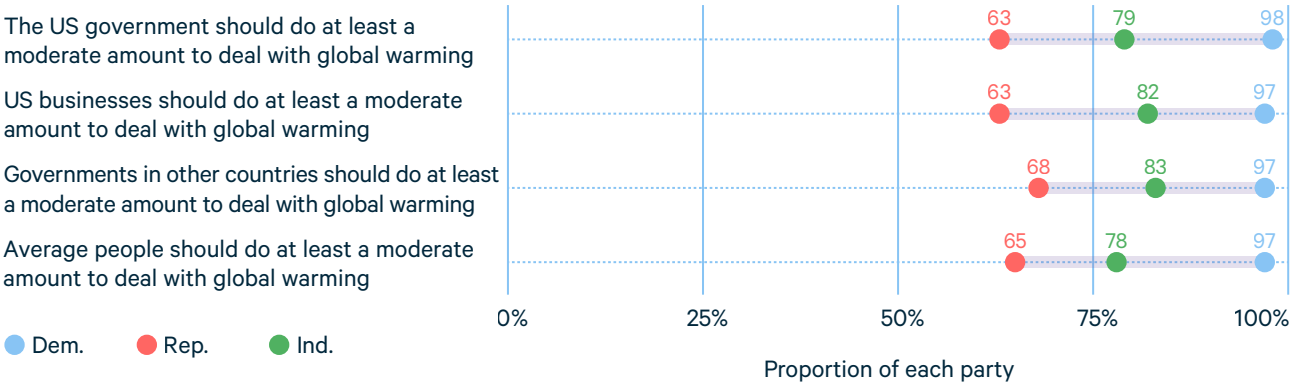
Figure 4.04. Party breakdown of beliefs about effects and observations of global warming



Majorities of Democrats and Republicans also diverge in their observations of the world around them. Majorities of Democrats (86%) and Republicans (56%) believe they have seen effects of global warming. But although majorities of Democrats believe that, during the last three years, global weather patterns have been more unstable (81%), that global temperatures have been higher (82%), and that weather patterns in the county where they live have been more unstable (60%), only minorities of Republicans hold those views: 41%, 41%, and 26%, respectively.

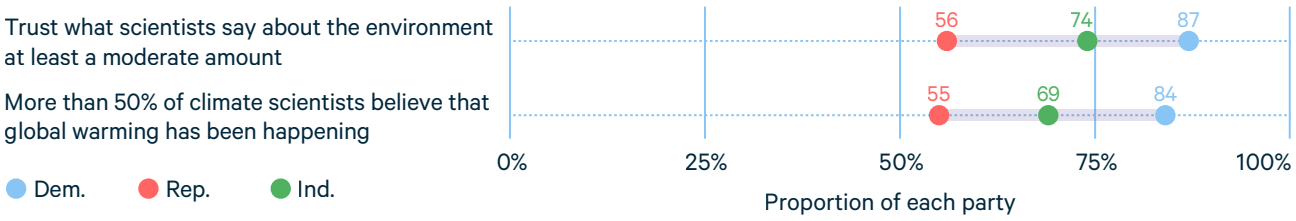
Majorities of Democrats and of Republicans endorse action to deal with global warming. Democrats are almost unanimously (97–98%) in favor of action by the US government, governments in other countries, US businesses, and average people. Sizable majorities (63–68%) of Republicans expressed these preferences as well. The partisan gap between Democrats and Republicans on these issues ranges from 27 to 50 percentage points and averages 36 percentage points.

Figure 4.05. Party breakdown of beliefs about actions to deal with global warming



Majorities of both parties think they have already seen effects of global warming and want action to deal with it, though the majorities of Democrats are larger.

Figure 4.06. Party breakdown of trust in scientists



87% of Democrats and 56% of Republicans trust climate scientists at least a moderate amount, and 84% of Democrats and 55% of Republicans believe that a majority of climate scientists believe that global warming has been happening.

Party identifiers also diverge on what psychologists call "attitude strength" (Petty and Krosnick 1995). Among Democrats, 82% are extremely or very sure of their opinions about whether the earth has been warming over the past 100 years, whereas only 40% of Republicans express that high level of certainty.

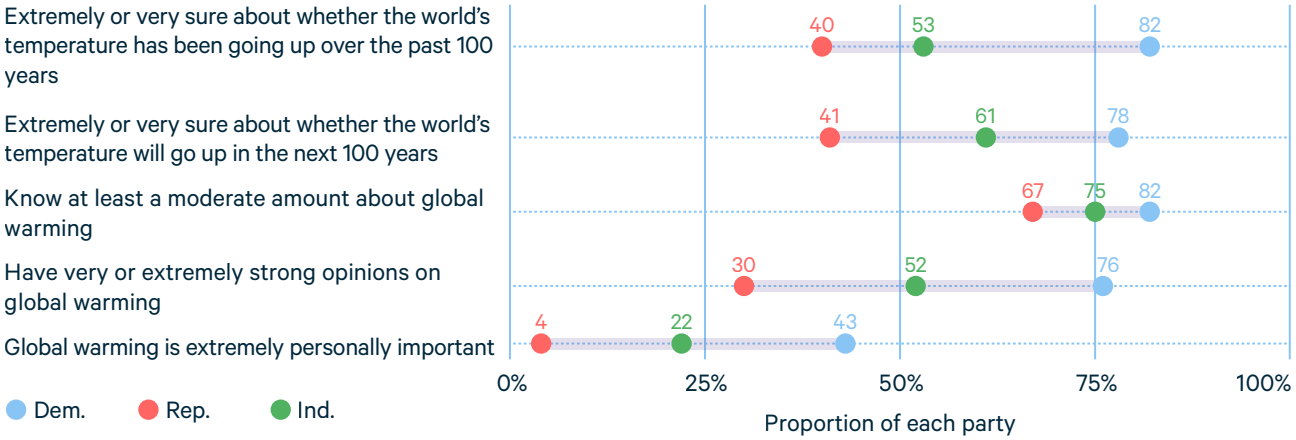
Likewise, 78% of Democrats expressed high certainty about whether the world's temperature will go up over the next 100 years if nothing is done to address it, whereas only 41% of Republicans express high certainty about their opinions on this question.

Similarly, 76% of Democrats said that their opinions about global warming are extremely or very strong, whereas only 30% of Republicans said they hold such strong opinions on the issue.

The partisans are more similar when it comes to how much they believe they know about global warming—82% of Democrats and 67% of Republicans believe they know at least a moderate amount about the issue.

Most importantly, members of the **issue public** are unequally present among Democrats, Republicans, and Independents. This idea, introduced in the "Overall Trends" section of the report, refers to individuals who are passionate about the issue, who think and talk about it, and who vote based on global warming. Whereas the issue of global warming is extremely important to 43% of Democrats, only 4% of Republicans feel the same way. Thus, when politicians or candidates talk about this issue, Democrats are much more attentive to those comments, whereas Republicans are largely indifferent.

Figure 4.07. Party breakdown of opinion strength



Mitigation Policies

In general, Republicans tend to oppose aggressive government regulations and government involvement in the economy and the business sector. Democrats tend to be open to government regulation and economic involvement designed to pursue desired goals. Therefore, one might expect that Republicans might be especially likely to oppose emissions reduction policies, whereas Democrats might be especially likely to favor these policies. Although this is true for many policies in this arena, it's not true for all; remarkably, we see striking agreement between Republicans and Democrats regarding some policies.

Respondents were asked to report their opinions about 24 policies intended to reduce future greenhouse gas emissions. Majorities, and sometimes huge majorities, of Democrats favor all but two of those policies—those majorities range from 57% to 97%.

Majorities of Republicans favor seven of the same policies that are favored by majorities of Democrats.

These areas of common ground are as follows:

- Tax breaks to encourage utilities to produce more electricity from water, wind, and solar power
- Requiring or encouraging power plants to reduce their greenhouse gas emissions
- Encouraging manufacturing of cars, appliances, and buildings that consume less electricity in order to reduce emissions
- Using new methods to reduce emissions from burning coal
- Supporting the Paris Agreement on global warming, which includes a US commitment to lower emissions by 25% below 2015 levels by 2025

Majorities of Democrats and Republicans also oppose two policies: tax breaks to encourage more nuclear power plant construction (33% and 44% favor, respectively), and increased taxes on electricity to cause people to use less of it (40% and 12% are in favor, respectively).

Figure 4.08. Party breakdown of support for "common ground" policies on which the majorities of Democrats and of Republicans agree

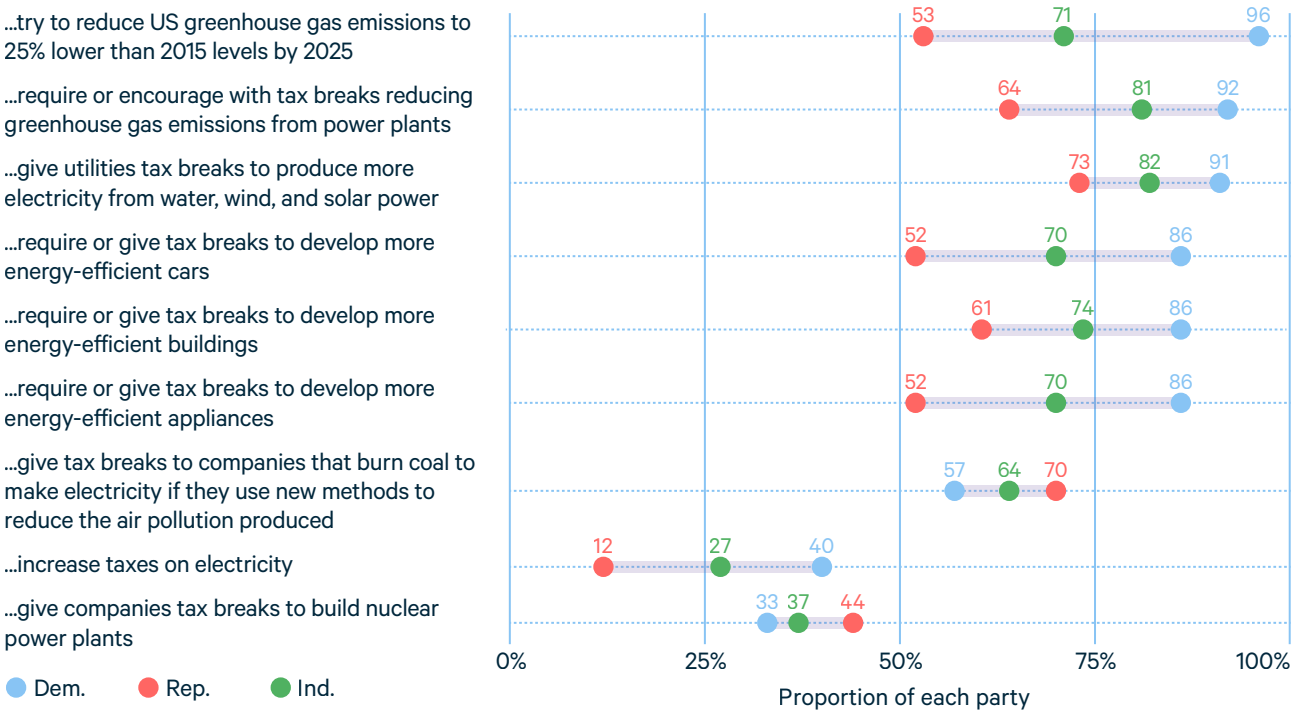
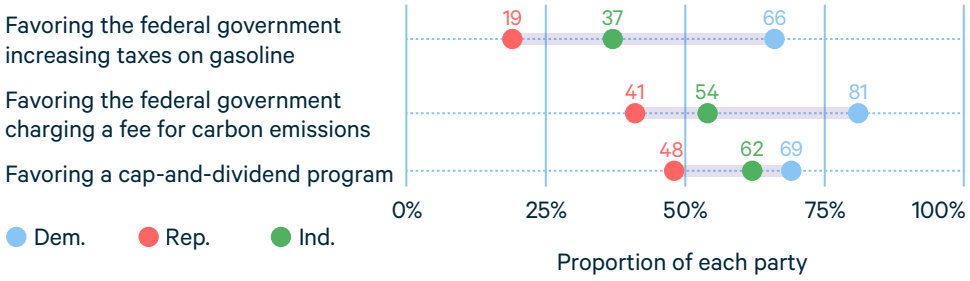
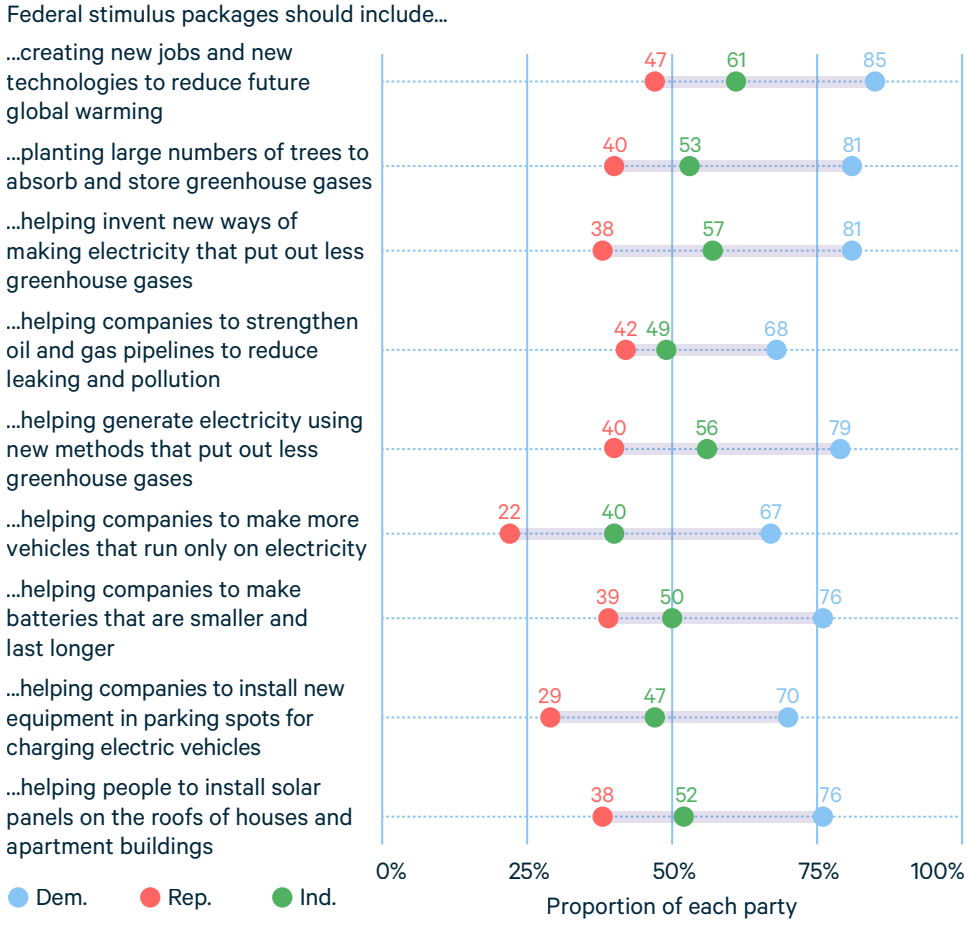


Figure 4.09. Party breakdown of opinions on mitigation policies on which the majorities of Democrats and of Republicans disagree



On the other policies included in the survey, majorities of Democrats and of Republicans do not agree. Minorities of Republicans and majorities of Democrats favor carbon pricing policies and increased gasoline taxes. In general, majorities of Democrats and minorities of Republicans believe that federal stimulus packages (to address the economic crisis associated with COVID-19) should include provisions to invest in the development of new technologies and in maintenance to reduce future emissions.

Figure 4.10. Party breakdown of opinions on federal stimulus policies on which the majorities of Democrats and of Republicans disagree



Majorities of Democrats and minorities of Republicans favor three policies put into place by President Obama that have been rolled back by President Trump: a mandate to power plants to cut carbon emissions from the electric sector by more than 30% relative to 2005 levels; a plan for the federal government to reduce its own emissions; and a mandate to increase fuel efficiency standards of all new cars and trucks made in the United States to get at least 55 miles per gallon by 2025.

Of the 24 policies, 17 are favored by a majority of Independents, including the 7 that are favored by majorities of Republicans and of Democrats.

Of the seven policies favored by a minority of Independents, two are also favored by minorities of Republicans and Democrats: tax breaks to encourage nuclear power plant construction and increased consumer taxes on electricity.

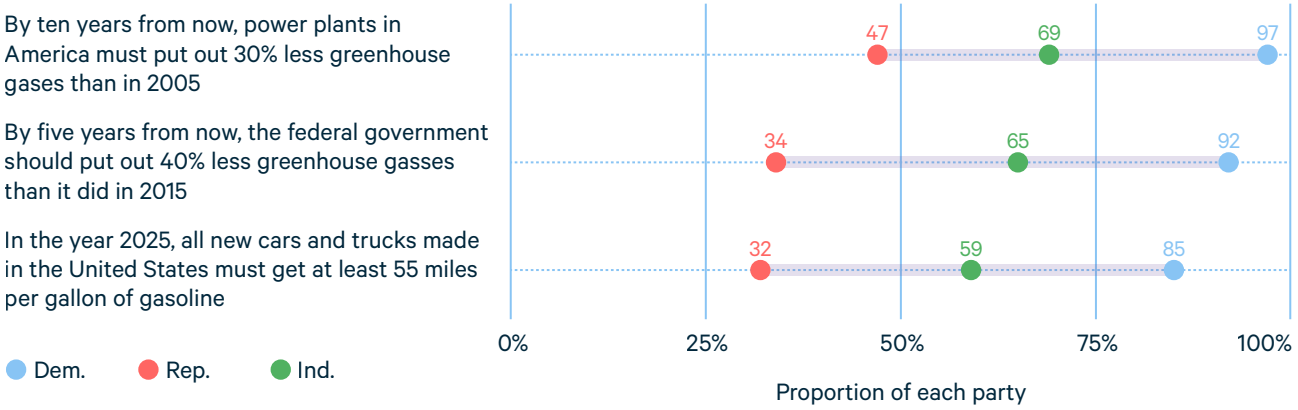
Four of the other five policies favored by a minority of Independents are: increasing consumer taxes on gasoline, helping companies prevent leaks and pollution from pipelines, spending stimulus money to advance manufacturing of all-electric cars, and installing charging stations for electric cars. For the proposed policy of helping companies make batteries that are smaller and last longer, 50% of Independents were in favor.

For two policies (tax breaks to companies that burn coal but use methods to reduce air pollution, and tax breaks to build nuclear power plants) more Republicans than Democrats are in favor, by margins of 13 and 11 percentage points respectively.

Of the remaining 22 policies, more Democrats than Republicans are in favor by margins ranging from 18 to 58 percentage points and averaging 37 percentage points.

In sum, Democrats are generally more supportive of emissions reduction policies than Republicans, and Independents are generally in between those two groups. And although majorities of both Republicans and Democrats agree with one another about some policies, they disagreed on most.

Figure 4.11. Party breakdown of opinions on Obama-era policies on which the majorities of Democrats and of Republicans disagree

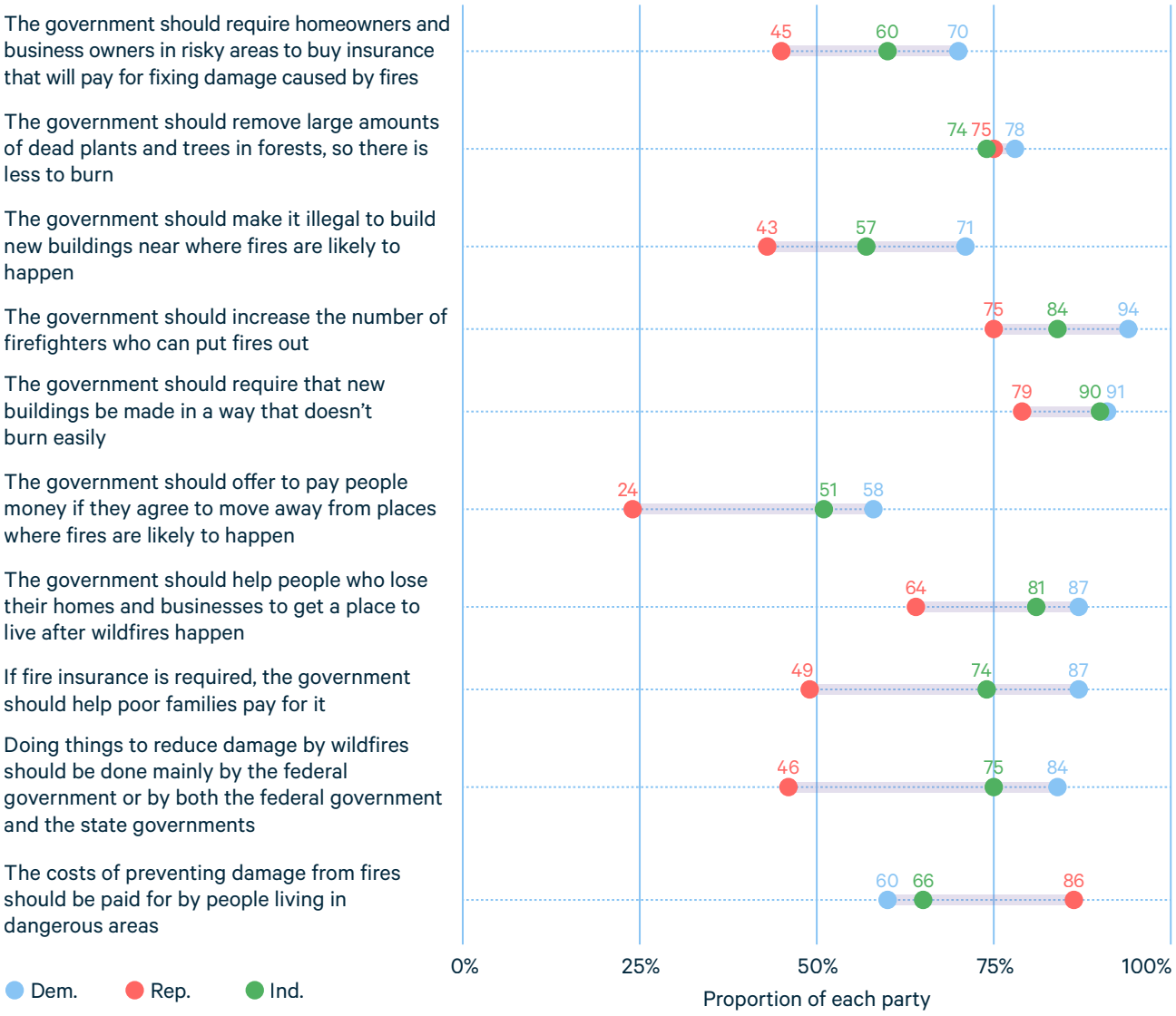


Adaptation Policies: Wildfires

Respondents were asked about eight policies designed to reduce harm to people and property from wildfires, which are thought by many natural scientists to be more common and more severe due to global warming. Majorities of Democrats and Independents favor all eight of these policies. Majorities of Republicans favor half of the eight.

Most partisans favor government efforts to improve infrastructure to prepare for and deal with wildfire damage. For example, 78% and 75% of Democrats and Republicans, respectively, favor government spending to remove large amounts of dead plants and trees in forests. Also, 94% and 75% of Democrats and Republicans, respectively, want to increase the number of firefighters.

Figure 4.12. Party breakdown of support for wildfire adaptation policies and opinions on who should be responsible



A majority of Democrats and Republicans, 91% and 79% respectively, favor government regulations requiring new buildings to be more fireproof. Likewise, 84% of Democrats and 64% of Republicans favor government financial assistance to families who lose their homes to wildfires.

Republicans and Democrats diverge on the issue of whether the federal government or state governments should lead action to implement wildfire adaptation policies. A majority of Democrats (84%) prefer that the federal government play the leading role or collaborate with state governments. In contrast, a minority of Republicans prefer this (46%)—with a majority preferring that state government play the leading role.

Democrats and Republicans agree about who should pay for wildfire adaptation policies—the majorities of both parties (60% and 86%, respectively) think that only people living in fire-prone areas should pay to prevent fire damage.

Of the ten questions posed about wildfire policy, the partisan gap ranges from 3% (regarding removing dead vegetation) to 38% (regarding subsidies for wildfire insurance for low-income families), averaging 25%.

EXPERT INSIGHT

People clearly want at least some federal action on disaster adaptation. Both federal and state leadership have pros and cons here; with state leadership, those in charge may have a more intimate knowledge of what people may need and how to efficiently deliver resources. Conversely, when a disaster hits, states may be reeling, and the federal government might be able to supply resources and assistance that would not otherwise be available.

—**Margaret Walls**, RFF Senior Fellow

Adaptation Policies: Floods

Majorities of Democrats and of Republicans favor all but one of the seven policies we asked about to reduce harm to people and property from floods. For example, a flood insurance mandate is favored by 77% of Democrats and 66% of Republicans, and flood insurance subsidies for low-income people are favored by 92% of Democrats and 53% of Republicans.

Most Democrats and most Republicans favor government effort to improve infrastructure to prepare for and deal with flood damage. For example, 92% and 80% of Democrats and Republicans, respectively, favor government spending to improve drainage in risky areas. Similarly, 92% and 73% of Democrats and Republicans, respectively, favor regulations to make new buildings more flood-proof.

Most Democrats and most Republicans agree about the federal government's role in flood protection efforts. 84% of Democrats and 67% of Republicans favor the federal government either leading or collaborating with state governments on such efforts.

Majorities of Democrats and of Republicans also agree on a payment strategy for flood damage adaptation efforts. 60% of Democrats and 86% of Republicans think that only the people living in flood-prone areas should pay to prevent fire damages.

Of the seven flooding questions, the partisan gap ranged from 11% (regarding the government requiring flood insurance) to 37% (regarding subsidies for flood insurance for low-income families), with an average of 21%. Majorities of Democrats and of Republicans agree on six of the seven issues.

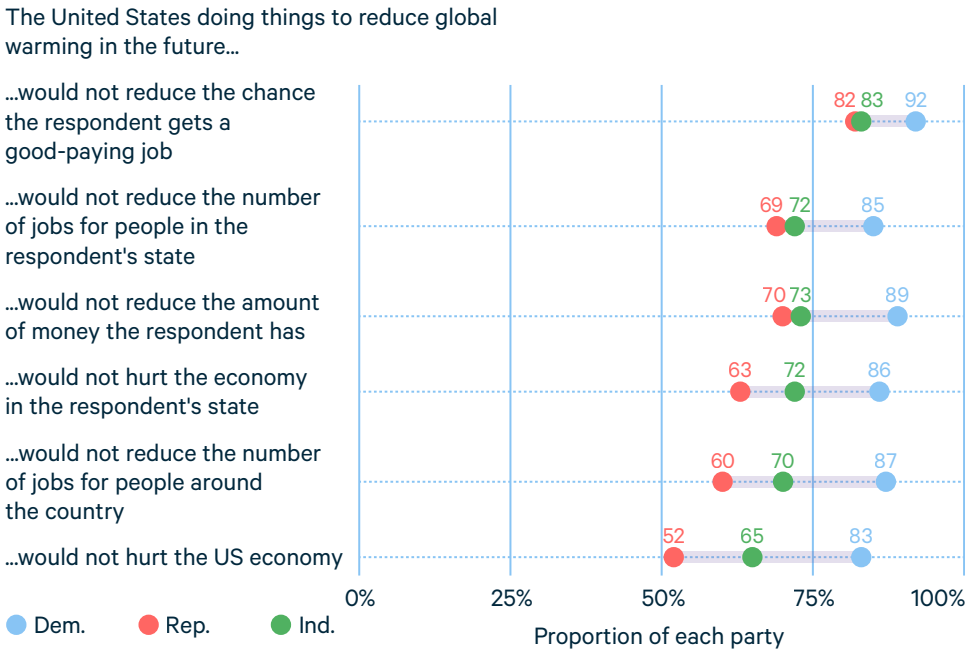
Figure 4.13. Party breakdown of support for flood adaptation policies and opinions on who should be responsible

Economic Consequences of Mitigation Policies

According to some observers, implementing some policies to reduce greenhouse gas emissions may increase the cost of American-made goods and services relative to those goods and services produced elsewhere, thus costing consumers and companies alike in the short term. In the "Policies and Politics" section of this report, we saw that very few Americans believe that such undesirable economic side effects result from mitigation efforts. Here, we report how partisans perceive these economic consequences.

Interestingly, majorities of Democrats and of Republicans believe that mitigation policies do not exert ill economic effects, whether at the national level, state level, or their personal levels. Among Democrats, huge majorities (83%–92%) believe that the United States doing things to reduce future global warming would not hurt the national economy, their state economy, the number of available jobs, or their own personal finances and job prospects. These sentiments were expressed by majorities of Republicans (52%–82%) as well. The partisan gap, averaged over these six measures of economic impacts, was 21 percentage points.

Figure 4.14. Party breakdown of beliefs about how climate action will affect the national economy, the respondent's state's economy, and the respondent personally



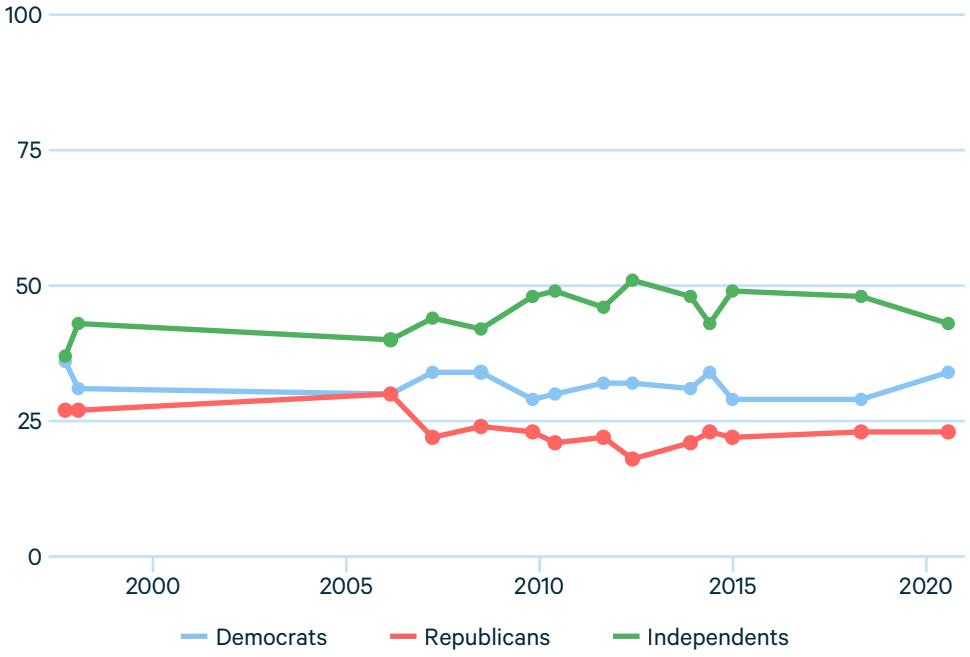
Majorities of Democrats and of Republicans believe that mitigation policies do not exert ill economic effects, whether at the national level, state level, or their personal levels.

Trends in the Partisan Gap from 1997 to 2020

When our first national survey was conducted in 1997, just before President Bill Clinton and Vice President Al Gore hosted the White House Conference on Climate Change, the partisan gap on many aspects of global warming was small. Over the years since then, however, the partisan gap has grown. The figures below track opinions on various issues related to global warming among Democrats, Republicans, and Independents and document the growth of the partisan gap.

To set the stage for these findings, we illustrate the percent of respondents in our surveys who identified themselves as Democrats, Republicans, and Independents.

Figure 4.15. Trends in party identification in America



> **Since 1997—just before the Clinton administration hosted the White House Conference on Climate Change—the partisan gap in climate beliefs has grown.**

Overview

In our surveys conducted since 1997, we have asked different questions in different surveys. The availability of measures by years is shown in the **technical report** for the "Partisan Divide" section.

Because we have not asked every survey question each year, in order to document trends over time in the partisan gap, we must make a tradeoff. We can either describe more years using fewer questions, or fewer years using more questions. We describe results using two different approaches, which end up supporting similar conclusions.

Figure 4.16 shows the average partisan gap on two opinions that were measured in all of our surveys: whether global warming has been happening, and whether, if warming has been happening, it has been caused at least partly by human activity. The partisan gap, which was only 8 percentage points on average in 1997 and 1998, peaked at 30 percentage points in 2011 and stabilized between 24 and 29 percentage points from 2012 to 2020. In 2020, this gap was 26 percentage points, on par with the past eight years.

These data refute the claim that the gap has grown in recent years amid an increasingly polarized political system in the United States.

Figure 4.17 shows the partisan gap using seven measures included in 10 surveys: (1) that global warming has been happening, (2) that, if warming has been happening, it was caused at least in part by human activity, (3) that government should reduce greenhouse gas emissions by power plants, (4) that CAFE standards should be increased, (5) that energy efficiency of buildings should be increased, (6) that energy efficiency of appliances should be increased, and (7) that climate scientists are trustworthy.

Using those measures, the partisan gap was 9 and 11 percentage points on average in 1997 and 1998, grew to 15 to 31 percentage points during 2007-2013, and stabilized between 22 and 29 percentage points in 2015–2020. In 2020, the gap was 29 percentage points, slightly greater than the previous years of 2018 (22%) and 2015 (23%).

Figure 4.16. Trends in the partisan gap using two measures (global warming existence and role of humans) across all years

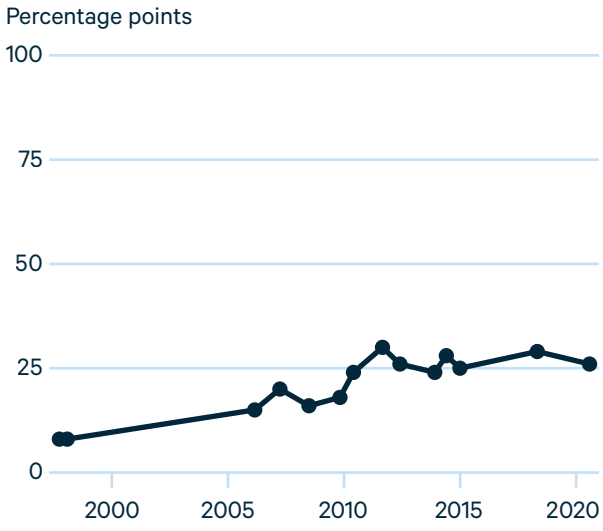
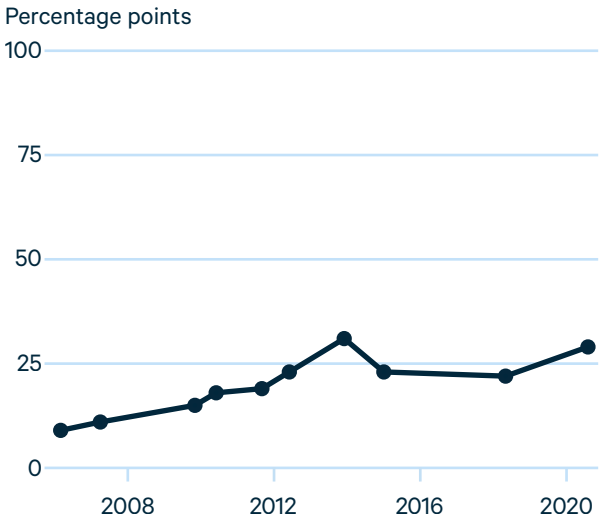


Figure 4.17. Trends in the partisan gap using the largest common set of (seven) global warming fundamentals measures



Fundamental Beliefs and Attitudes

Next, we describe the magnitude of and trends in the partisan gap for individual opinions over the years.

Global warming has been happening. Since 1997, majorities of Democrats, Republicans, and Independents have believed that the earth has probably been warming over the past 100 years. In 2020, 94% of Democrats, 67% of Republicans, and 78% of Independents believed that global warming has been happening. The partisan gap grew from 9 percentage points in 1997 to 27 percentage points in 2020. But the gap has not grown steadily over those years: 2010 marked a point of notable growth, from 15 percentage points the year before to 28 percentage points. The gap has not notably grown during the past eight years.

Global warming has been caused mostly or partly by humans. Since 1997, majorities of Democrats, Republicans, and Independents have believed that, if the world's temperature has increased over the past 100 years, warming has been caused at least partly by humans. In 2020, 94% of Democrats reported belief that increases in global temperature were caused mostly or partly by human activities—the highest level of consensus for Democrats. Independents and Republicans also manifest high levels in 2020, although not record highs: 80% of Independents and 69% of Republicans believe that global warming has been attributable to human activities. And again, no notable growth in the partisan gap has occurred since 2011.

Figure 4.18. Proportion of each group who believed the world's temperature has probably been increasing over the past 100 years

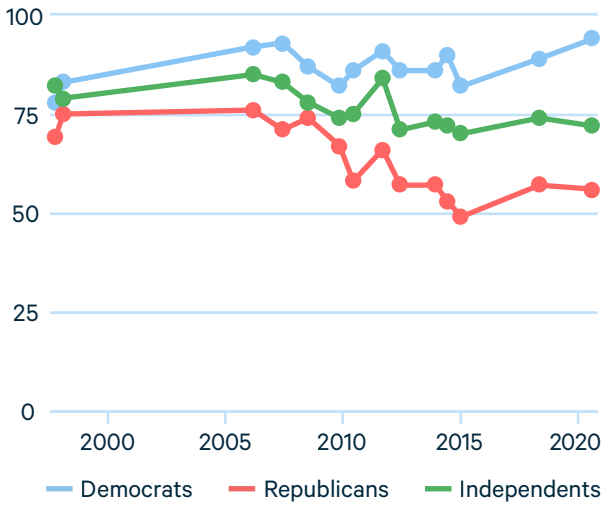
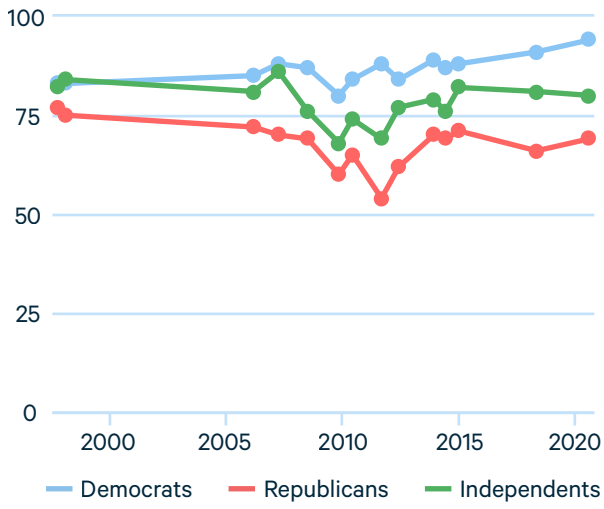
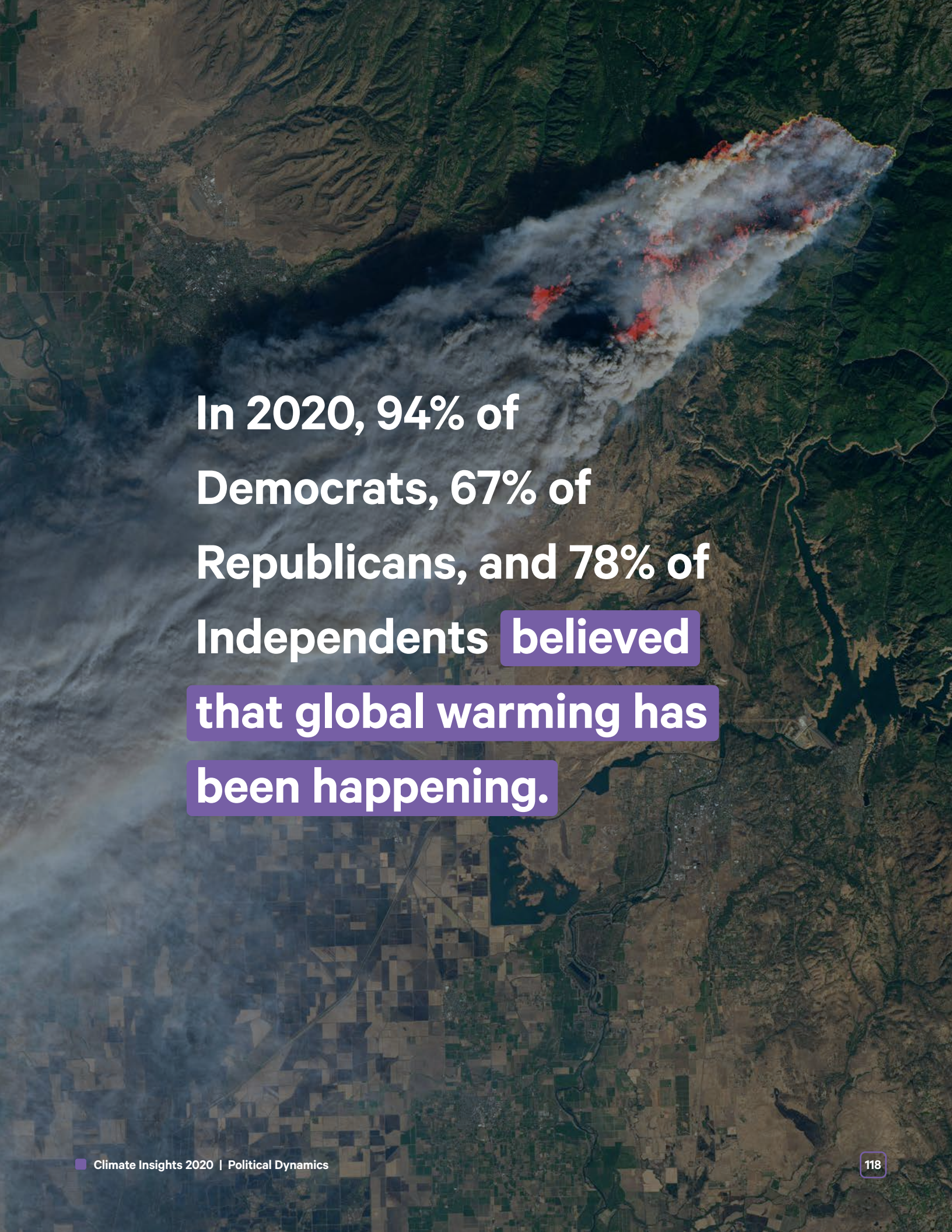


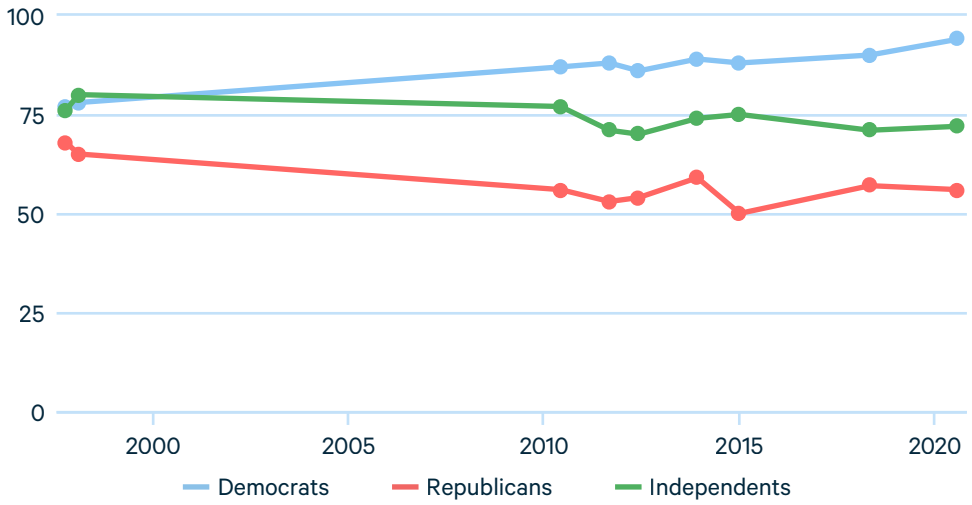
Figure 4.19. Proportion of each group who believed the increase in the world's temperature over the past 100 years was caused mostly or partly by humans





In 2020, 94% of Democrats, 67% of Republicans, and 78% of Independents believed that global warming has been happening.

Figure 4.20. Proportion of each group who believed the world's temperature will probably go up over the next 100 years



Future warming. Since 1997, majorities of Democrats, Republicans, and Independents have believed that the earth will probably be warmer in a century if nothing is done to prevent it. In 2020, 94% of Democrats, 72% of Independents, and 56% of Republicans believe that warming will probably continue in the future. No notable growth has occurred in the partisan gap since 2011.

5°F warmer would be bad. Majorities of Democrats and of Independents have consistently believed that 5°F of global warming would be bad, but the proportion of Republicans expressing that belief has hovered around the midline, peaking at 59% in 1997 and dipping to its lowest points of 47% in 2010 and 2015. The partisan gap in 2020 is the biggest observed since 1997 at 34 percentage points.

Figure 4.21. Proportion of each group who thought 5°F of warming in 75 years would be bad

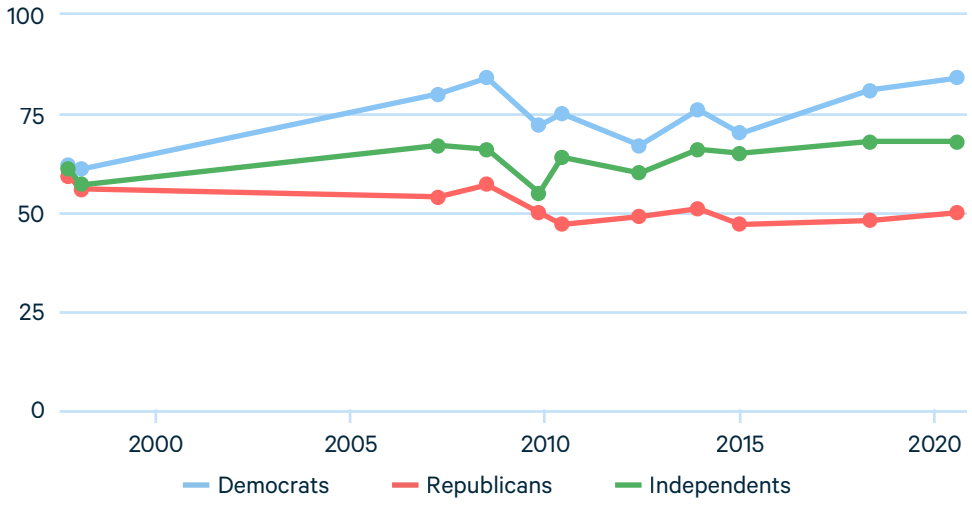
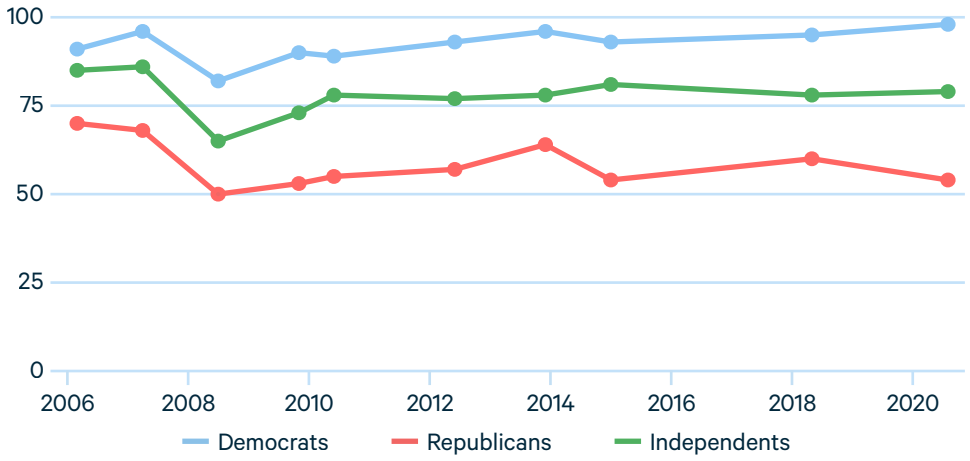


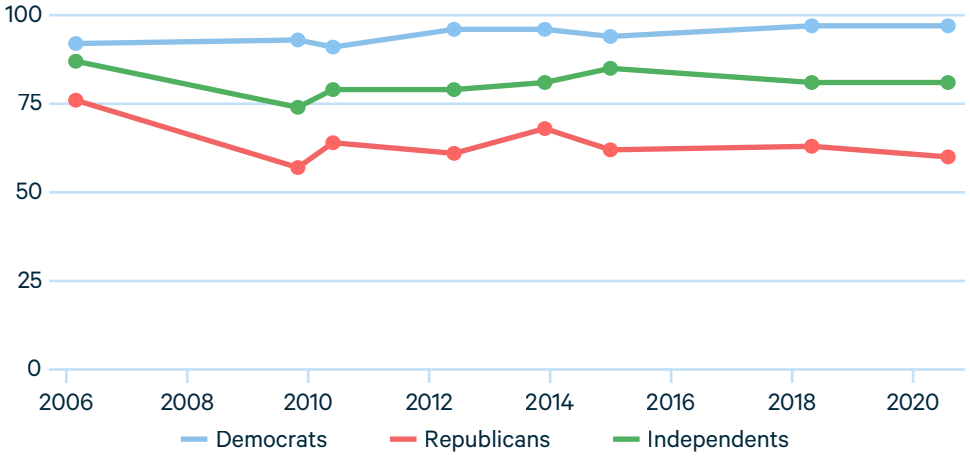
Figure 4.22. Proportion of each group who thought global warming will be a very or somewhat serious problem for the United States



Serious problem for the United States. Majorities of Democrats, Republicans, and Independents have consistently believed that global warming will be a very or somewhat serious problem for the United States in the future. In 2020, nearly all Democrats surveyed (98%) believe that global warming will be a serious problem for the United States, while 54% of Republicans, and 79% of Independents believe the same. The partisan gap is now 44 percentage points.

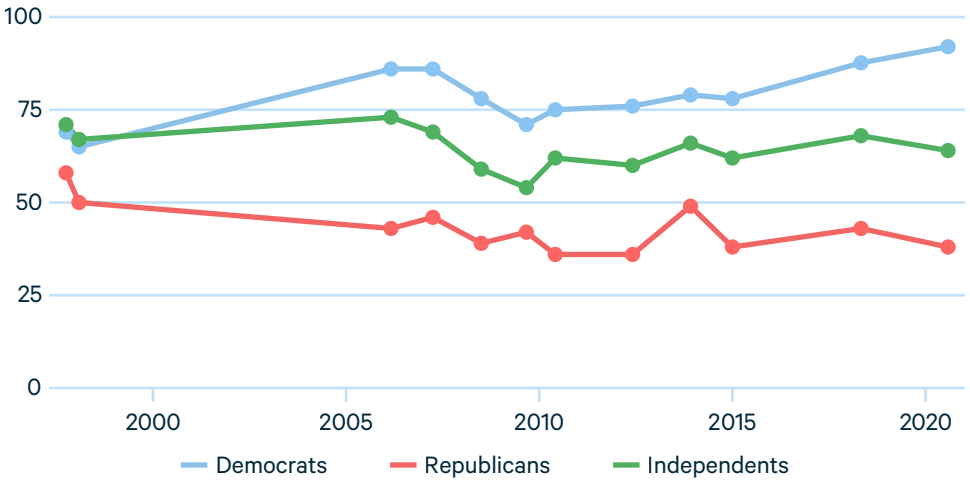
Serious problem for the world. Majorities of Democrats, Republicans, and Independents have consistently believed that global warming will be a very or somewhat serious problem for the world in the future. In 2020, 97% of Democrats, 60% of Republicans, and 81% of Independents hold this view, with a partisan gap of 37 percentage points (about the same as in 2009).

Figure 4.23. Proportion of each group who thought global warming will be a very or somewhat serious problem for the world



Government Action

Figure 4.24. Proportion of each group who thought the US government should do more about global warming



The US government should do more to deal with global warming. Since 1997, majorities of Democrats and Independents have consistently believed that the federal government should do more about global warming. In 2020, 92% of Democrats, 64% of Independents, and 38% of Republicans favor more federal action. The partisan gap is 54 percentage points in 2020.

Governments in other countries should do more to deal with global warming. Since 1997, majorities of Democrats, Republicans, and Independents have believed that governments in other countries should do more about global warming. In 2020, 87% of Democrats, 54% of Republicans, and 67% of Independents believe this, with a partisan gap of 33 percentage points.

Figure 4.25. Proportion of each group who thought that governments in other countries should do more about global warming

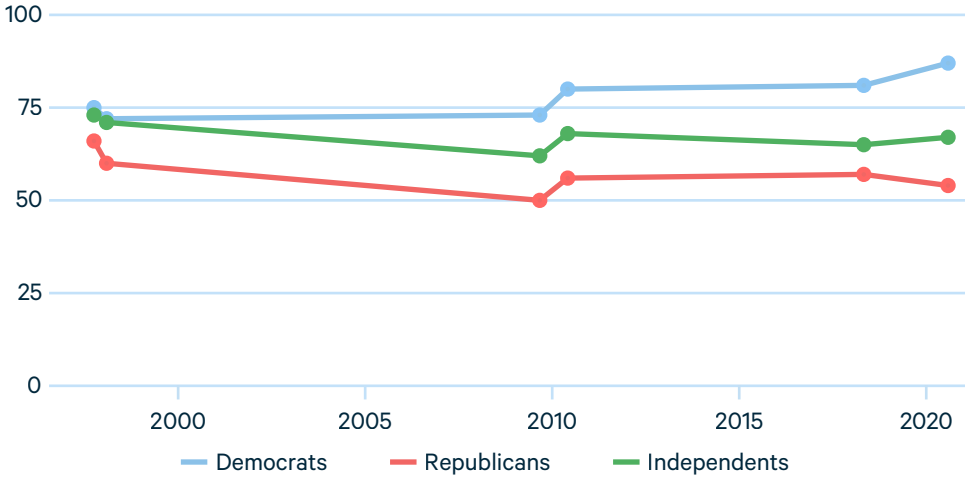
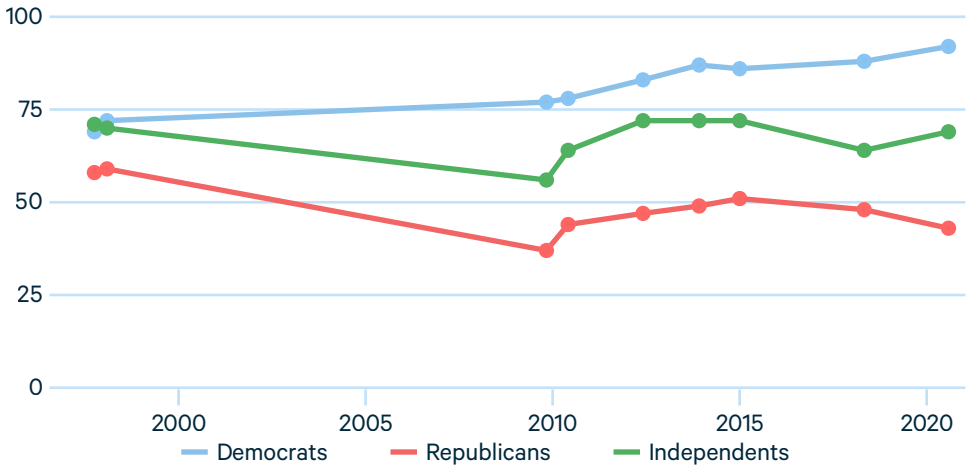


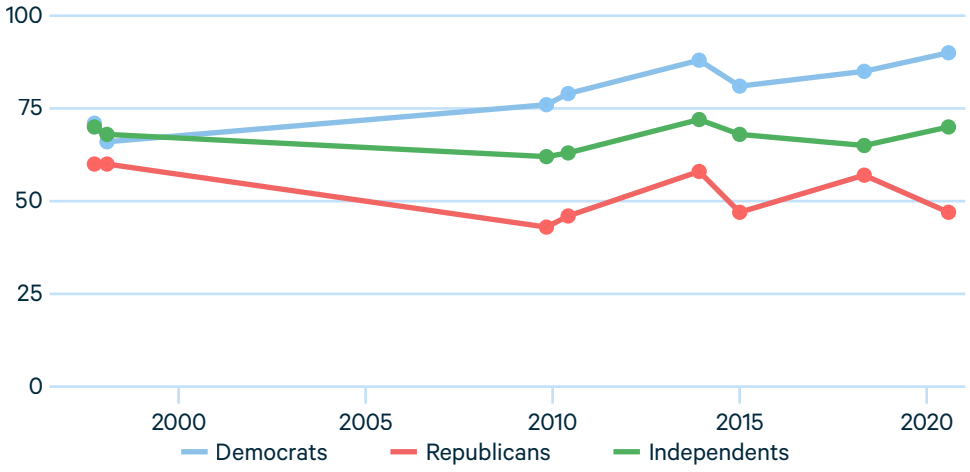
Figure 4.26. Proportion of each group who thought that US businesses should do more about global warming



US businesses should do more to deal with global warming. Since 1997, majorities of Democrats and Independents have believe that US business should do more about global warming. In 2020, 92% of Democrats and 69% of Independents believe that businesses should do more. Minorities of Republicans have favored increased action from businesses, with all-time highs of 58–59% in 1997 and 1998. The partisan gap is 49 percentage points in 2020.

Average people should do more to deal with global warming. Since 1997, majorities of Democrats and Independents have believed that average people should do more about global warming. In 2020, 90% of Democrats and 70% of Independents think that average people should do more. Smaller proportions of Republicans have also favored increased individual action, with all-time highs of 60% in 1997 and 1998. The partisan gap is 43 percentage points in 2020.

Figure 4.27. Proportion of each group who thought that average people should do more about global warming



EXPERT INSIGHT

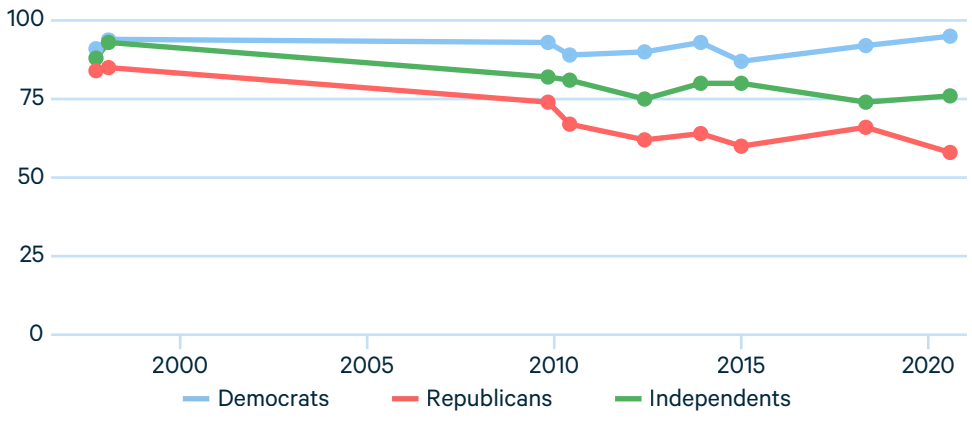
Though there are differences between the parties, the majority of Americans agree that governments, businesses, and individuals should do more to combat climate change. However, that action looks different for these various stakeholders. For individuals, that might include eating less meat or driving less. For businesses, it may take the form of transparent climate pledges and actions enabled by consumer-driven preferences for cleaner goods, such as cutting down on material waste. Governments can do more with regulatory decisions and trade negotiations and reduce their own emissions.

Considering that all three major political affiliations assigned similar beliefs for each of these four categories, the general consensus seems to be that respondents hold high standards which have not yet been met. The question remains, though, whether people will show their approval if these entities do, in fact, rise to the occasion. Will Americans buy more from environmentally conscious businesses even if their prices are higher, or is regulation required to level the playing field? Will Americans vote for "green" candidates? While climate change action continues to grow in the public conversation, I think that incentives will be necessary to enact real change in the market and political spheres. One can infer that Americans appear ready to support that.

—**Dallas Burtraw**, RFF Darius Gaskins Senior Fellow

Limit Greenhouse Gas Emissions. Majorities of Democrats, Republicans, and Independents have consistently believed that the federal government should limit the amount of greenhouse gases that businesses emit. In 2020, 95% of Democrats, 58% of Republicans, and 76% of Independents favored this policy option, with a partisan gap of 37 percentage points (a fairly large increase from past years).

Figure 4.28. Proportion of each group who thought the federal government should limit the amount of greenhouse gas US businesses emit



Though there are differences between the parties, the majority of Americans agree that governments, businesses, and individuals should do more to combat climate change.

Mitigation Policies

Produce electricity from renewable energy sources. Majorities of Democrats, Republicans, and Independents have consistently favored federal government efforts to generate more electricity using water, wind, and solar power. In 2020, 91% of Democrats, 73% of Republicans, and 82% of Independents favor this policy, reflecting a partisan gap of 18 percentage points.

Reduce emission by power plants. Majorities of Democrats, Republicans, and Independents have consistently favored federal government efforts to lower the amount of greenhouse gases produced by power plants. In 2020, 92% of Democrats, 64% of Republicans, and 81% of Independents favor this policy, with a partisan gap of 28 percentage points (about the same as in 2013).

Figure 4.29. Proportion of each group who favored the federal government giving companies tax breaks to produce more electricity from water, wind and solar power

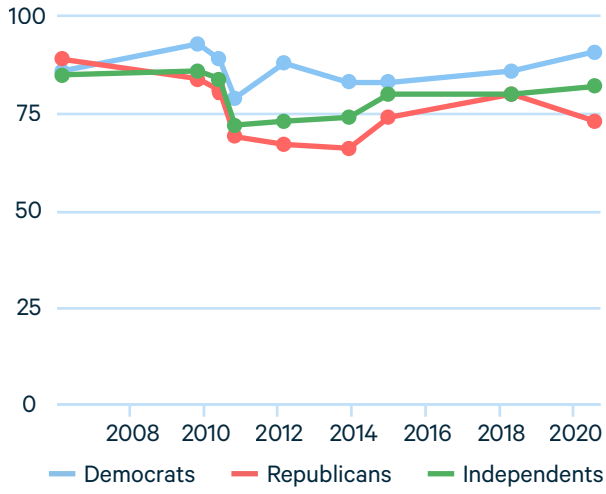
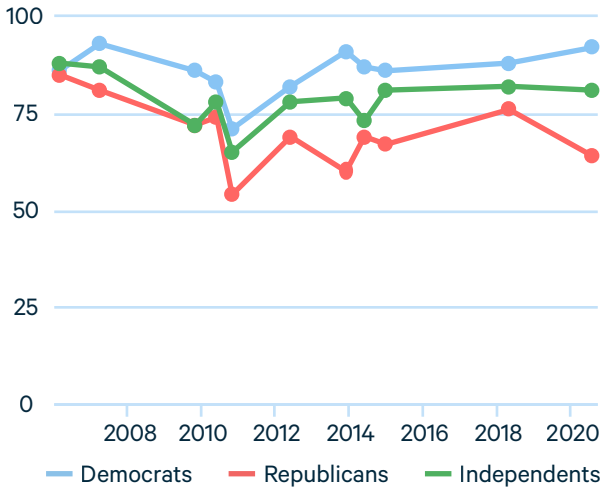


Figure 4.30. Proportion of each group who favored the government requiring or encouraging with tax breaks reduction of greenhouse gas emissions from power plants



In 2020, 91% of Democrats, 73% of Republicans, and 82% of Independents favor federal government efforts to generate more electricity using water, wind, and solar power, reflecting a partisan gap of 18 percentage points.

Increase CAFE Standards. Majorities of Democrats, Republicans, and Independents have consistently favored federal government efforts to cause improvement in the fuel efficiency of cars. In 2020, 86% of Democrats, 52% of Republicans, and 70% of Independents favor this policy option, with a partisan gap of 34 percentage points (about the same as in 2013).

Increase energy efficiency of buildings. Majorities of Democrats, Republicans, and Independents have consistently favored federal government efforts to improve the energy efficiency of new buildings. In 2020, 86% of Democrats, 61% or Republicans, and 74% of Independents favor this policy option, with a partisan gap of 25 percentage points.

Increase energy efficiency of appliances. Majorities of Democrats, Republicans, and Independents have consistently favored federal government efforts to cause appliances to become more energy efficient. In 2020, 86% of Democrats, 52% of Republicans, and 70% of Independents favor this policy option, with a partisan gap of 34 percentage points (about the same as in 2013).

Figure 4.31. Proportion of each group who thought the government should either require or give tax breaks to construct more energy-efficient cars

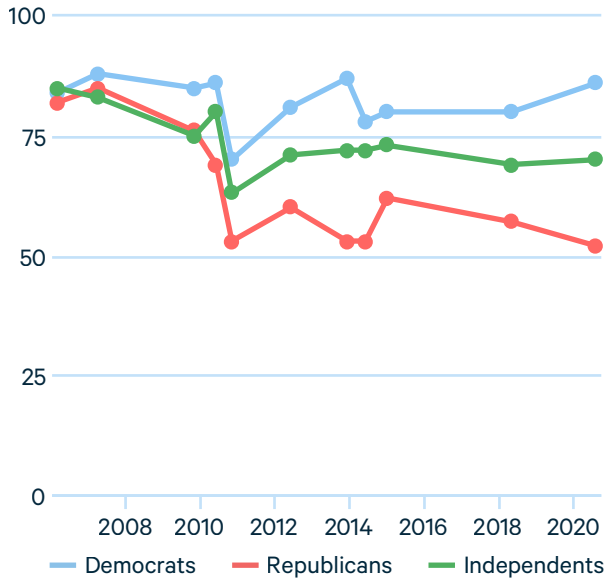


Figure 4.32. Proportion of each group who thought the government should either require or give tax breaks to construct more energy-efficient buildings

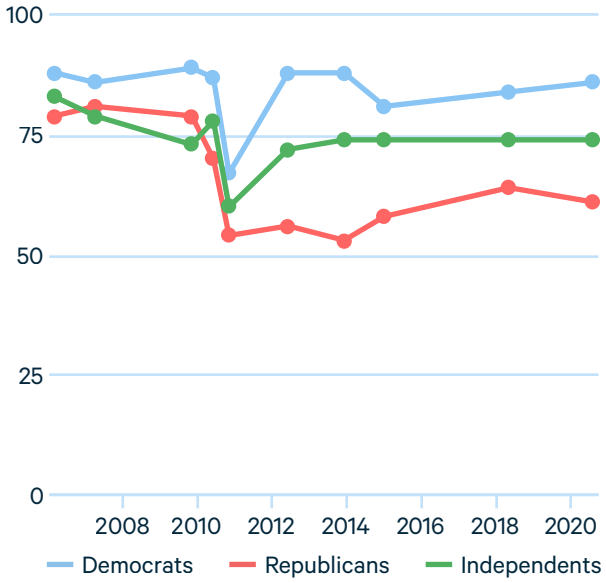


Figure 4.33. Proportion of each group who thought the government should either require or give tax breaks to construct more energy-efficient appliances

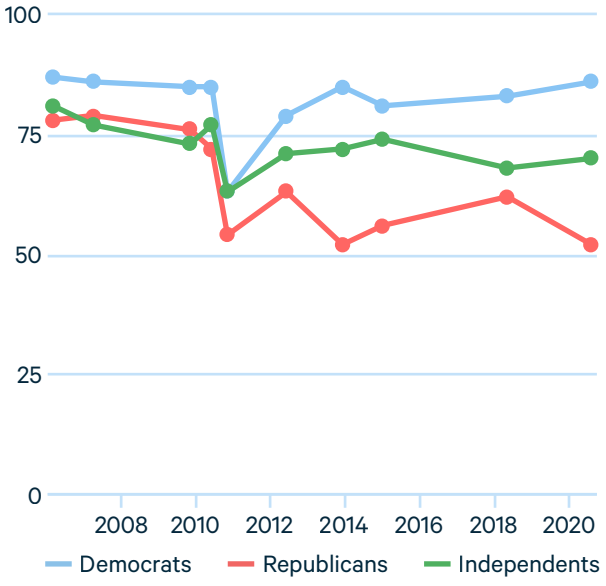
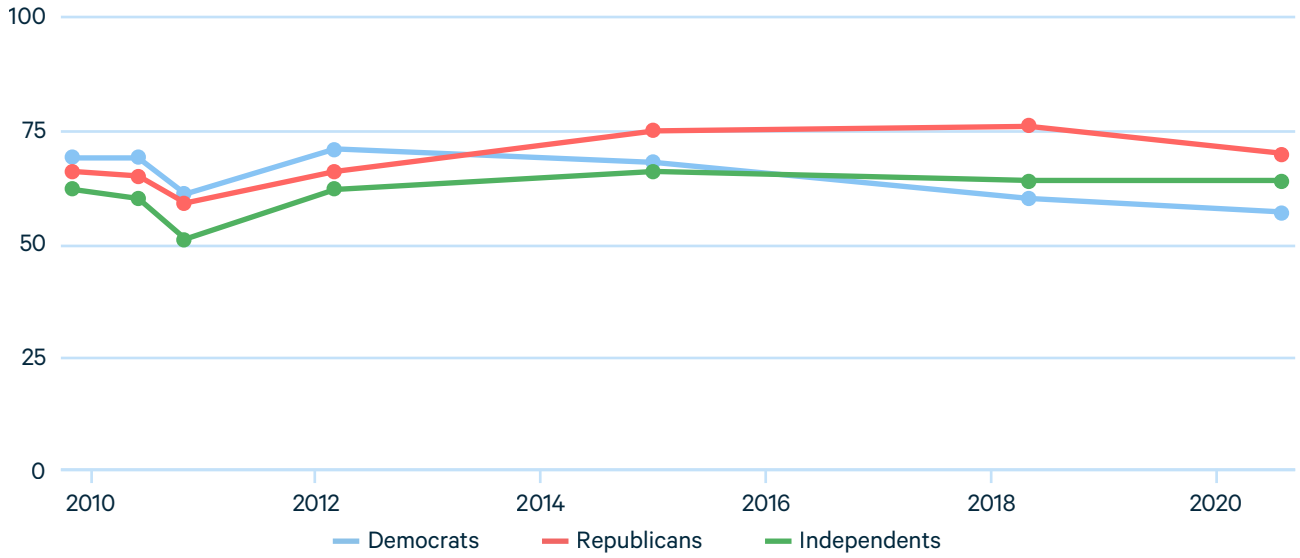


Figure 4.34. Proportion of each group who thought the government should require or give tax breaks for the use of new methods to reduce air pollution from coal-fired electricity generation



Carbon capture and storage. Majorities of Democrats, Republicans, and Independents have consistently favored federal government efforts to encourage reducing air pollution from burning coal. Strikingly, this is most popular among Republicans in 2020 (70%), less popular among Independents (64%), and less popular still (57%) among Democrats. Thus, the partisan gap reversed, with support 13 percentage points higher among Republicans than Democrats.

EXPERT INSIGHT

Unlike many of the other policies explored in this survey, more Republicans than Democrats or Independents approved of incentives or requirements for carbon capture and storage. Encouraging carbon capture through tax credits may be particularly appealing to Republicans who disapprove of additional regulatory mandates and increased taxes.

In 2018, Congress increased the **45Q tax credits** for companies that **capture and store or use the carbon dioxide they produce** rather than releasing it into the atmosphere. These tax credits could help bolster the use of technologies to fight climate change by reducing the amount of greenhouse gases that coal and other fossil fuels create. These tax credits had bipartisan support in Congress, and Republican leaders have introduced other bills as well that focused on carbon capture and sequestration.

Constructing and operating carbon sequestration technology tends to be costly, so tax credits have the potential to stimulate its growth and technological change, both of which can reduce costs and prices, much like the tax breaks for solar and wind energy. One important note, though, is that how the regulations for eligibility and other elements are written matters—as shown in **my research with Brian Prest** on refined coal tax credits and **my research with Jay Bartlett on 45Q**. In order to benefit the environment, these incentives must actually lead to decreased emissions.

—**Alan Krupnick**, RFF Senior Fellow

Unlike many of the other policies outlined in this survey, more Republicans than Democrats or Independents approved of incentives or requirements for carbon capture and storage.

Nuclear Power Plants. The proportions of Democrats, Republicans, and Independents who favored federal government efforts to provide tax breaks to encourage construction of nuclear power plants have varied above and below 50%. Republicans have almost always favored this more than Democrats and Independents. In 2020, 33% of Democrats, 44% of Republicans, and 37% of Independents favor this policy option, with a partisan gap of 11 percentage points (about the same as in 2006 and after).

Gasoline Consumption Taxes. An increase in federal taxes on gasoline to cause people to use less of it has almost never gained majority support. Increased gasoline taxes reached and surpassed 50% favoring among Democrats in 2015 and 2018, then gained significant traction in 2020, reaching a peak at 65%. The partisan gap in 2020 was 47 percentage points, an all-time high.

Electricity Consumption Taxes. An increase in federal taxes on electricity to cause people to use less of it has never gained majority support. Increased electricity taxes are supported by only 40% of Democrats, 12% of Republicans, and 27% of Independents in 2020, with a partisan gap of 47 percentage points—an all-time high.

Figure 4.35. Proportion of each group who favored the federal government giving tax breaks to build nuclear power plants

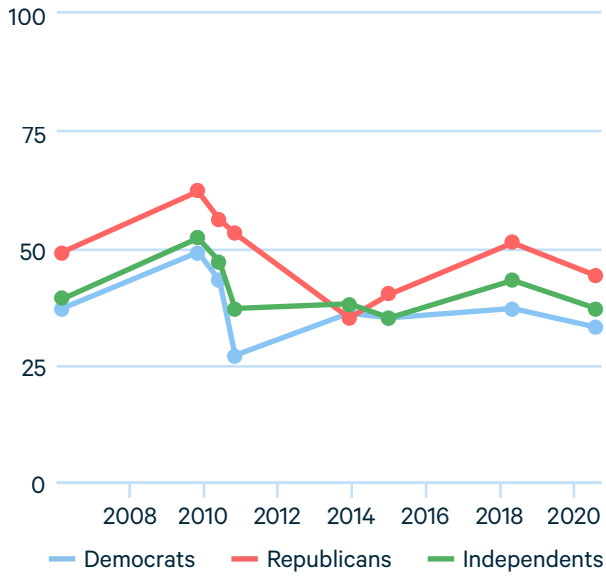


Figure 4.36. Proportion of each group who favored the federal government increasing taxes on gasoline

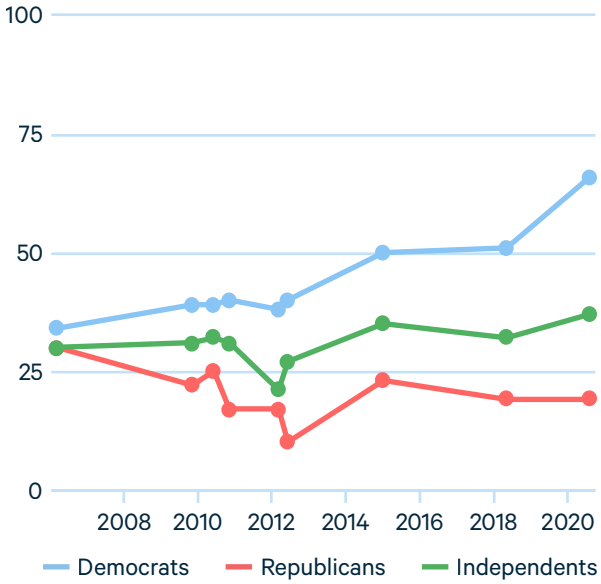
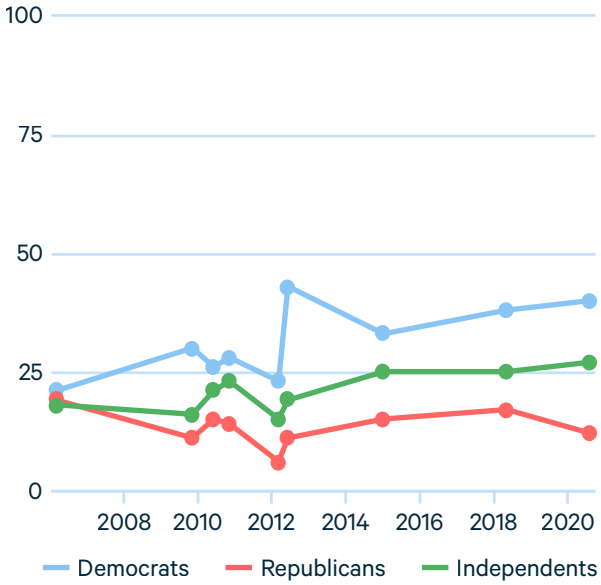


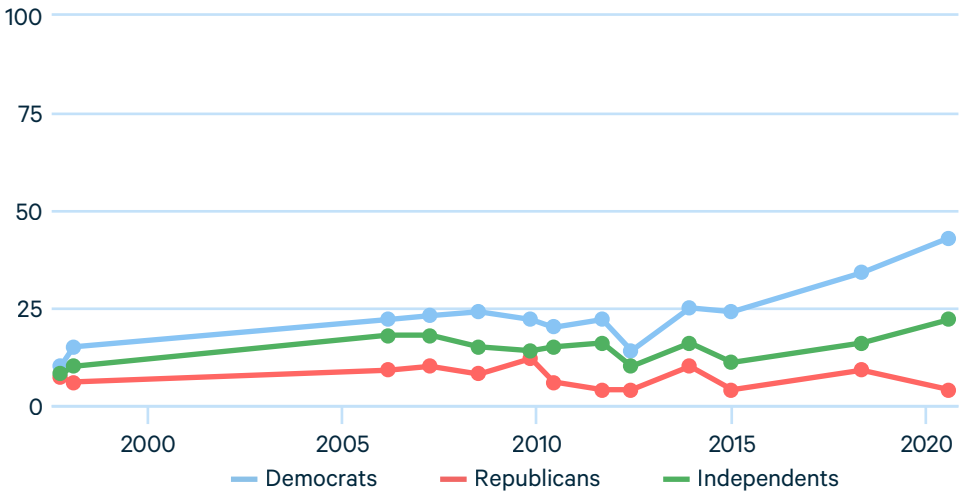
Figure 4.37. Proportion of each group who favored the federal government increasing taxes on electricity



Engagement

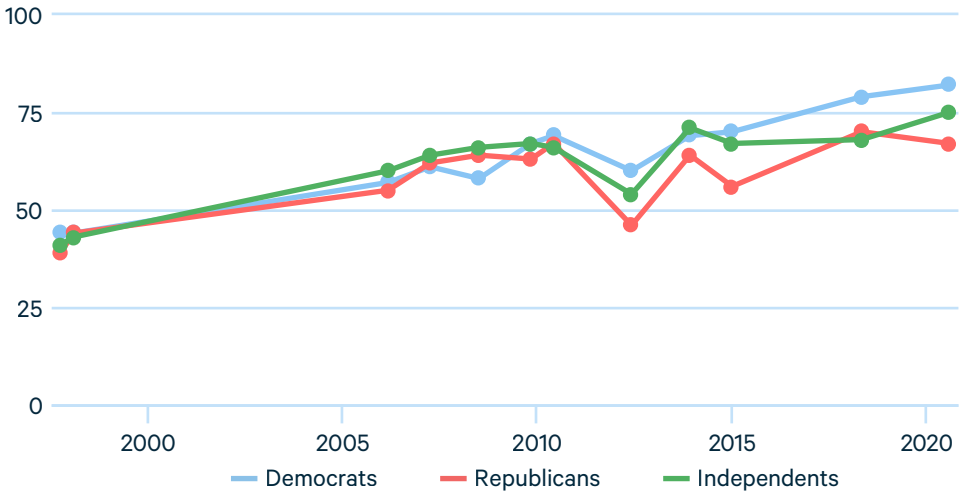
Issue Public. The proportion of people in the global warming issue public (for whom the issue is extremely personally important) is largest among Democrats in 2020 at 43%. Meanwhile, 22% of Independents and 4% of Republicans fall into the issue public – a 39-percentage-point partisan gap, which is the largest gap since 1997.

Figure 4.38. Proportion of each party to whom global warming is extremely personally important



Knowledge about Global Warming. In 2020, reported knowledge about global warming is high among all three groups, and higher among Democrats than among Republicans and Independents, with a 15-percentage-point partisan gap.

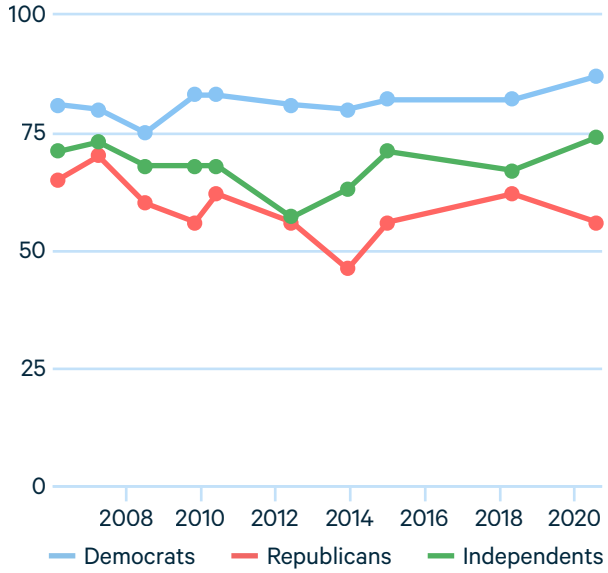
Figure 4.39. Proportion of each group who thought they knew a lot or a moderate amount about global warming



Trust in Climate Scientists

Trust in Climate Scientists. The vast majority of Democrats (87%) and smaller majorities of Republicans (56%) and Independents (74%) trust scientists studying the environment in 2020. The partisan gap is 31 percentage points in 2020.

Figure 4.40. Proportion of each group who trusted the things scientists say about the environment completely, a lot, or a moderate amount



Trust in climate scientists is at an all-time high among Democrats and Independents.

EXPERT INSIGHT

Who would have thought that we would question our trust in science? Yet the data show clear disparities in how people view scientists. This may be partly due to increasingly complex problems that science is expected to solve. Creating a polio vaccine and getting to the moon were relatively straightforward challenges, but today's problems—from climate change to cross-over of zoonotic disease like the novel coronavirus—require a more interdisciplinary, systems approach.

It is also clear that many scientists are not trained to communicate with non-scientists. Several professional societies have taken on this challenge proactively. The Ecological Society of America, for example, runs training programs for ecologists at their annual meeting and in special programs. From my experience, one of the most successful training programs is Stanford University's **Earth Leadership Program**. And as testament to the importance of this topic, the National Academies are supporting a Standing Committee on Science Communication.

One challenging aspect of this issue is the loss of critical thinking in K–12 education. Many schools don't have trained science teachers below high school. This situation is exacerbated in **under-resourced schools** characterized by poverty or near poverty. Is it any wonder that many people form their opinions from social media, rather than more authoritative sources? I will leave it to others to speculate on the significant separation between parties since 2018, but I believe we will look back on 2020 as a time when society's waning trust in science and our education system as a whole will be put under a microscope to understand... why?

—**Ann Bartuska**, RFF Senior Advisor

Conclusion

One way to think about these findings is from the perspective of policymakers who wish to be guided at least partly by the opinions of their constituents. If America is divided 50–50 along party lines on the issue of global warming, then the public would offer no guidance in the decisionmaking process, leaving legislators to make decisions based on other considerations.

In the prior sections of this report, we documented large and sometimes huge majorities of Americans agreeing about the existence, cause, and threat of global warming, and about the desirability or undesirability of climate and natural disaster policy options. We also documented large and sometimes huge majorities of Americans agreeing about many other aspects of climate impacts and policy.

In this section, we documented many instances in which majorities of Democrats and Republicans agree with one another—about the existence, cause, and threat of global warming, and about policy approaches to climate mitigation and disaster adaptation.

This is not to say there is no partisan gap in global warming beliefs. As many observers would expect, on many aspects of this issue, endorsement of "green" views is notably more common among Democrats than among Republicans. But as noted above, our 2020 survey indicates that Republicans and Democrats together make up just 57% of Americans. Thus, agreement or disagreement between these individuals is of interest, but it may not be the make-or-break factor in policy decisions, because Independents make up 43% of Americans today—the plurality of the public. Majorities of Independents take "green" positions on many aspects of the issues investigated here. In this light, and given that Republicans do not overwhelmingly oppose climate action, it seems that claims that the nation is hopelessly polarized on this issue are not accurate.

Furthermore, the 26- and 29-percentage-point average partisan gaps shown in Figures 4.16 and 4.17 are best understood in comparison to partisan gaps on other issues. Surveys conducted by several institutions during the past six months illustrate the partisan gap for a variety of issues. These examples, shown in Table 1, demonstrate significant variation in the size of the partisan gap across these issues, from 20% (consensus between parties) for banning police chokeholds to 60% (wide partisan divide) for cutting funding for local police departments.

Thus, a partisan gap of 26 to 29 percentage points on global warming falls on the lower end of this spectrum of policies, with similar levels of bipartisan support to maintaining spending on Medicaid, and greater bipartisan support than we see on availability of abortion services and reparations for Black Americans.

Additionally, a recent **Pew Research Center study** found other large partisan gaps on other important national issues, from immigration to gun control, which had average partisan gaps of 43 and 57 percentage points, respectively (Pew 2019). Clearly, the partisan gaps seen here on global warming are not notable for being huge in the context of contemporary American politics.

Table 1. Partisan gaps on various issues from multiple 2020 surveys

Policy	Republicans	Democrats	Partisan Gap
Support "banning the use of chokeholds by police officers" [a]	51%	71%	20%
Favor "allowing young immigrants who were brought to the US illegally as children to remain in the country if they meet certain requirements" [b]	73%	95%	22%
Oppose "state government decreasing spending on Medicaid to deal with a budget shortfall" [c]	62%	85%	23%
Believe "abortion should be generally available to those who want it" [b]	20%	66%	46%
Think the federal government should "pay money to Black Americans whose ancestors were slaves as compensation for that slavery" [a]	5%	54%	49%
Support "cutting some funding from police departments in your community and shifting it to social services" [d]	10%	70%	60%

[a] **ABC News/Ipsos**. June 17–18, 2020. N=727 adults nationwide. Web-based survey. Estimates were computed by the authors.
[b] **CBS News Poll**. May 29–June 2, 2020. N=1,309 adults nationwide. Margin of error ± 3.1.
[c] **Kaiser Family Foundation**. May 13–18, 2020. N=1189 adults nationwide. "Would you support or oppose your state government decreasing spending on Medicaid to deal with a budget shortfall?" Estimates were computed by the authors.
[d] **Quinnipiac University Poll**. June 11–15, 2020. N=1,332 registered voters nationwide. Margin of error ± 2.7.

> **The partisan gaps on global warming are not notably larger than those on other issues.**

Section 5

Electric Vehicles

Contents

Introduction

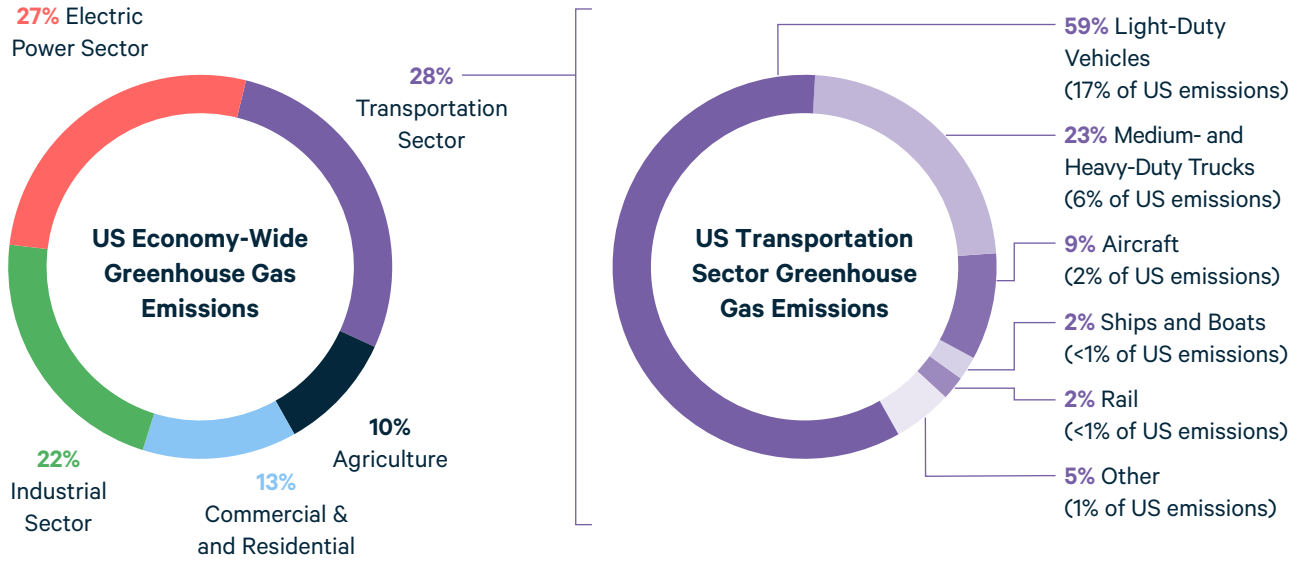
According to findings described in prior sections of this report, large majorities of Americans believe that the earth has been warming over the past 100 years; that this warming will continue in the future if unaddressed; that it will constitute a nationally and globally serious problem; and that governments, businesses, and individuals should take steps to curb this warming and its likely effects.

According to some natural scientists and economists, one potential step to reduce emissions and mitigate climate change would be the widespread adoption of all-electric vehicles (EVs), which can be powered by electricity generated by sunlight, wind, and water. According to the US Environmental Protection Agency (see below), transportation emits more greenhouse gases than any other sector in the US, attributable to transportation's near-complete dependence on fossil fuels. Thus, emissions can be dramatically reduced by widespread adoption of EVs.

Perhaps partly for this reason, manufacturing and sales of EVs have been increasing in recent years. Still, thus far, such sales represent a small share of consumer automobile purchases in the United States.

There are various possible reasons for the slow adoption of this technology. Since most people who might buy an EV already own a car, purchasing one is what economists call a consumer durable replacement decision. According to rational choice theory, consumers will be inclined to replace their gasoline-powered cars with EVs when the latter is expected to yield higher expected utility than the former over the course of ownership. However, recent psychological research has shown that not all consumers think this way. There are considerable psychological costs entailed by durable replacement decisions, and these psychological costs are barriers to the adoption of new technologically innovative products like EVs (for a review, e.g., see Guiltiman 2010).

Figure 5.01. US Greenhouse Gas Emissions (2018)



Data from EPA "Inventory of US Greenhouse Gas Emissions and Sinks" (2018)

Perhaps consumers have developed attachments to their current gasoline-powered cars, creating additional psychic value , referred to as the endowment effect in behavioral economics (Kahneman, Knetsch, & Thaler 1990), and the mere ownership effect in psychology (Beggan, 1992). This additional value makes consumers less likely to replace their current cars, exhibiting the behavior of loss aversion. Additionally, consumers may be uncertain of their evaluations of the expected benefits and costs of a new product like an EV. That uncertainty, to many consumers who are typically risk-averse, may decrease the attractiveness of buying an EV and cause a delay in consumer adoption of such cars.

In addition, some public reluctance to purchase EVs may be derived from functionality. For example, although the charging capacity of EV batteries has been increasing, the miles-per-charge of such vehicles remains more limited than the distance capacity of gasoline-powered vehicles. Furthermore, the United States is blanketed with gasoline stations, giving gasoline-powered vehicles significant flexibility to travel distances that are limited only by the purchasing power of their drivers. In contrast, EVs can only be recharged in locations that offer the necessary infrastructure, and recharging takes time that travelers may not always have available. The attempt by the now-defunct EV firm Better Place to locate battery-swapping stations across the country was meant to solve this problem, but the company's plan did not come to fruition, blamed partly range anxiety—the fear that EVs cannot drive the distances that passengers require and will therefore, leave them stranded (Noel and Sovacool, 2016).

However, even people whose travel patterns do not rule out EVs may hesitate before purchasing them for a variety of other reasons, some more rational than others. For example, prospective car buyers might perceive EVs to cost more to maintain than gasoline-powered vehicles. Prospective buyers might believe that there are fewer mechanics qualified to fix all-electric cars than can fix gasoline-powered vehicles, which would impose the inconveniences of additional distance, time, and cost when maintenance is required. Buyers might think that the acceleration of EVs cannot match that of gasoline-powered vehicles. Buyers might think that EVs depreciate more quickly than do gasoline-powered vehicles.

In light of these possible hesitations, it is interesting that both US President Donald Trump and President-Elect Joe Biden have recently expressed support for government efforts to promote use of all-electric vehicles. For example, during the first presidential debate on September 29, 2020, both candidates said they favor enhanced use of electric vehicles. Mr. Biden has pledged to build 500,000 charging stations on highways, to increase the proportion of federally owned and operated vehicles that are all-electric, and to provide tax credits to incentivize consumer purchases of such vehicles (Biden, 2020). During the debate, Mr. Trump also expressed his support for EVs: "I'm OK with electric cars, too. I'm all for electric cars. I've given big incentives for electric cars" (Kolodny, 2020).

With electric vehicles seeming to secure bipartisan support from leaders, it is of interest to explore the openness of American consumers to purchasing all-electric

vehicles and to identify the sources of consumer hesitation impeding such purchases. To that end, we conducted a national survey asking American adults about their openness to purchasing all-electric vehicles in the future and their perceptions of various attributes of such vehicles. These questions allowed us to quantify the various hesitations and to estimate the impact of each belief on likelihood of purchasing all-electric vehicles in the future.

Understanding those sources of consumer hesitation may shed light on factors currently impeding expansion of the EV market in the United States. Many factors are presumed to influence consumer purchases, such as the cost of a product; the product's safety, reliability and effectiveness; advertising and marketing to promote the product; brand appeal packaging; and more. Building on consumer choice theory, we hypothesized that product safety concern, economic costs, product features, normative considerations, and prior exposure may predict the public's hesitation to purchase EVs (e.g., Ewing & Sarigollu, 2000).

Furthermore, when purchasing expensive and technically complex products such as EVs, consumers are confronted with many competitive alternatives, and considering each alternative requires digesting extensive descriptions of the specifications and functionalities of the product. Gathering, processing, comparing, and integrating the large array of information about each attribute of competing alternatives involves substantial cognitive work and psychological involvement (e.g., Abramson, and Desai, 1993), which may diminish consumers' incentives to venture into a new market. Consequently, consumers without the experience or time to thoughtfully 'comparison shop' may hesitate before buying EVs so as to avoid expending the effort required to gather, sift, and process the technical specifications. Alternatively, these individuals may form intentions about purchasing EVs based on a small set of considerations to minimize their effort and rather rely on heuristic shortcuts in guiding their decisions (e.g., Kahneman, 2000).

We also explored whether decisionmaking about EVs might differ between men and women. Many studies suggest that women are more risk-averse than men (Eckel, & Grossman, 2008) and invest more conservatively than men (Bajtelsmit, & Bernasek, 1996), which suggests that women may be more hesitant to adopt EVs than men. Furthermore, women place different weight than men on various product attributes when making purchasing decisions (Arslanagic, Pestek, & Kadic-Maglajlic, 2014; Blakewell, & Mitchell, 2006). We therefore explored whether men and women might differ in the weight placed on different attributes that might influence openness to purchasing EVs.

Past scholarship has explored factors that inhibit purchasing of EVs in the United States and abroad, informed by elaborate psychological theories in some cases. For example, Nayum and Klockner (2014) estimated the parameters of a mediated structural equation model pointing to the roles of awareness, social norms, personal norms, attitudes, intentions, knowledge, and more (see also Priessner, Sposato, and Hampl, 2018). Barbarossa et al. (2015) provided evidence of the impact of eco-friendly self-identity, concern about the environmental consequences of consumption, and moral obligation (see also Thogersen, and Ebsen, 2019). Schmalfuss, Muhl, and Krems

Understanding the sources of consumer hesitation may shed light on factors currently impeding expansion of the electric vehicle market in the United States.

(2017) and Thogersen and Ebsen (2019) showed that direct experience with EVs generally made people more positive toward them, thus reducing purchase resistance. Jansson, Nordlund, and Westin (2017) documented the impact of attitudes and social influence on purchase resistance.

Provocative as these papers are, they are thick on abstract theory, often rely on data collected outside the United States (e.g., Barbarossa et al., 2015; Jansson, Nordlund, & Westin, 2017; Priessner, Sposato, & Hampl, 2018; Thogersen, & Ebsen, 2019), and when done in the United States, did not involve representative samples of prospective car buyers. We took advantage of representative sample survey data and implemented a much simpler analytic approach by estimating the impact of perceptions of the advantages and disadvantages of EVs on consumer openness to purchasing them. In that sense, our study is more akin to that done by Carley, Krause, Lane, and Graham (2013), whose analysis explored perceptions of two disadvantages of EVs: range restriction and charging time, both of which were shown to inhibit purchasing intentions. We expand on their approach by exploring a wider range of potential disadvantages of EVs to identify the drivers of resistance to purchasing them.

These issues were explored using the data from our national telephone survey, conducted from May 28 to August 10, 2020. In this section, we describe the results obtained from statistical analyses of the data and spell out the implications of those results. A separate methodology report, which can be found **here** under "Methodology and Data," describes the methods of the survey data collection and the measures included in it to address all-electric vehicles.

EXPERT INSIGHT

During the past decade, we have seen a dramatic increase in the number of plug-in hybrid and all-electric vehicles on the road. As both all-electric and plug-in hybrid prices have declined and performance has improved with the help of government subsidies, the power of EVs in the auto industry is growing. In fact, Tesla is the most valuable car company in the United States, and, as of mid-October 2020, was worth more than Ford and General Motors combined.

However, EVs still make up a small market share of new passenger vehicles. Compared to gas-powered cars, there are relatively few options and charging stations remain scarce in many places in the United States. Gas-powered vehicles will likely continue dominating the market for some time, but EVs may replace gas-powered vehicles in the long-term. When that time comes will be influenced by the presence of government subsidies, advances in battery technology, and consumer behavior. But overall, the transition from one vehicle technology to another will most likely be gradual.

On the political side, something to watch is California Governor Gavin Newsom's executive order announcing that, by 2035, California will require all new passenger vehicles sold in the state to produce no direct emissions. California is the first jurisdiction to do this in the United States, and the action follows similar announcements that a few countries have made, such as France and Germany. Considering that California accounts for about 10 percent of US sales, it will be interesting to see what will happen to the EV market if CA follows through. Political action like this on the state and federal level will likely have an influence on the future of EVs.

—**Joshua Linn**, RFF Senior Fellow

Methodology

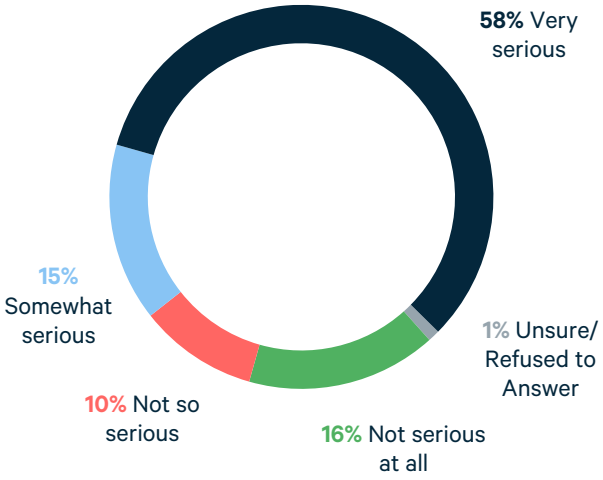
The Climate Insights 2020 national public opinion survey involved telephone interviews with a representative sample of 999 adults living in the United States. The Climate Insights 2020 national public opinion survey involved telephone interviews with a representative sample of 999 adults living in the United States. We conducted statistical analyses to explore these responses further. For more information on the survey methodology, including details on sample design, field procedures, data verification, weighting, and questions used to measure demographics, please see the **Electric Vehicles Survey Methodology Report** and the **Climate Insights 2020: Electric Vehicles Technical Report**. Question wordings for each figure can also be found in Appendix A of this report.

Why May Americans Be Resistant to Electric Vehicles?

Opinions on Global Warming

Nearly one-quarter (26%) of Americans believe that unchecked global warming will not be a problem for the United States (16%) or believe it will be a "not so serious" problem (10%). These individuals may be less motivated to consider buying an EV than the 15% who believe that unchecked global warming will be a somewhat serious problem and the 58% who think that unchecked global warming will be a very serious problem.

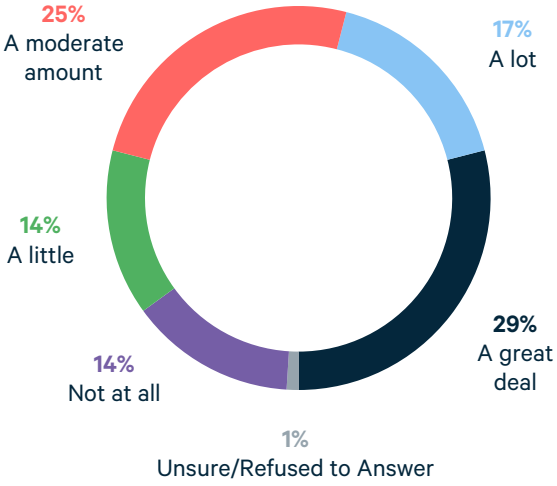
Figure 5.02. Americans' beliefs about how serious a problem global warming will be for the United States



Distributions of Perceptions of EVs

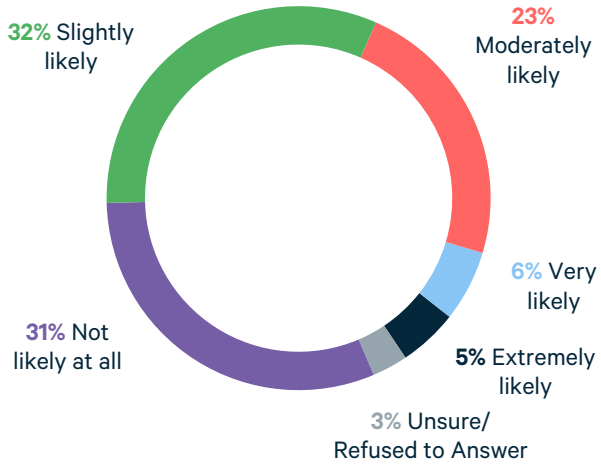
Environmental benefits. More than one-quarter (28%) of Americans believe that driving an EV will not help the environment at all (14%) or that it will help the environment "a little" (14%). These individuals may be less motivated to consider buying an all-electric car than the one-quarter of Americans (25%) who believe that driving an all-electric car will help the environment "a moderate amount," the 17% who believe that it will help the environment "a lot," and the 29% who believe that it will help the environment "a great deal."

Figure 5.03. How much Americans think driving an all-electric car helps the environment



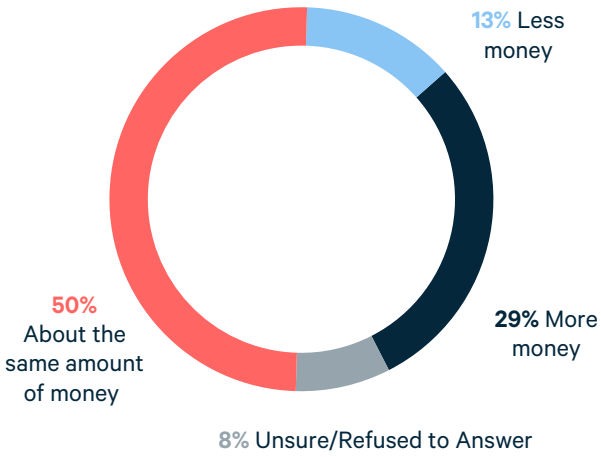
Safety. About one-third (34%) of Americans believe that EV batteries are extremely likely (5%), very likely (6%), or moderately likely (23%) to catch on fire. These individuals may be less motivated to consider buying an EV than the nearly two-thirds of Americans who believe that batteries catching on fire is either slightly likely (32%) or not likely at all (31%).

Figure 5.04. How likely Americans think it is that EV batteries will catch on fire



Economics. Nearly one-third (29%) of Americans believe that maintaining EVs is more costly than maintaining gasoline-powered cars, and these individuals may be less open to purchasing an EV then the 13% and 50% of Americans who believe that maintenance of all-electric cars is less costly than or as costly as maintaining gasoline-powered cars, respectively.

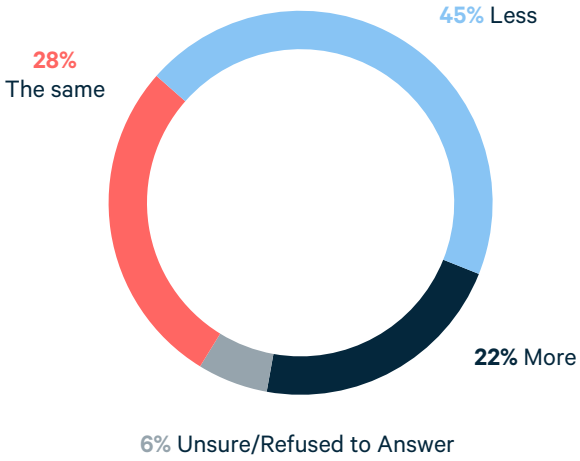
Figure 5.05. Americans' beliefs about maintenance costs of EVs relative to gasoline-powered cars



22% of Americans believe that driving EVs is more costly than driving gasoline-powered cars, and these people may be less motivated to buy an EV than are the 45% and 28% of Americans who believe that driving EVs is less costly than or as costly as driving gasoline-powered cars, respectively.

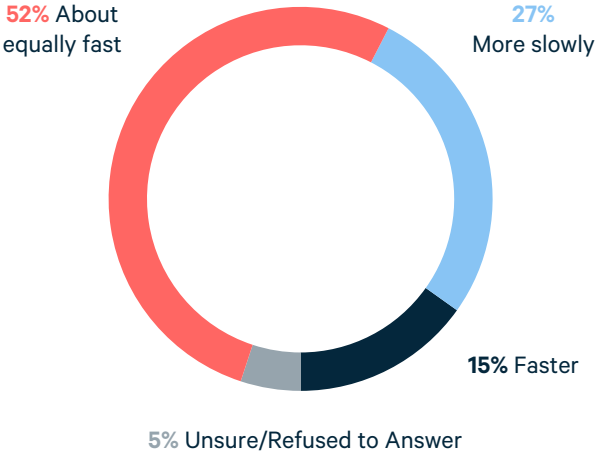
> **45% of Americans think that it is cheaper to drive an EV one mile than a gasoline car.**

Figure 5.06. Americans' beliefs about whether the electricity to drive an EV one mile costs more, less, or the same as gas to drive a gasoline-powered vehicle one mile



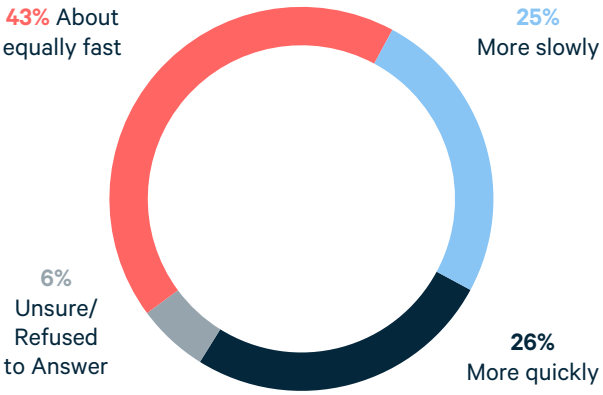
15% of Americans believe that all-electric cars lose value more quickly than gas-powered cars. These people may be less motivated to purchase an EV than the 27% who think that EVs lose value more **slowly** than gas-powered cars and the 52% who believe that depreciation of all-electric cars and gasoline-powered cars is about the same.

Figure 5.07. Percentage of Americans who think EVs lose value faster, more slowly, or at the same rate as gasoline-powered vehicles



Performance and efficiency. One-quarter of Americans (25%) believe that all-electric cars have poorer acceleration than gasoline-powered cars. These people may be less motivated to buy EVs than the 26% who believe that all-electric cars have better acceleration than gasoline-powered cars and the 43% who perceive no difference in acceleration between all-electric cars and gasoline-powered cars.

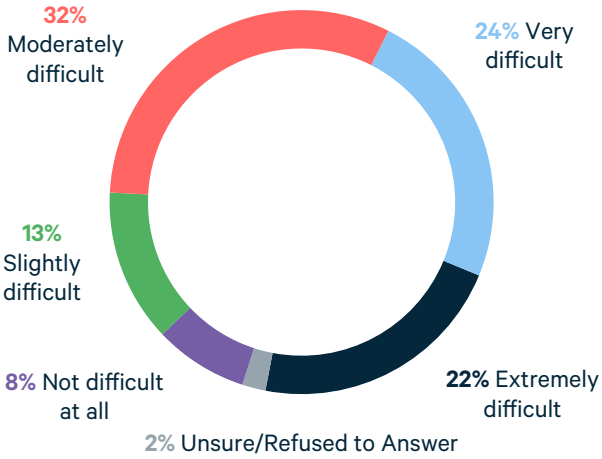
Figure 5.08. Americans' beliefs about whether Artens Artens



22% of Americans believe that charging EV batteries is extremely difficult, 24% believe it is very difficult, and 32% perceive it to be moderately difficult. If perceived difficulty of charging EV batteries factors into the decision to purchase, these 78% of Americans may be more reluctant to buy EVs than are the 13% and 8% who believe battery charging is slightly difficult and not difficult at all, respectively.

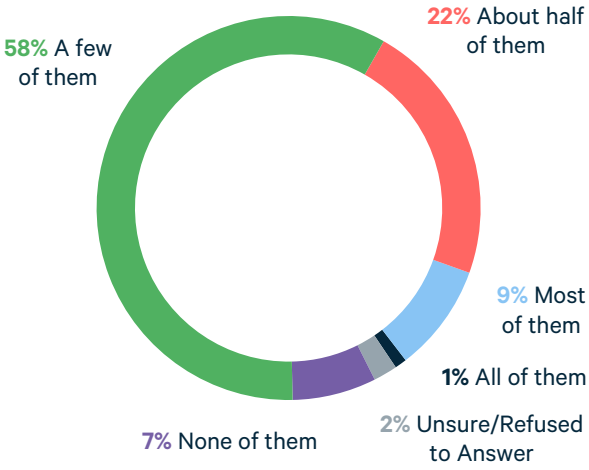
> **78% of Americans think finding an EV charging station is at least moderately difficult.**

Figure 5.09. Americans' beliefs about how difficult it is to find an EV charging station



58% of Americans believe that "a few" auto mechanics can repair EVs, and 7% believe that "essentially none" can. These Americans may be more reluctant to buy EVs than those who believe that "about half," "most," or "all" mechanics can fix them (22%, 9%, and 1%, respectively).

Figure 5.10. Americans' beliefs about how many mechanics can fix EVs



A little more than half of Americans who anticipate purchasing a car in the future will consider buying an all-electric car.

Prior exposure. 65% of Americans have not driven or known someone who has driven an all-electric car or truck. These people—representing about two-thirds of Americans—may be more reluctant to buy an EV than are the 34% who have driven one or know someone who has driven one.

Openness to buying an EV. 40% of Americans said they will buy a car in the future and will consider buying an all-electric car, 30% said they will buy a car in the future but will not consider buying an all-electric car, and 28% said they will not buy a car in the future. Thus, of future car buyers, 57% said they will consider buying an EV.

Figure 5.11. Percentage of Americans who have or have not driven an EV or known someone who has

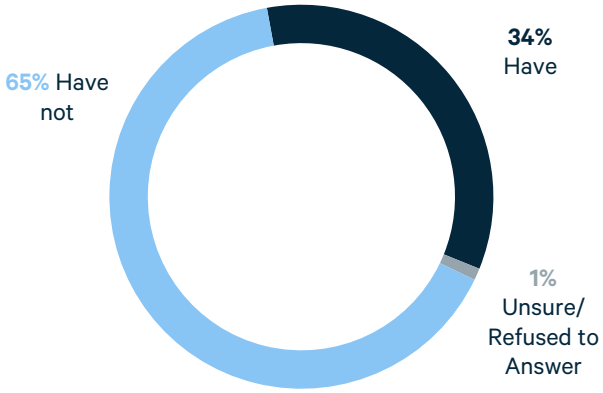
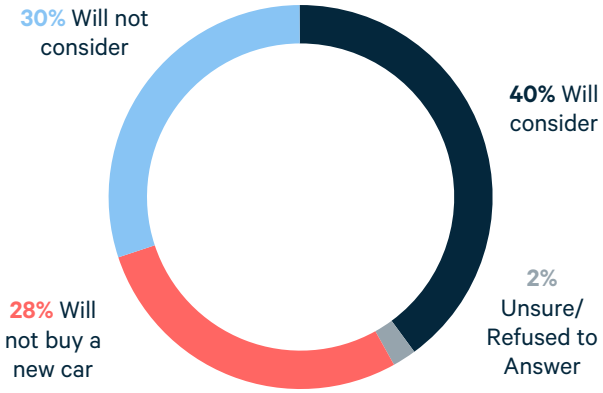


Figure 5.12. Percentage of Americans who will or will not consider buying an EV



EXPERT INSIGHT

It appears that many people would at least consider buying an EV. This is striking, because EVs represent about 2% of all new vehicle sales. It begs the question, what is preventing those *considering* an EV from actually *buying* an EV? It may be a combination of reasons. First, only a few dozen EV models are available, compared to hundreds of gasoline models. This really restricts options. Second, EVs remain more expensive than an equivalent gasoline vehicle. Third, battery range remains a concern, as a typical mass-market EV still only gets 200 to 300 miles per charge. This is much smaller than the range of a typical gasoline vehicle.

It seems that many people think charging is a challenge (Figure 5.09), even though the number of EV charging stations has increased a lot over time. This could be due to a lack of awareness of where charging stations are located. Gas stations are large and obvious, while EV charging stations are less obvious.

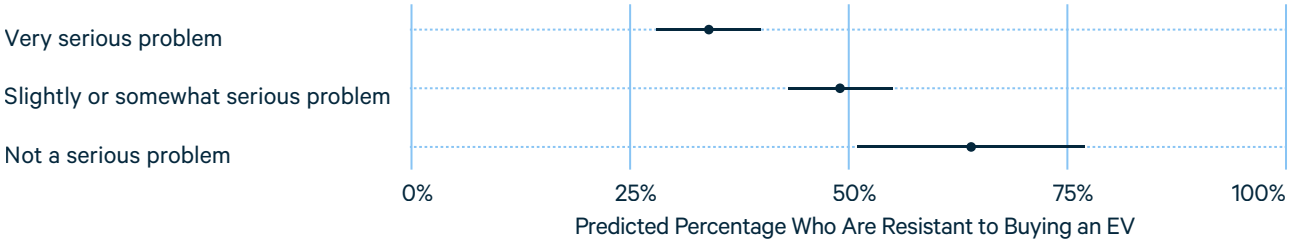
—**Benjamin Leard**, RFF University Fellow

65% of respondents have neither driven nor known someone who has driven an all-electric car or truck.

Predicting Resistance to Purchasing EVs

Global warming. In the OLS regression predicting purchase openness (see **technical report**), the strongest predictor of reluctance is the belief that global warming will not be a serious problem for the United States in the future. The more serious people believe global warming will be in the future, the more likely they are to consider buying EVs.

Figure 5.13. Predicting reluctance to buy an EV: Effects of global warming beliefs



Environmental protection. Controlling for beliefs about global warming, the perception that driving EVs does not help the environment did not inhibit intentions to purchase such cars. When the perception that driving EVs does not help the environment was included among the predictors in the regression equation but beliefs about global warming were not, beliefs about environmental protection were a marginally significant inhibitor to purchase intentions, as expected. Thus, it seems that beliefs about global warming are the motivator behind this relation involving environmental protection.

Figure 5.14. Predicting reluctance to buy an EV: Effects of beliefs about environmental benefits

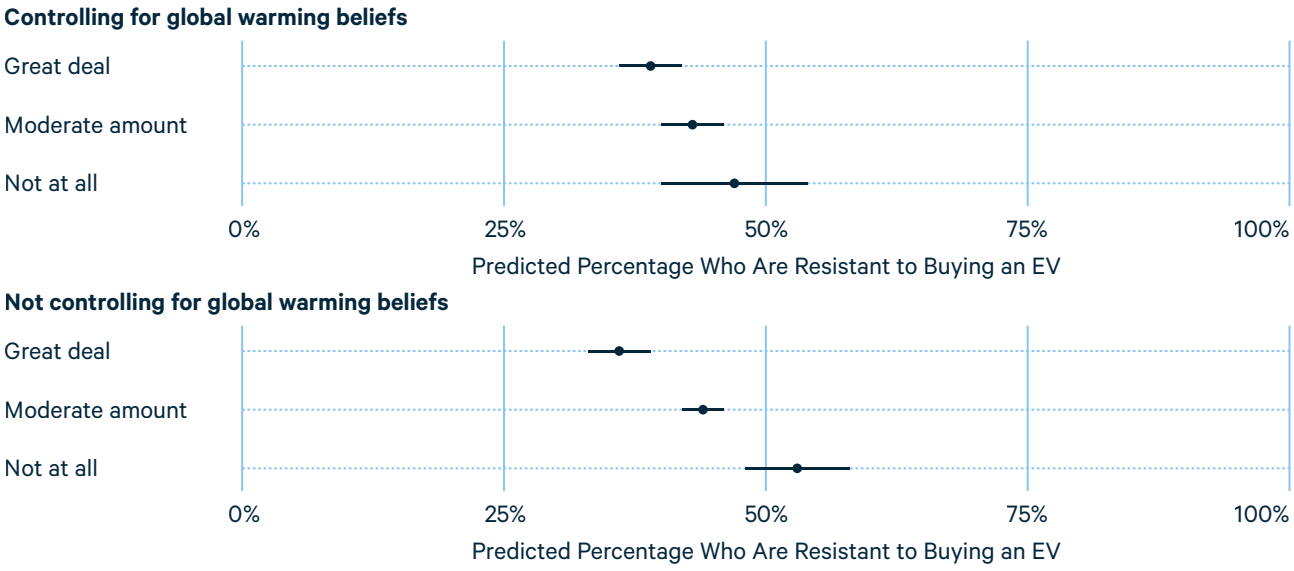
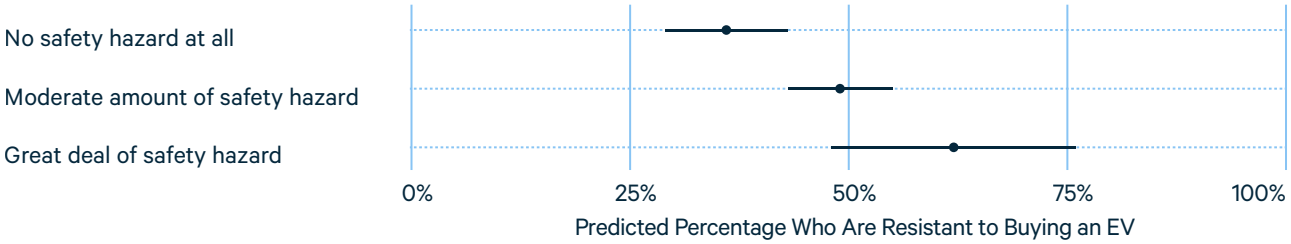


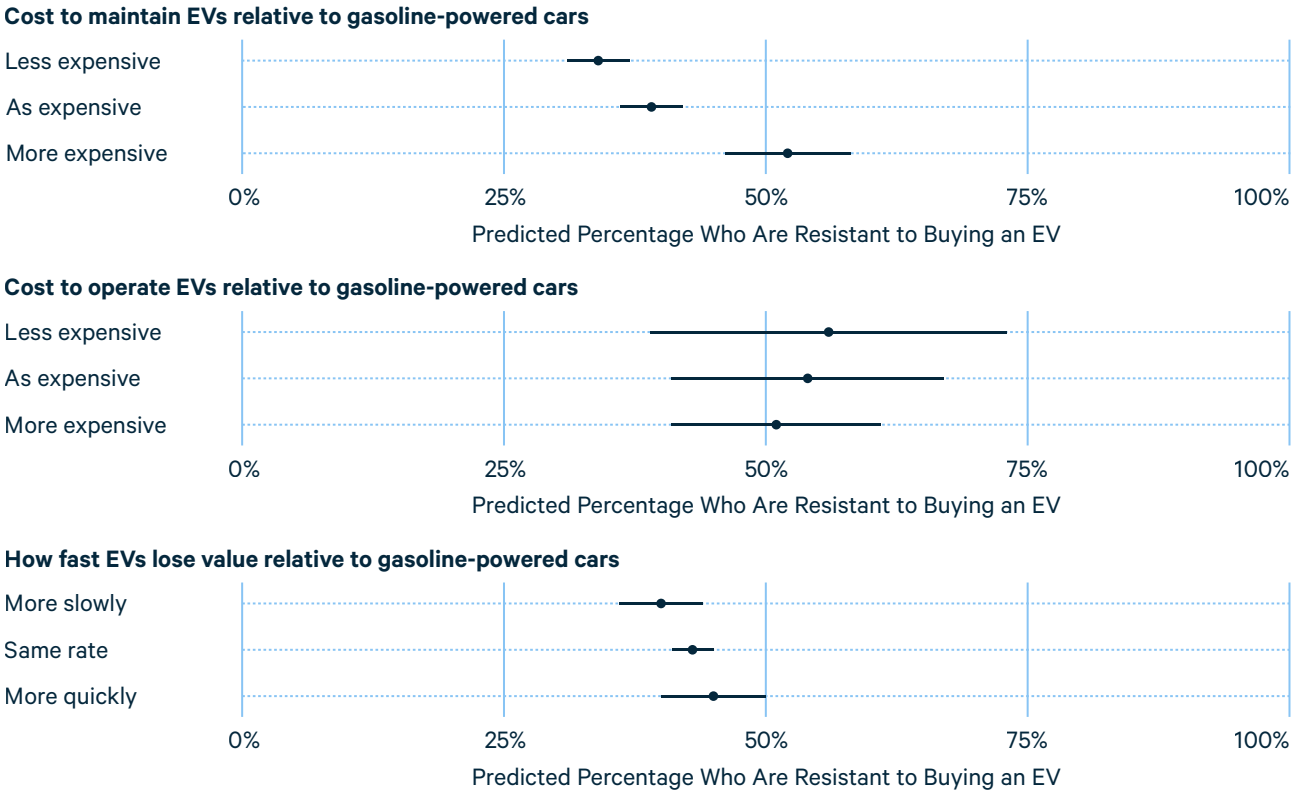
Figure 5.15. Predicting reluctance to buy an EV: Effects of beliefs about safety



Safety. The perception that batteries pose a safety hazard substantially reduced people's openness to purchasing EVs.

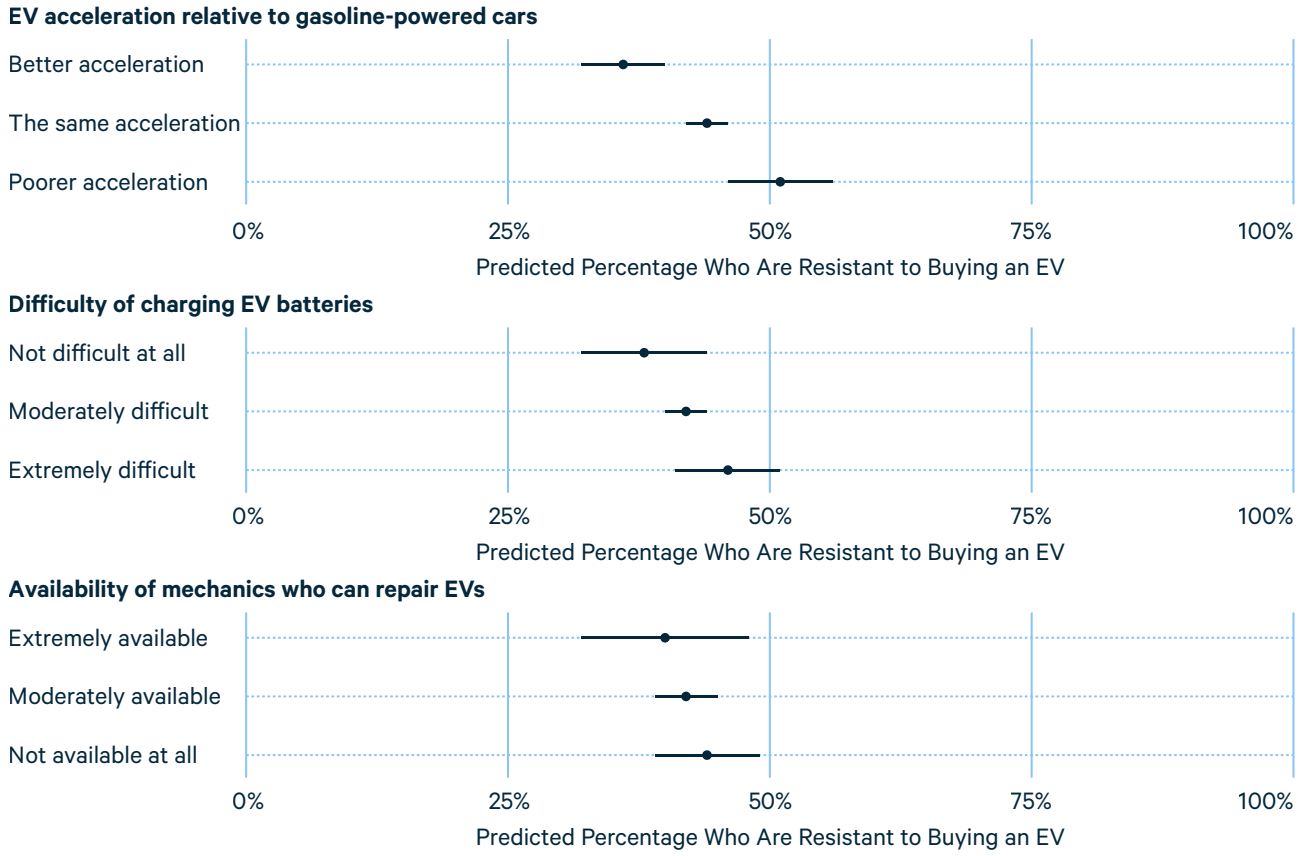
Economic costs. Perceived greater maintenance costs of EVs as compared to gas-powered vehicles was another predictor of purchasing reluctance. Believing that EVs are more expensive to maintain was a deterrent to purchasing as well. The perception that EVs are more expensive to operate and depreciate more quickly than gasoline-powered cars did not inhibit purchasing intentions.

Figure 5.16. Predicting reluctance to buy an EV: Effects of perceived cost



The perception that batteries pose a safety hazard substantially reduced people's openness to purchasing all-electric vehicles.

Figure 5.17. Predicting reluctance to buy an EV: Effects of beliefs about acceleration, charging difficulty, and availability of mechanics



Performance and efficiency. The perception that EVs have better acceleration than gasoline-powered cars predicted the openness to purchasing all-electric cars marginally significantly. Perceiving worse acceleration was not a deterrent.

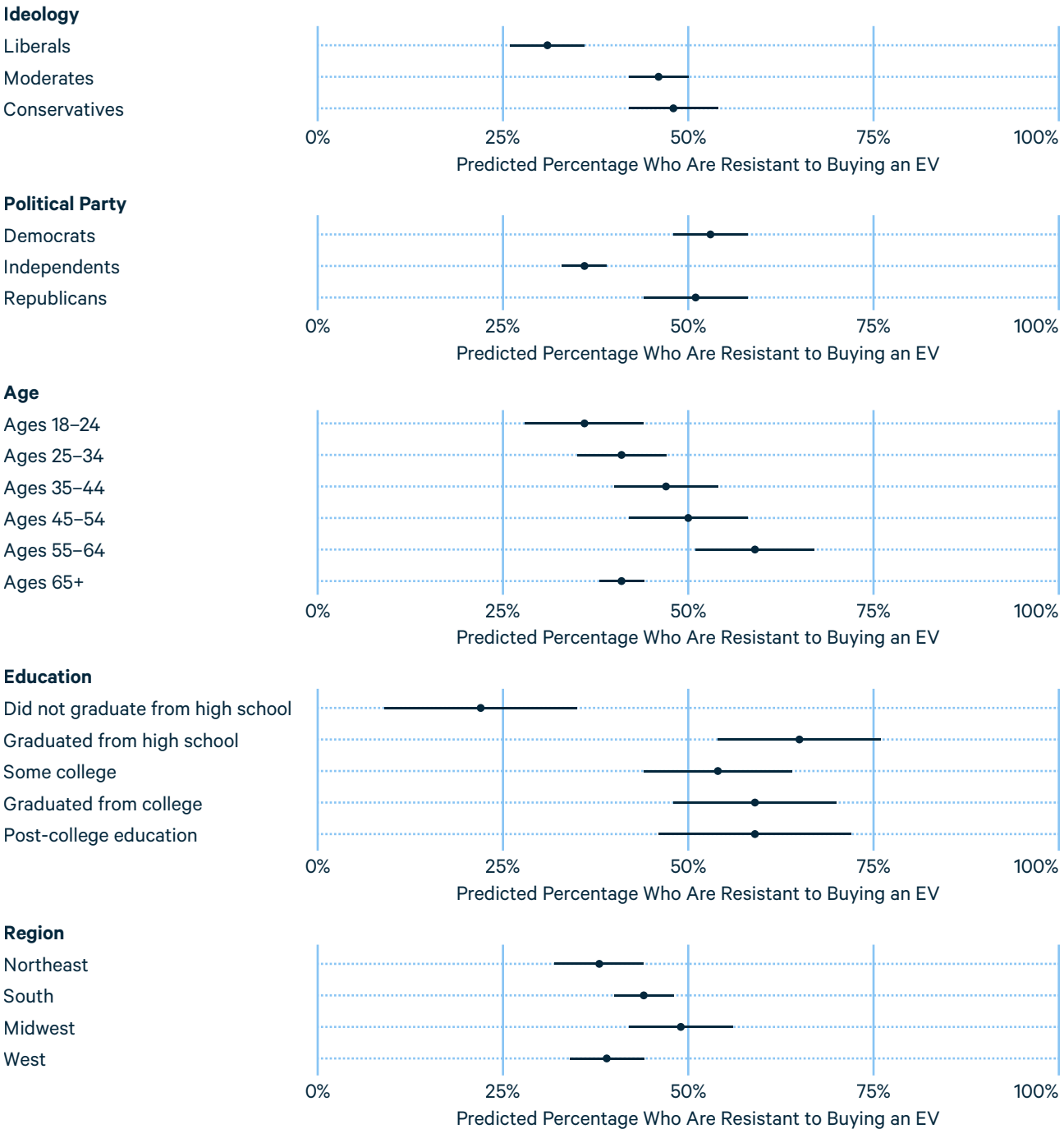
The perceived difficulty of charging batteries and the perceived lack of car mechanics knowledgeable in EV repair did not inhibit purchasing intentions.

Prior exposure. Prior experience driving EVs did not enhance openness to purchasing all-electric cars.

Figure 5.18. Predicting reluctance to buy an EV: Effects of prior experince driving EVs or knowing someone who had an EV

Other predictors. Liberals are less resistant than moderates to purchasing EVs. Democrats are marginally significantly more resistant than are Independents. People ages 55 to 64 were significantly more resistant than people ages 18 to 25. High school graduates were significantly more reluctant than people who had not graduated from high school. People in the Northeast region of the United States were marginally significantly less resistant to purchasing EVs. Sex, Hispanic ethnicity, race, income, and marital status were unrelated to resistance.

Figure 5.19. Predicting reluctance to buy an EV: Effects of other factors



Moderators of the Predictors of Resistance to Purchasing EVs

Moderation by Sex

Men and women* differed in terms of the predictors of their openness to purchasing all-electric cars (for regression coefficient estimates testing moderation, see the **technical report** for the "Electric Vehicles" section).

Belief that global warming will be a serious problem significantly enhanced openness to buying an EV in the future among women, and did not among men.

The perception that driving EVs does not help the environment inhibited intentions to purchase such cars among men and did not among women.

Figure 5.20. Predicting reluctance to buy an EV: Effect of global warming beliefs by sex

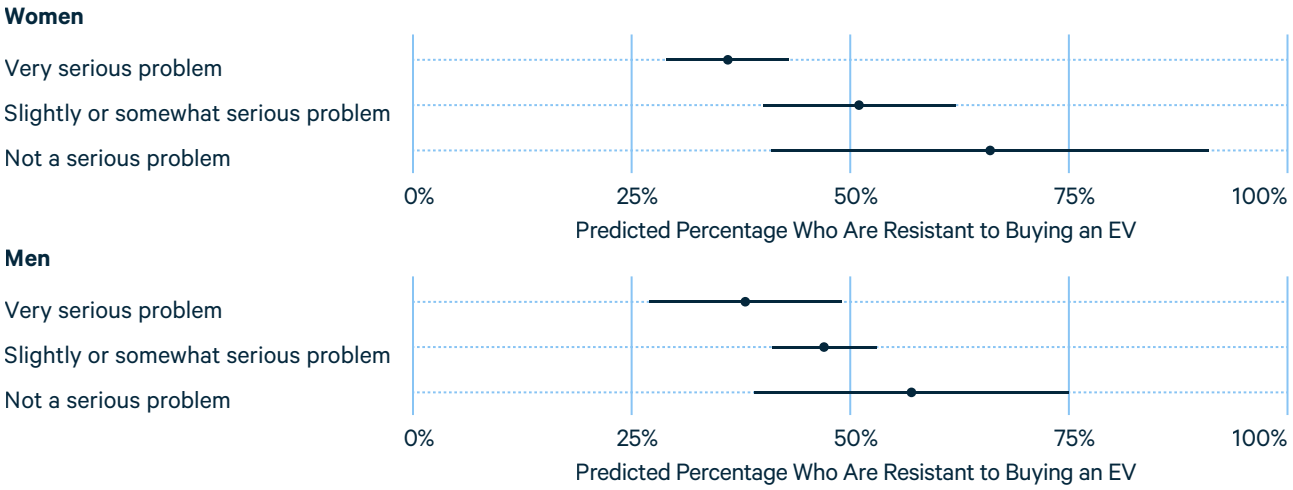
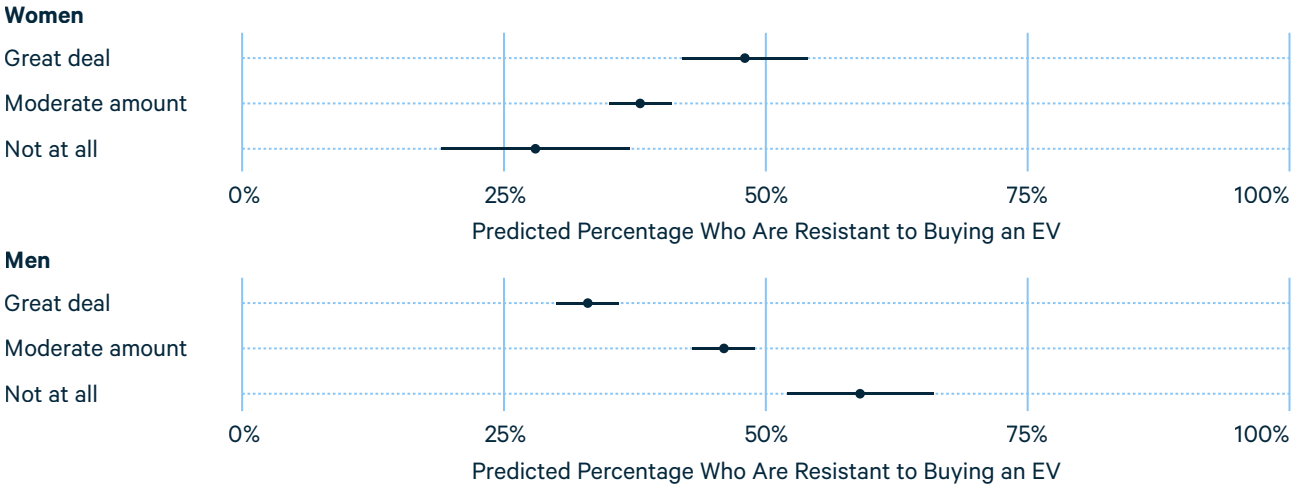
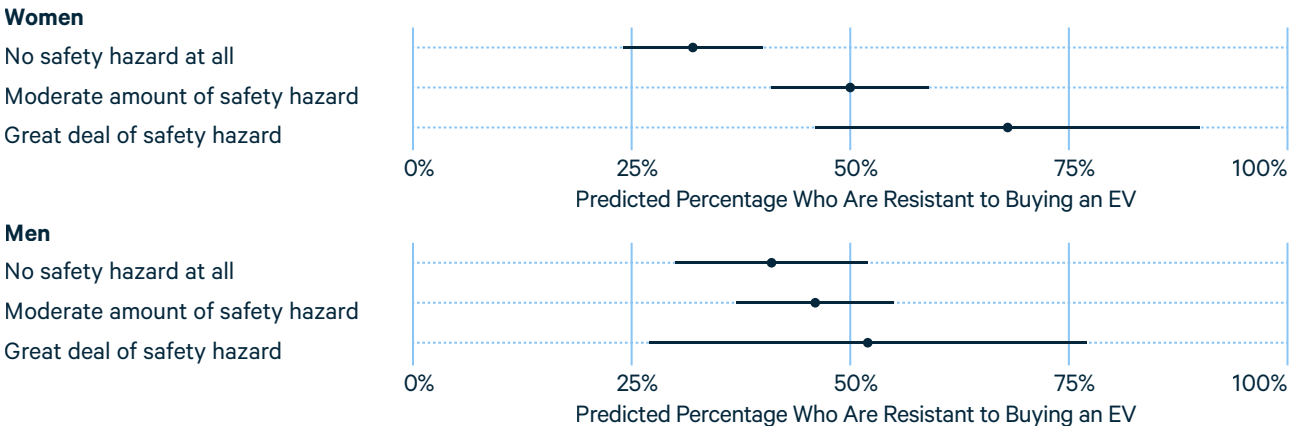


Figure 5.21. Predicting reluctance to buy an EV: Effect of environmental benefit beliefs by sex



**Respondents were asked, "Are you male or female?" Hereafter, respondents who said they were female are referred to as "women," while respondents who said they were male are referred to as "men."*

Figure 5.22. Predicting reluctance to buy an EV: Effect of safety beliefs by sex



The perception that EV batteries pose a safety hazard substantially reduced people's openness to purchasing EVs among women but did not among men.

Perceived greater EV maintenance costs were a strong predictor of reluctance to buy these cars among men, but did not increase reluctance among women. In contrast, the perception that EVs depreciate more quickly inhibited purchasing intentions among women to a high degree, but did not have the same effect among men.

Figure 5.23. Predicting reluctance to buy an EV: Effect of cost and depreciation beliefs by sex

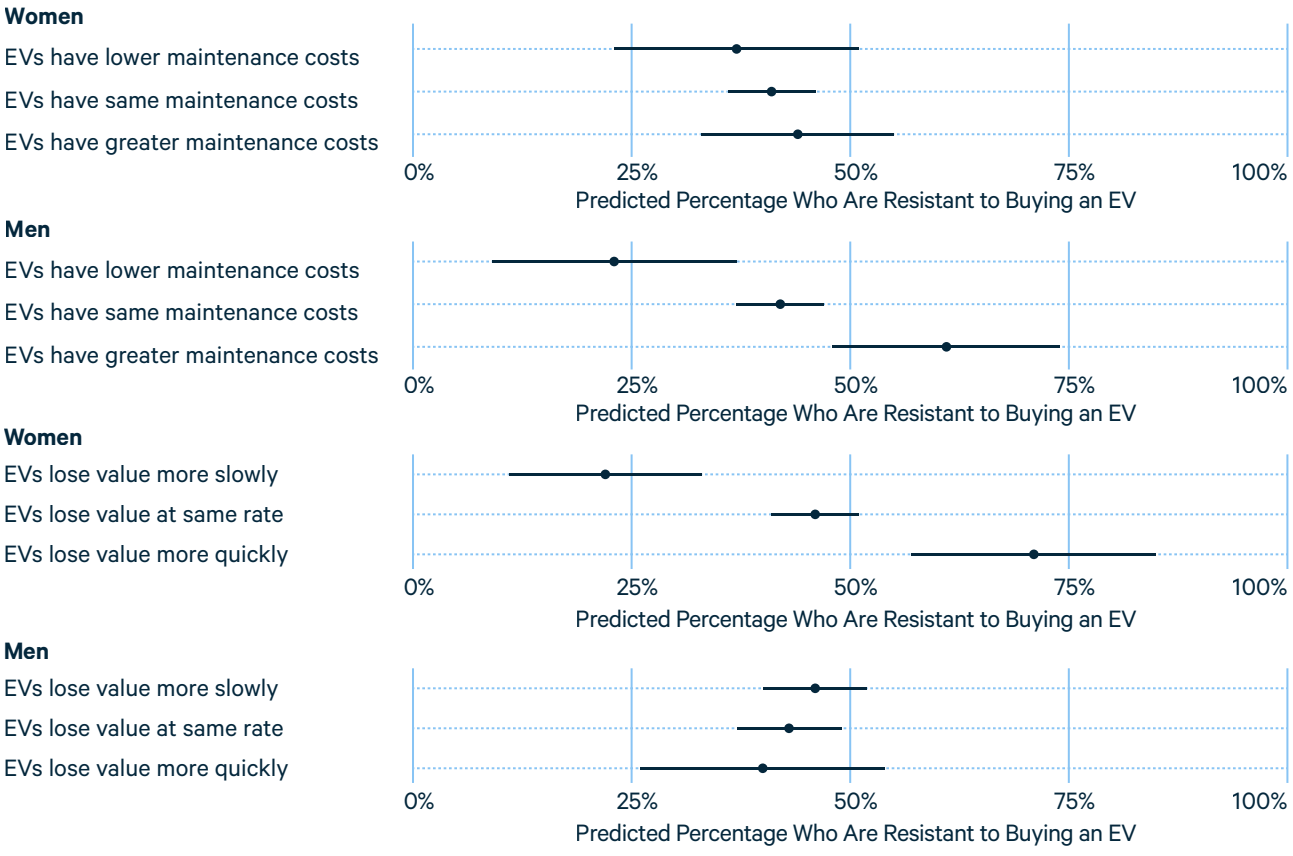
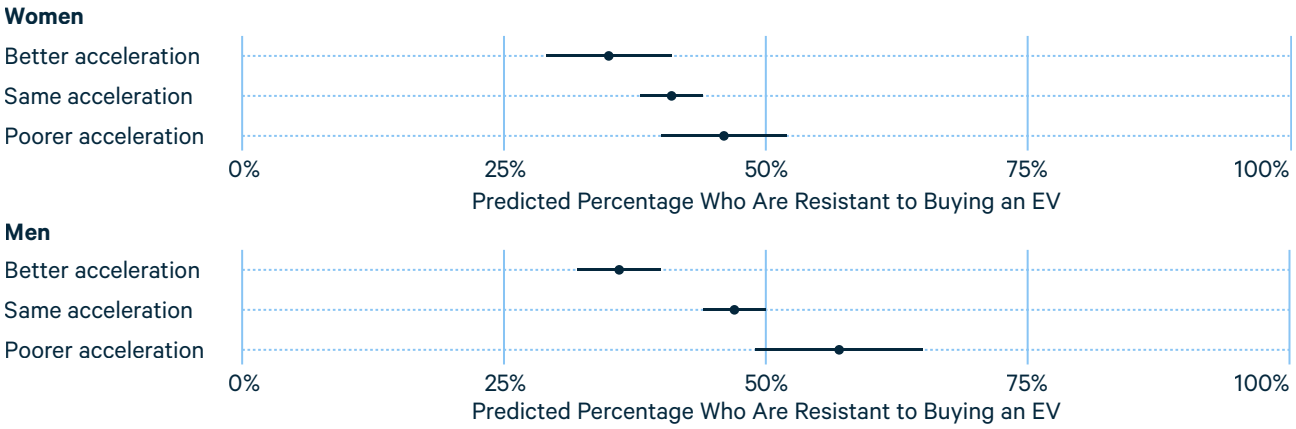
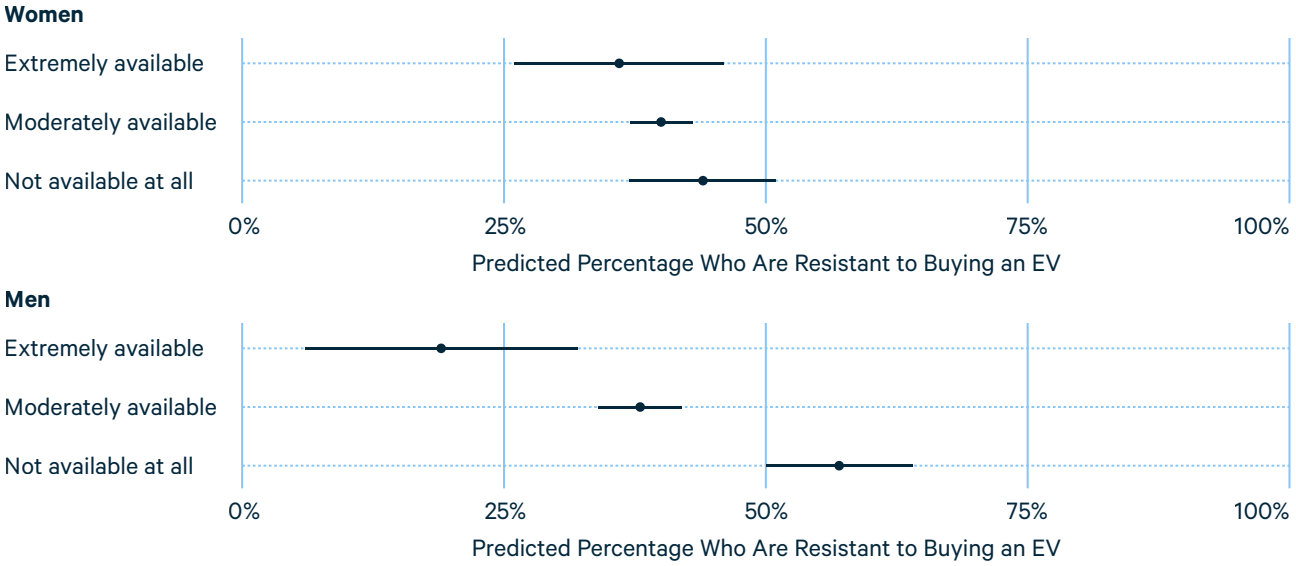


Figure 5.24. Predicting reluctance to buy an EV: Effect of acceleration beliefs by sex



The perception that EVs have poorer acceleration than gasoline-powered cars predicted the resistance to EVs among men but did not predict resistance among women. Perceived unavailability of car mechanics to repair EVs decreased purchasing intentions among men but did not among women.

Figure 5.25. Predicting reluctance to buy an EV: Effect of beliefs about availability of mechanics who can fix EVs by sex



Moderation by Education

More educated people differed from less educated people in terms of the criteria that drive their reluctance to purchase EVs.

For example, the belief that global warming will be a serious problem significantly enhances openness to buying an EV among people who did not graduate from college more than among people who did.

The perception that EV batteries pose a safety hazard substantially reduced the openness to purchasing EVs among people without a college degree but did not reduce openness among college graduates.

Figure 5.26. Predicting reluctance to buy an EV: Effect of global warming beliefs on those who did and did not graduate from college

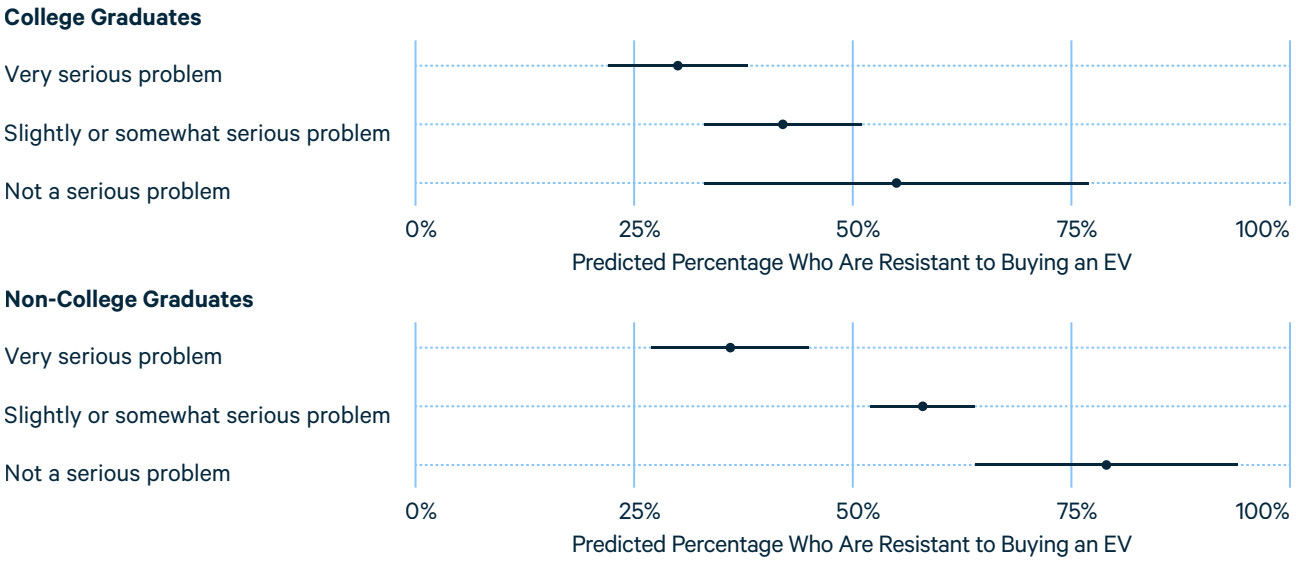


Figure 5.27. Predicting reluctance to buy an EV: Effect of safety beliefs on those who did and did not graduate from college

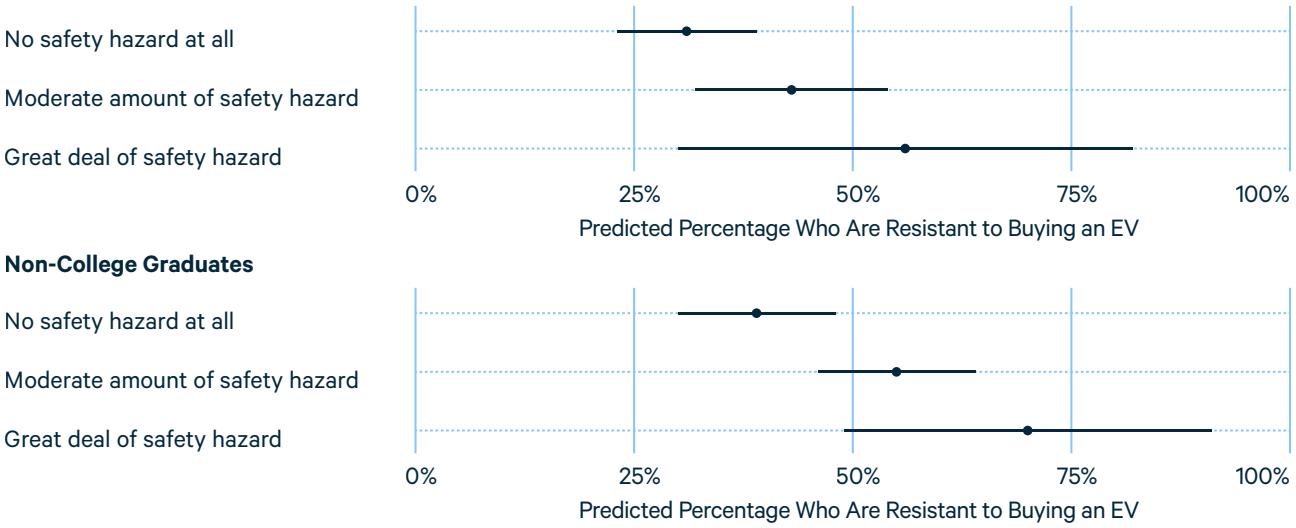
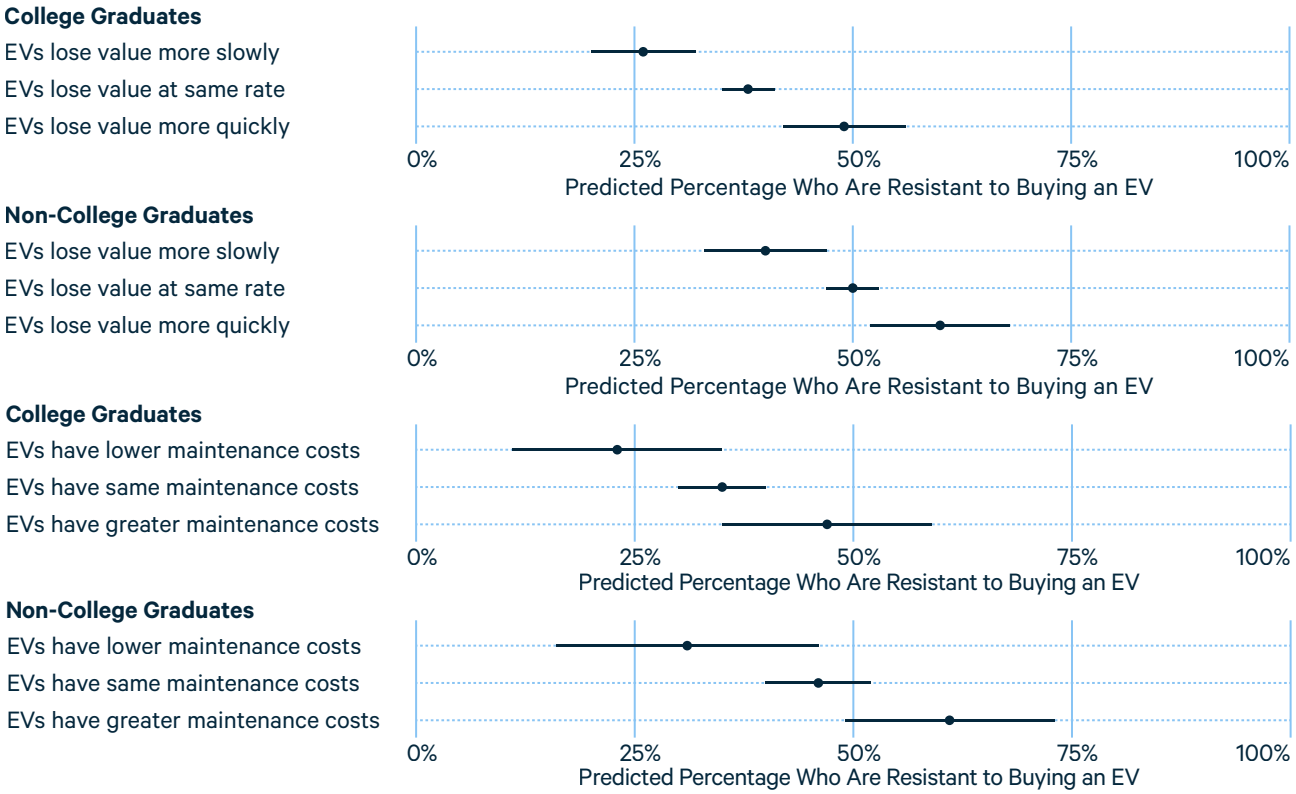


Figure 5.28. Predicting reluctance to buy an EV: Effect of depreciation and cost beliefs on those who did and did not graduate from college

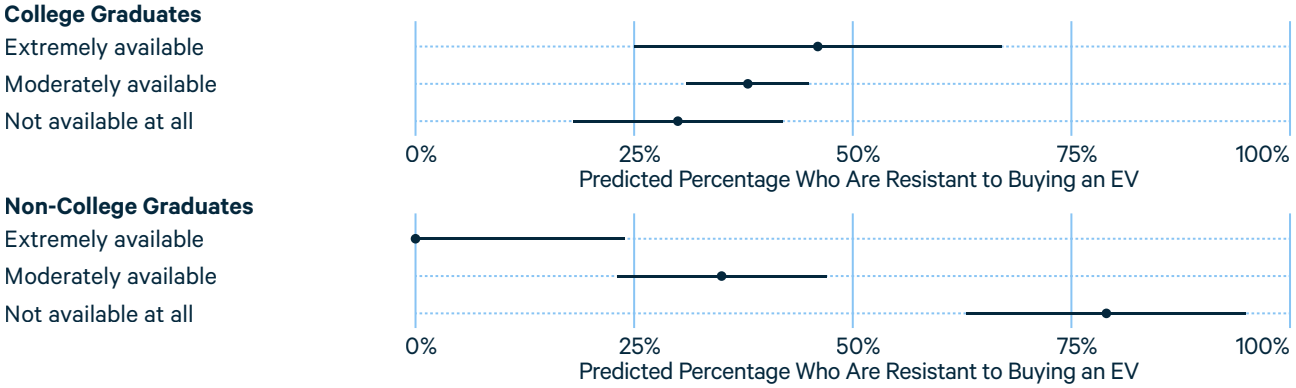


Perceiving all-electric cars to depreciate more quickly inhibited purchasing intentions among college graduates but did not among people without college degrees.

Perceiving greater maintenance costs of all-electric cars predicted reluctance to buy these cars equally strongly among people with and without college degrees.

Perceived unavailability of car mechanics to repair all-electric cars substantially decreased purchasing intentions among Americans without college degrees but did not among college graduates.

Figure 5.29. Predicting reluctance to buy an EV: Effect of beliefs about availability of mechanics who can fix EVs on those who did and did not graduate from college



Moderation by Prior Experience

Believing that global warming will be a serious problem significantly enhanced openness to buying EVs among Americans without prior exposure to such cars. However, belief in the severity of global warming did not enhance openness among Americans with prior experience.

The perception that EV batteries pose a safety hazard equally reduced openness to purchasing all-electric cars among people with and without prior exposure.

Figure 5.30. Predicting reluctance to buy an EV: Effect of global warming beliefs on those with and without prior experience

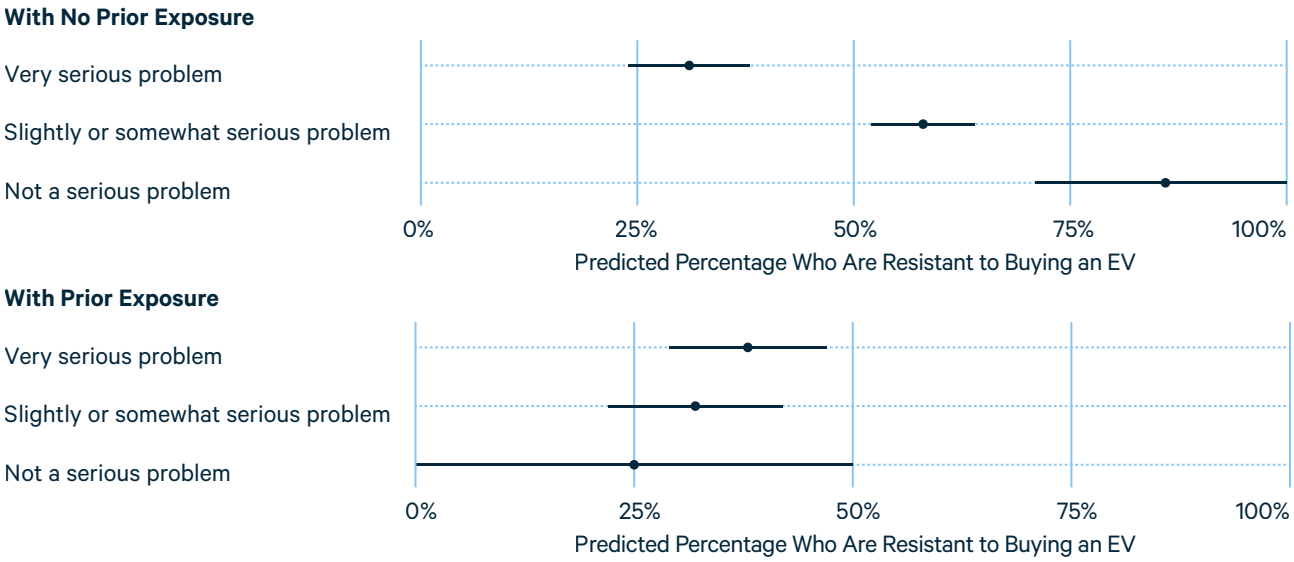


Figure 5.31. Predicting reluctance to buy an EV: Effect of safety beliefs on those with and without prior experience

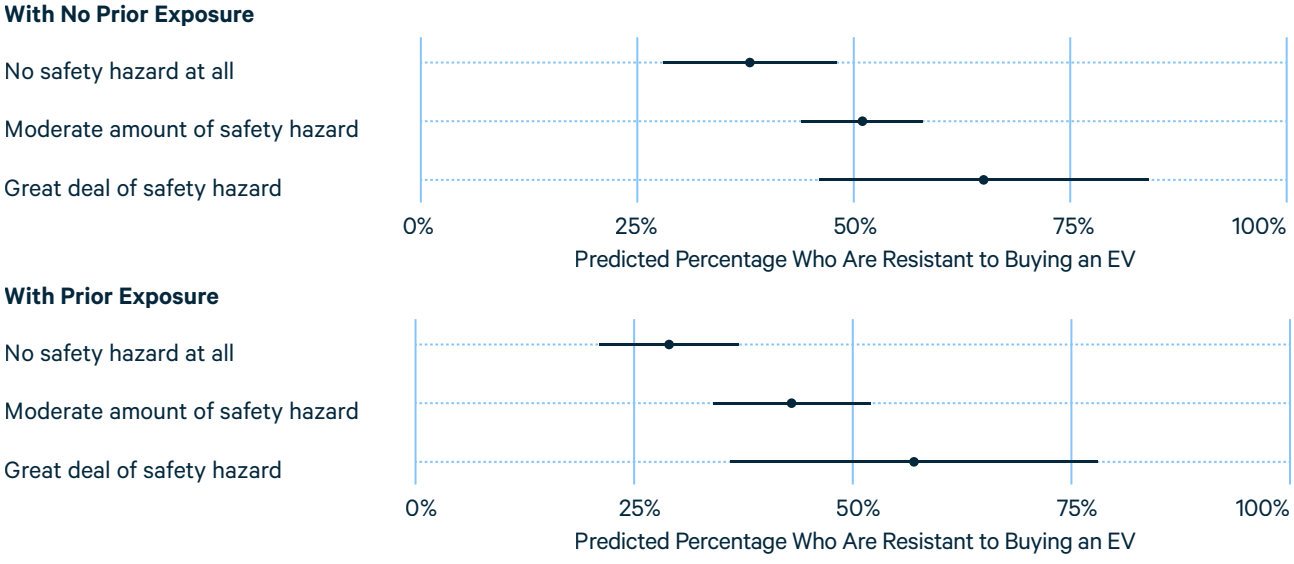
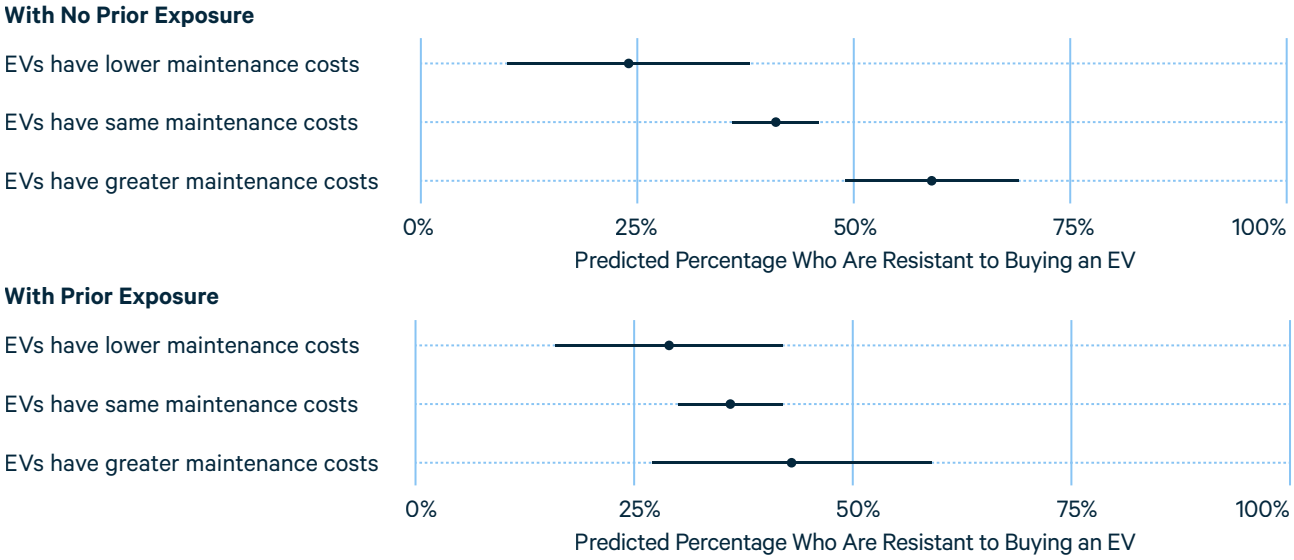


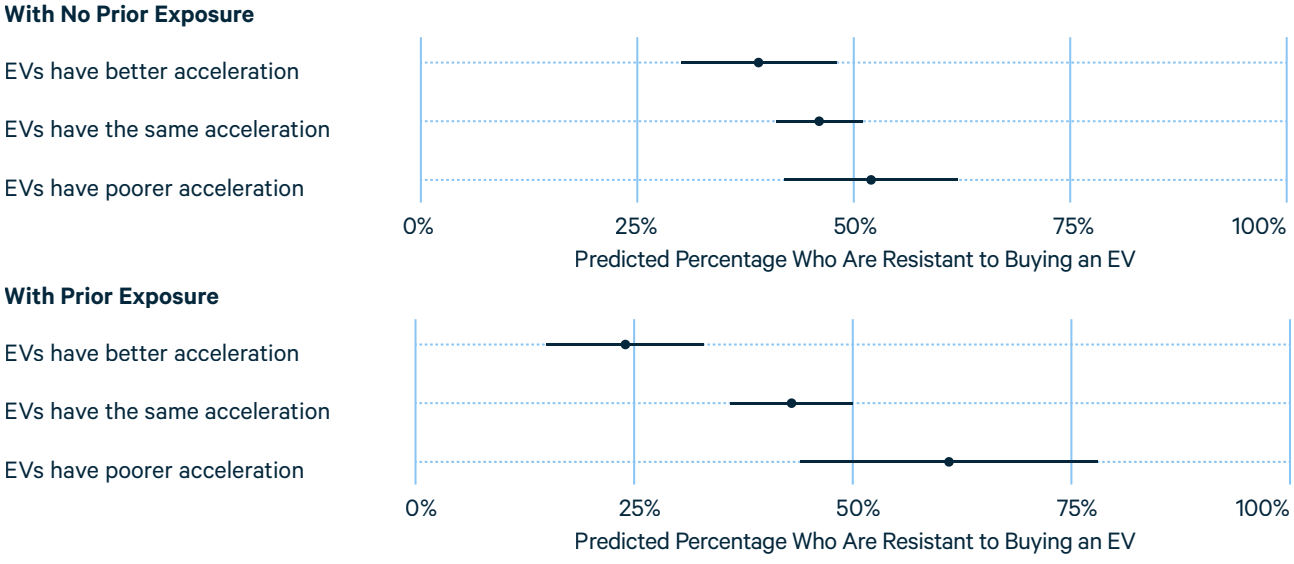
Figure 5.32. Predicting reluctance to buy an EV: Effect of maintenance cost beliefs on those with and without prior experience



Perceived high EV maintenance costs increased hesitation to buy these cars among people without prior experience, but did not increase hesitation among people with previous exposure.

Perceived poor acceleration predicted the resistance to all-electric cars among Americans with prior exposure, but did not affect hesitation among Americans without prior exposure.

Figure 5.33. Predicting reluctance to buy an EV: Effect of acceleration beliefs on those with and without prior experience



Conclusion

These findings shed light on how people perceive EVs and how those perceptions drive public resistance to purchasing EVs. At present, 57% of future car buyers are willing to consider an EV. Thus, there are almost as many people who are reluctant to consider buying one as there are people who would not. And that reluctance comes from a variety of different beliefs.

The most important driver of openness to purchasing an EV is belief that global warming will be a serious problem for the United States in the future. Among potential car buyers, perceptions of this threat are not maximized. So if perceptions of the threat posed by global warming increase in the coming years, openness to purchasing EVs seems likely to increase.

But even if that happens, there are other psychological sources of hesitation regarding EV purchases. When examining the full sample, we saw the following barriers appear: the perception that batteries might catch on fire, the perception that maintenance costs of EVs are higher than the cost of maintaining gas-powered cars, and the perception that EVs have weaker acceleration than do gasoline-powered vehicles.

Furthermore, when we analyzed subgroups of the population defined by sex, education, and prior exposure to EVs, we identified other beliefs that are also barriers to purchasing among subgroups: the belief that charging batteries is difficult, the belief that EVs depreciate more quickly than gasoline-powered cars, and the belief that mechanics who can fix EVs are not numerous. Thus, to the extent that all of these beliefs change in directions favorable to EVs, there is reason to believe that purchase openness will increase as well.

It is interesting to note that simply having driven an EV or knowing someone who has one does not make people more inclined to purchase an EV in the future. This suggests that if, as time passes, more people have the opportunity to experience or hear about owning an EV, we do not expect to see increased willingness to purchase based on this factor alone.

The findings reported here contribute to the literatures in marketing on consumer decisionmaking by highlighting differences in decisionmaking criteria based on a person's sex, education, and prior experience. First, perhaps contrary to the notion that women are more likely than men to hesitate to adopt new technologies, we did not see any effect of sex directly on purchasing openness when controlling for beliefs. It is interesting to note, however, that among women—but not among men—experience driving an EV or knowing someone who has done so increased openness to purchasing an EV, consistent with the notion that familiarity with a new technology reduces reluctance about it. Among women, economic and safety were key concerns, with accelerated depreciation concerns the most powerful barrier to purchasing, followed by concern about battery fires. For men, maintenance costs and mechanic availability were important sources of hesitation.


The most important driver
of openness to purchasing
an all-electric vehicle is
belief that global warming
will be a serious problem
for the United States in the
future.

Regarding education, the only notable difference was that concern about mechanic availability was a very powerful source of hesitation among people with lower levels of education, whereas it was not at all a deterrent among people with higher levels of education.

Interestingly, having prior experience with EVs reduced the impact of maintenance cost concerns but enhanced the impact of acceleration concerns. Also, surprisingly, being a Democrat was a source of hesitation among people without prior experience but not among Democrats with prior experience.

The findings reported here highlight opportunities for advocates of EVs to educate the public about the attributes of these vehicles. Increasing education and public awareness would likely translate into an enhanced appetite for EVs. If public inclination to make such purchases increases in the years to come, it will be interesting to then test whether the possible influences on opinion identified here were in fact responsible for the observed shifts.

Section 6

Opinion in the States

Contents

Introduction

In this report, we have shown that majorities of Americans believe that the earth has been warming, that this warming is caused by humans, and that Americans largely support public carbon pricing policies and tax incentives to address issues related to climate change.

Do those preferences shape public policy? According to some political theorists, democracies only function effectively if elected representatives enact the policies that their polities support (Dahl 1989). This is thought to lead to popular support of government and confidence in the democratic process. Public opinion can shape policy-making through at least two mechanisms: (1) elected representatives can learn the policy preferences of all of their constituents through representative sample surveys, and (2) constituents with passionate opinions on an issue can shape their representatives' policy pursuits by voting, sending letters and making telephone calls to their representatives, attending protests, and more.

Public opinion surveys can transmit information to elected officials about their constituents' wishes, and evidence suggests that representatives have at least sometimes been responsive to such data (Hulland, Baumgartner, and Smith 2018; Jacobs and Shapiro 2000). Yet it is hard to blame elected officials if they do not follow the will of the public, because useful survey data are rarely available. Government officials deal with numerous issues at any one time, and public opinion surveys rarely document opinions on all of those issues. More importantly, most surveys are of the nation as a whole, whereas no one in the US Congress represents the entire country. Instead, each representative is sent to the nation's capital to represent a state or congressional district. Surveys measuring the opinions of residents of such limited geographic areas are even more rare and limited in scope than are national surveys. So to allow representatives to consider the views of all of their constituents, a new type of data must be provided to them.

Here, we propose a new technique for generating such data, using high quality national surveys of representative samples of American adults to yield accurate assessments of opinions in the US states. We refer to this method as the **aggregation-disaggregation technique** (ADT). To implement the ADT, an investigator must have a large set of national surveys for which respondents were selected using unclustered sampling methods. That requirement rules out the use of the vast majority of what are called "household surveys," which involve multistage random sampling of homes in clusters located near one another, thereby minimizing travel for interviewers. Instead, population surveys must involve either random digit dialing to landlines and cell phones by human interviewers or mailing paper questionnaires to households selected via simple random sampling from all those in the country.

To implement the ADT, one must first collect a set of conventionally sized surveys of representative samples of a single population (e.g., all American adults) that have

asked the same question with the same wording in each survey. Normally, the surveys would have been conducted repeatedly over a sustained period of years. Having collected these data, the next step of the ADT is **aggregation**–combining all the data into a single dataset. Next, the **disaggregation** phase involves producing separate estimates of public opinion in each state. To do so involves multivariate estimation that statistically adjusts for changes in opinions over time to yield estimates of public opinion in each state in each year when a survey was conducted.

The ADT is built on two important assumptions that have foundations in the literatures on American public opinion and survey methodology. First, the ADT assumes that public opinion changes slowly over time, and that shifts at the national level are likely to occur roughly evenly across each of the states. Support for this presumption comes from research by Page and Shapiro (1992), who demonstrated first that public opinion is rarely subject to dramatic shifts over time. Furthermore, they found that different subgroups of the American population (as defined by demographics, for example) do not drift apart on issues of public policy and instead changed in sync with one another. Page and Shapiro (1992) referred to this phenomenon as "parallel publics," whereby a change in public opinion in one subgroup was found in all other subgroups. Of special interest for the present inquiry, Page and Shapiro (1992) examined differences between geographic subgroups (Northerners vs. Southerners, Urban vs. Rural) on a multitude of issues and rarely found different trend lines in such groups. Their overwhelming body of evidence shows that public opinion shifts in parallel fashions across geographic subgroups.

The second assumption of the ADT is that random samples, when sufficiently powered, should not only provide accurate estimates of national public opinion but should also provide accurate estimates within states. True random sampling requires that all individuals in a population have a known, non-zero chance of being selected, and so-called "base weights" must be used to equate those probabilities of selection across sample members. The most common form of this involves random digit dialing (RDD) of landlines and cellphones. Research has found that samples recruited using these methods continue to yield highly accurate estimates of the population under study (Callegaro et al. 2014; Chang and Krosnick 2009; Cornesse et al. 2020; MacInnis, Krosnick, and Cho 2018; Yeager et al. 2011). Although an individual national probability sample may not have a sufficient number of observations in each of the 50 states to provide precise estimates of public opinion, combining data from many surveys conducted over time using probability samples can produce sufficient numbers of observations. For detailed information on the methodology of the survey and data included in this report, please see the appendices.

Methodology

This section details the results of ADT estimation using a series of surveys conducted by the Political Psychology Research Group (PPRG) at Stanford University between 1997 and 2020 (for a description of the surveys' methodologies, see the appendices). Using these data, we estimated public opinion on a range of different matters related to global warming in US states and produced maps documenting our findings.

Over the course of more than two decades, PPRG surveys have documented that large majorities of Americans believed that the earth has been warming, that that warming has been due to human activities, that warming poses a serious threat, and that government should take action to reduce future warming (e.g., Krosnick et al. 2006). These surveys involved interviewing truly random samples of the American adult population, so they provide legislators and advocacy groups with accurate snapshots of what the public wants from its government. In all, 22 questions were asked in enough surveys to allow the application of the ADT, tapping what we call "fundamental" beliefs about climate change, engagement in the issue, and policy preferences. The wordings of the survey questions were balanced and unbiased, and the question topics are roughly summarized below, along with the years when each question was asked (for exact question wordings, see Appendix A):

Fundamentals:

- Global warming has been happening (1997, 2006-2015, 2018, 2020)
- Warming will continue in the future (2010-2012, 2015, 2018, 2020)
- Past warming has been caused by humans (1997, 2006-2012, 2014-2015, 2018, 2020)
- Warming will be a serious problem for the United States (1997, 2006-2010, 2012, 2015, 2018, 2020)
- Warming will be a serious problem for the world (2006, 2009-2010, 2012; 2015, 2018, 2020)
- 5 degrees of warming in 75 years will be bad (2007-2010, 2012, 2015, 2018, 2020)
- The US government should do more to address global warming (1997, 2006-2010, 2012, 2015, 2018, 2020)

Engagement:

- Warming is extremely personally important to the respondent (1997, 2006-2012, 2015, 2018, 2020)
- Highly knowledgeable about global warming (1997, 2006-2010, 2012, 2018, 2020)

Policies:

- The US should take action on the issue regardless of what other countries do (2008, 2010, 2012, 2015)
- The US government should limit greenhouse gas emissions by businesses (2009-2010, 2012, 2015, 2018, 2020)
- Limit greenhouse gas emissions by power plants (2006-2007, 2009-2012, 2014-2015, 2018, 2020)
- Favor a national cap-and-trade program (2008-2010, 2012, 2015, 2020)
- Increase fuel efficiency of cars (2006, 2007, 2009-2012, 2015, 2018, 2020)
- Build more all-electric vehicles (2009-2012, 2015)
- Build appliances that use less electricity (2006, 2007, 2009-2012, 2015, 2018, 2020)
- Build more energy-efficient buildings (2006, 2007, 2009-2012, 2015, 2018, 2020)
- Tax breaks to produce renewable energy (2006, 2009-2012, 2015, 2018, 2020)
- Tax breaks to reduce air pollution from coal (2009-2012, 2015, 2018, 2020)
- Tax breaks for nuclear power (2006, 2007, 2009-2012, 2015, 2018, 2020)
- Increase consumption taxes on electricity (2006, 2007, 2009-2012, 2015, 2018, 2020)
- Increase consumption taxes on gasoline (2006, 2007, 2009-2012, 2015, 2018, 2020)

Figures 6.01–6.22 present maps showing state-level public opinion for 20 survey items as of 2020. Two additional maps show state opinions as of 2015—the most recent year in which those two questions were asked (on unilateral action and on building more all-electric vehicles). In some maps, some states have no percentage because too few survey respondents in that state were asked the question to permit reliable estimation.

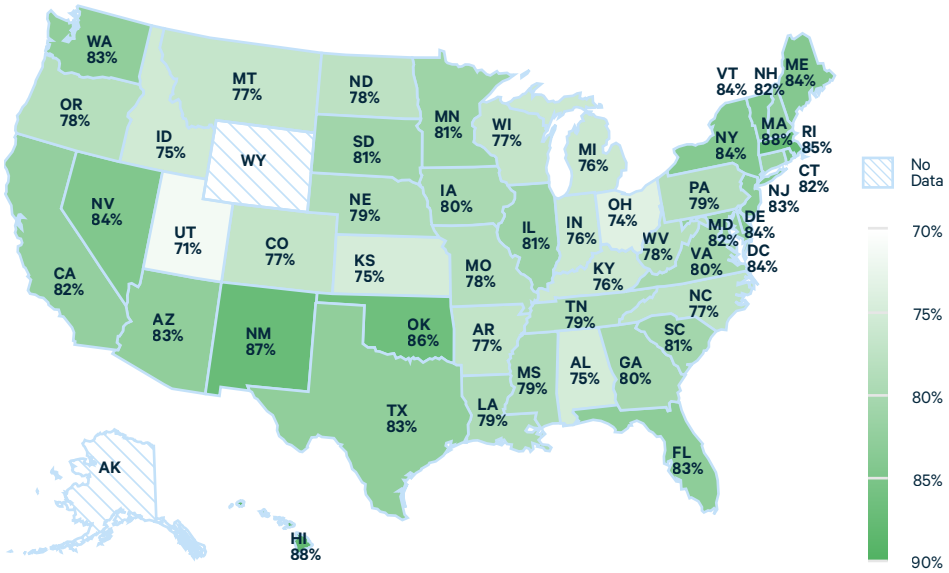
The surveys of nationally representative samples of American adults that we analyzed are listed by year of data collection in Table 1 of the **technical report**. Sponsors included Ohio State University, Stanford University, University of Arizona, ABC News, USA Today, Time Magazine, The Washington Post, New Scientist Magazine, Planet Green, the Associated Press, Reuters, Resources for the Future, and ReconMR. Data were collected by ReconMR, Abt SRBI, SSRS, GfK Custom Research (formerly known as Knowledge Networks), Ipsos, TNS, the American Life Panel (ALP), and the Ohio State University Center for Survey Research. In most of these surveys almost all of the questions posed were about global warming. The remaining surveys were so-called "omnibus surveys" that included questions on many different topics, only a few of which were about global warming. Most surveys involved random digit-dial telephone interviewing, and a few involved data collected from probability samples of adults who answered questions via the Internet, recruited by random digit dialing and by mail.

Data from a total of 27,661 respondents were analyzed. Results are not reported when fewer than 50 people answered a question in a state. The state estimates and their standard errors appear in Appendix B.

View the **Climate Insights 2020: Opinion in the States Technical Report**.

Across all seven fundamental opinions, majorities of the residents in all analyzed states hold what might be called “green” opinions–they believe that warming has been happening, that it is attributable to human activities, and that it poses a threat to the welfare of the United States and the world. More than 70% of the residents of all states believe that warming has occurred. In a majority of the states, belief in the existence of warming is greater than 80%. The largest majority is in Massachusetts (88%), and the smallest is in Utah (71%).

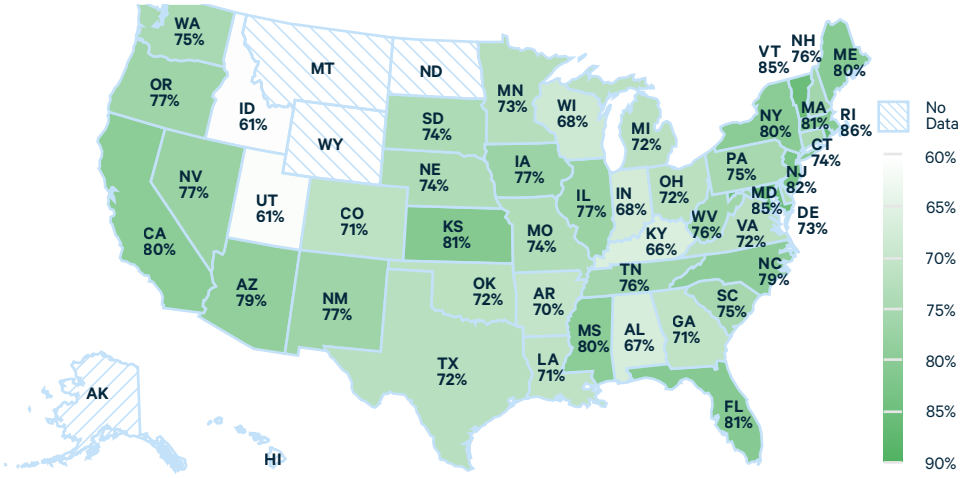
Figure 6.01. Percentage of each state who believe global warming has been happening (2020)



The largest majority of residents who believe that warming has been happening is in Massachusetts (88%).

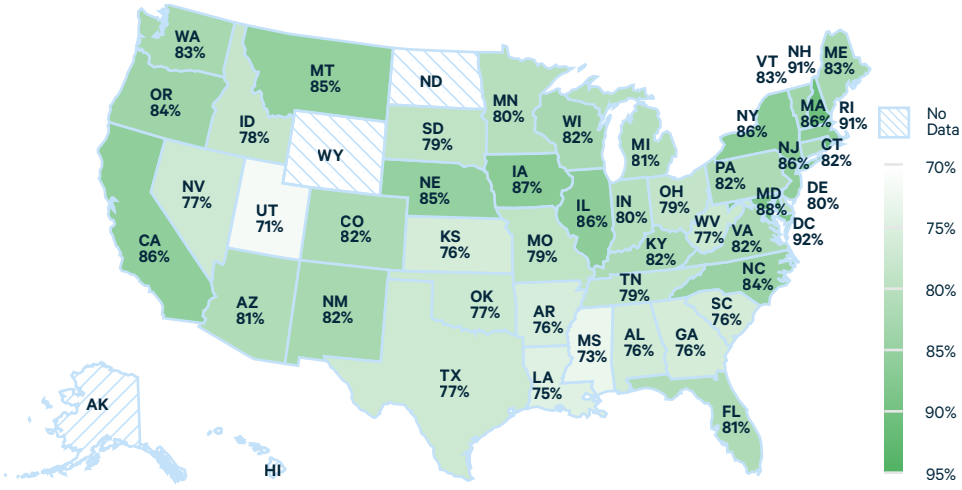
Similarly, large majorities in all states believe that the world's temperature will rise in the future if nothing is done to address it. The New England states of Rhode Island (86%) and Vermont (85%) have the largest majorities, and Idaho and Utah (both 61%) have the smallest. In only six states did fewer than 70% of residents believe that future warming will happen, and no states manifested majorities smaller than 60%.

Figure 6.02. Percentage of each state who believe that the earth will warm in the future (2020)



There is also widespread agreement that warming has been caused by human activity. The fraction of people expressing this opinion is never below 70% in any state. Utah has the smallest majority (71%), and Rhode Island and New Hampshire have the largest (91%). In general, greater levels of skepticism about people's role in causing global warming appear in the South and in certain Midwestern and Western states.

Figure 6.03. Percentage of each state who believe past warming has been caused by humans (2020)



Majorities in all states believe that global warming will be a serious problem for both the United States and the world. Idaho has the smallest majorities holding these beliefs (60% and 62%, respectively), and Rhode Island leads the Northeastern states with the largest majorities (94% and 92%, respectively).

Figure 6.04. Percentage of each state who believe warming will be a serious problem for the United States (2020)

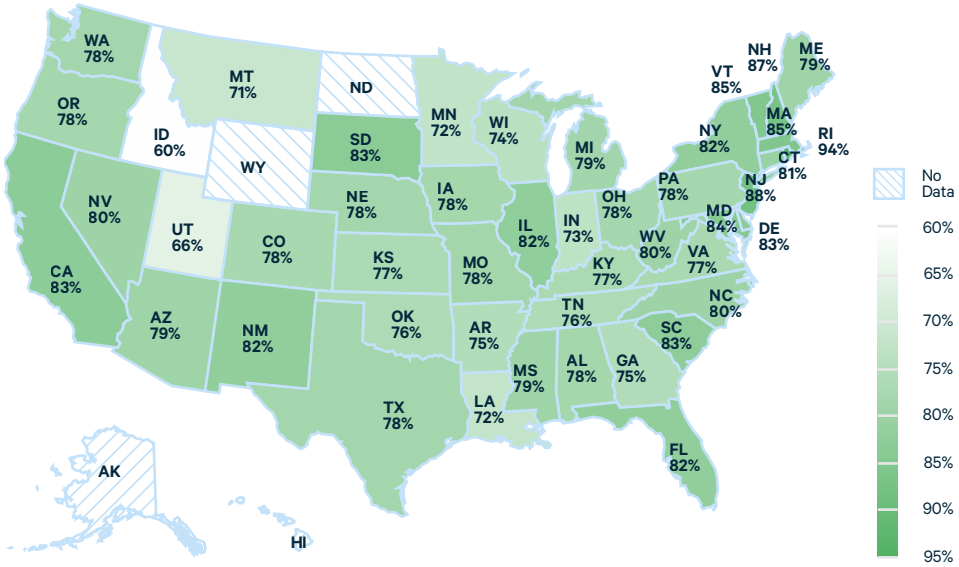
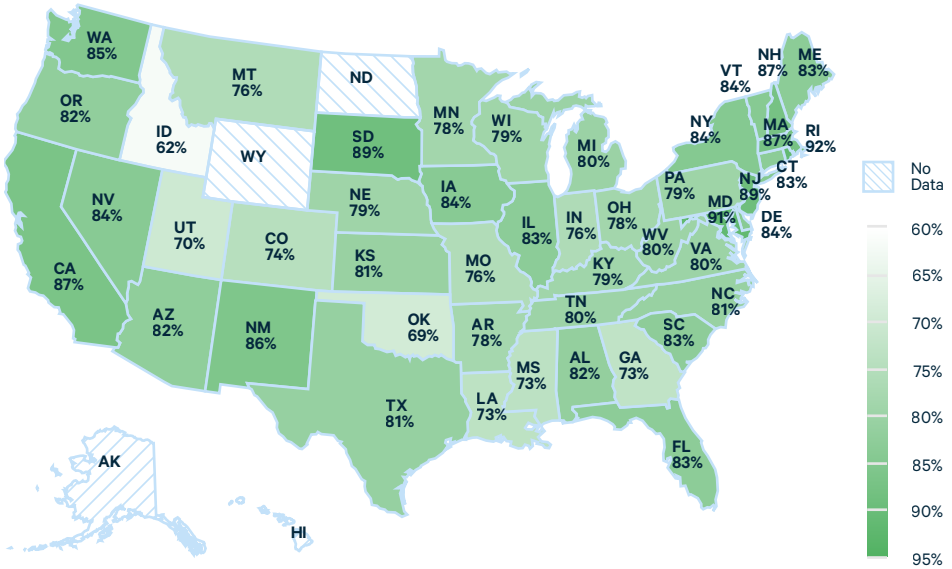
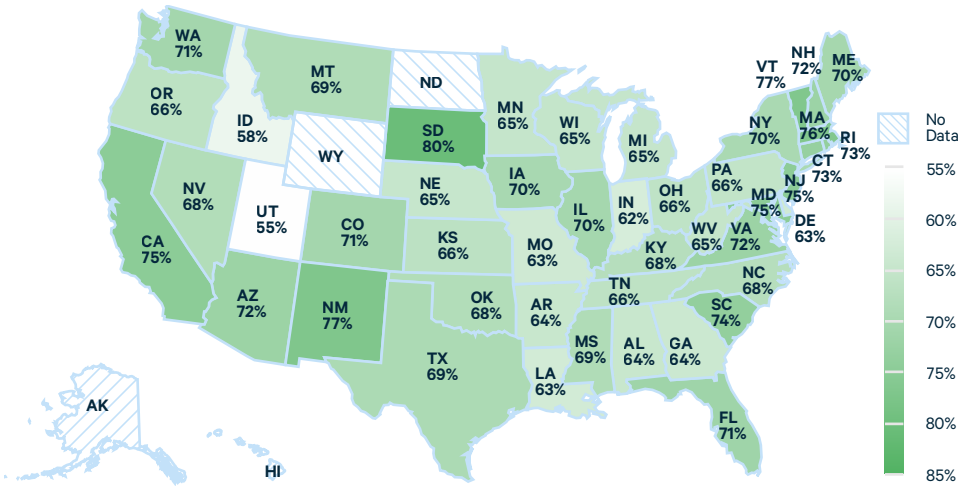


Figure 6.05. Percentage of each state who believe warming will be a serious problem for the world (2020)



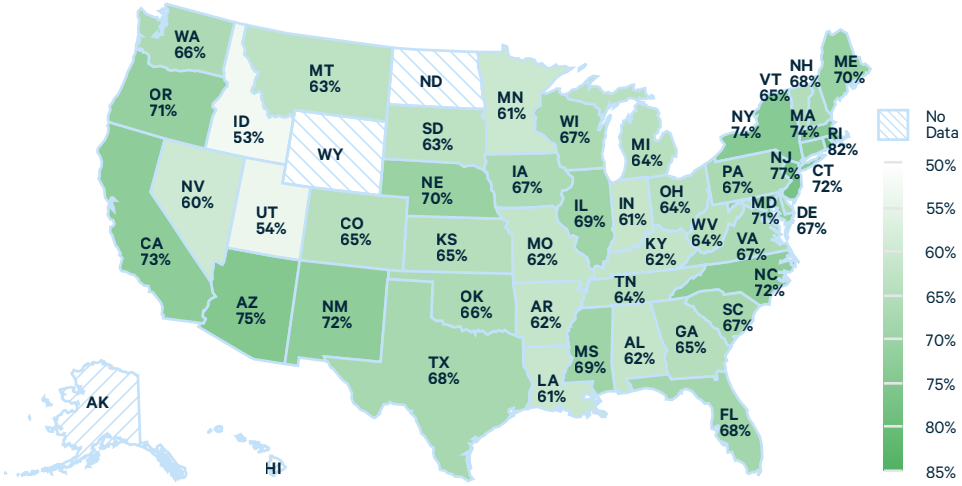
Likewise, majorities of all states believe that 5 degrees of warming over the next 75 years will be bad. The smallest majorities appear in Idaho (58%) and Utah (55%), and most states are in the 60%-80% range. Large majorities appear in the Northeastern states, but the largest majorities appear in South Dakota (80%) and New Mexico (77%).

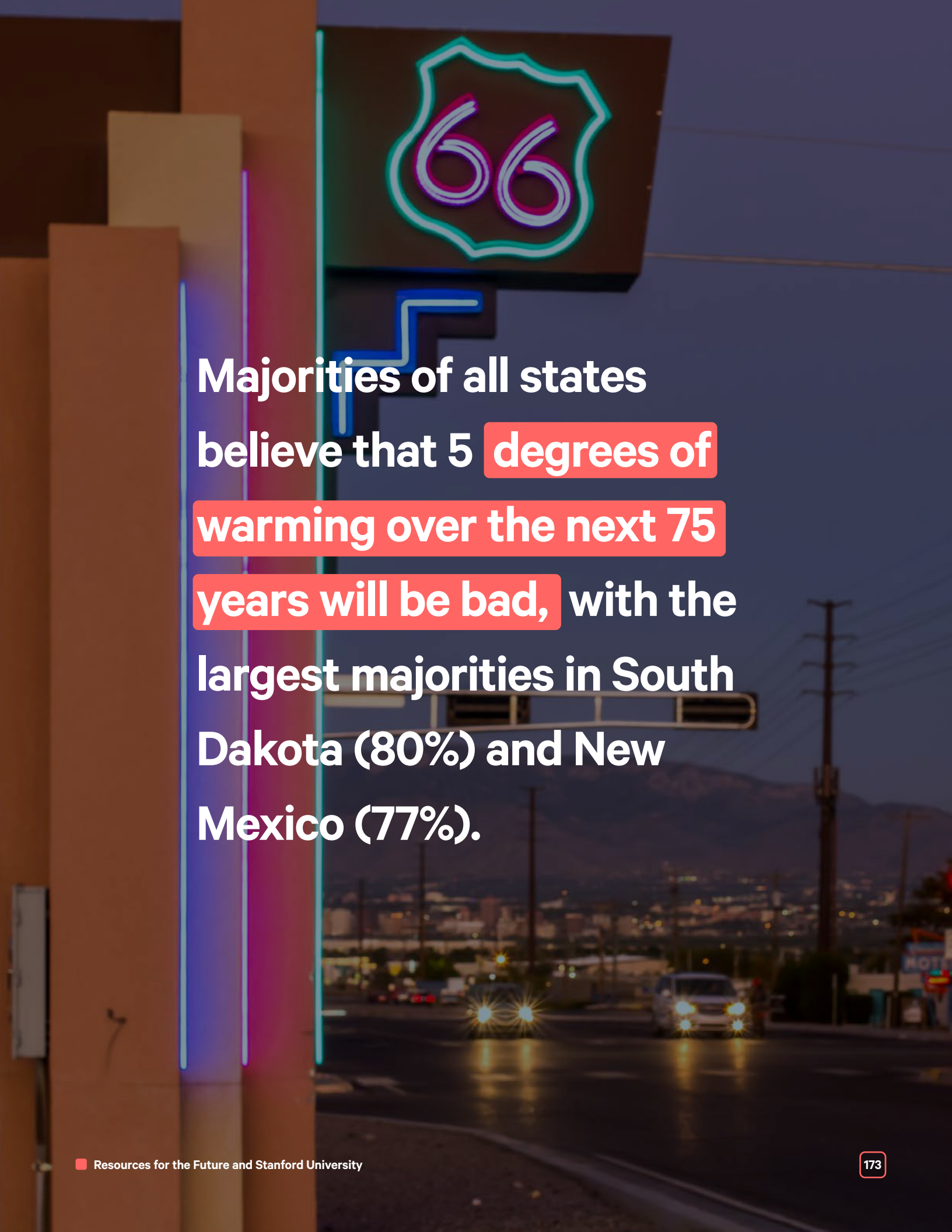
Figure 6.06. Percentage of each state who believe 5 degrees of warming will be bad (2020)



Sizable majorities of all states want the US government to do more than it is now to combat climate change. The smallest majorities appear in Western states like Idaho (53%), Utah (54%), and Nevada (60%), whereas the largest majorities are in Northeastern states like Rhode Island (82%) and New Jersey (77%).

Figure 6.07. Percentage of each state who believe government should do more to address global warming (2020)



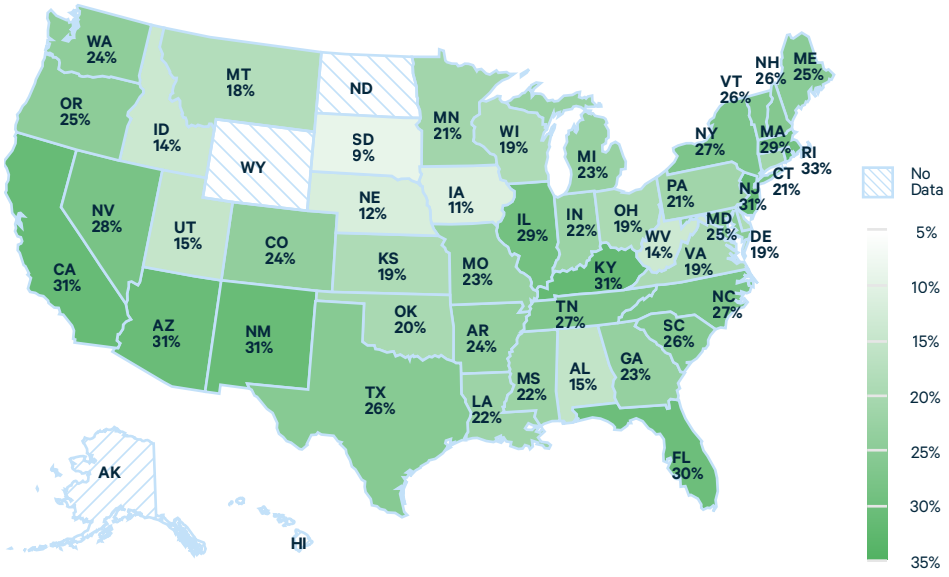


Majorities of all states believe that 5 degrees of warming over the next 75 years will be bad, with the largest majorities in South Dakota (80%) and New Mexico (77%).

Public Engagement on Global Warming

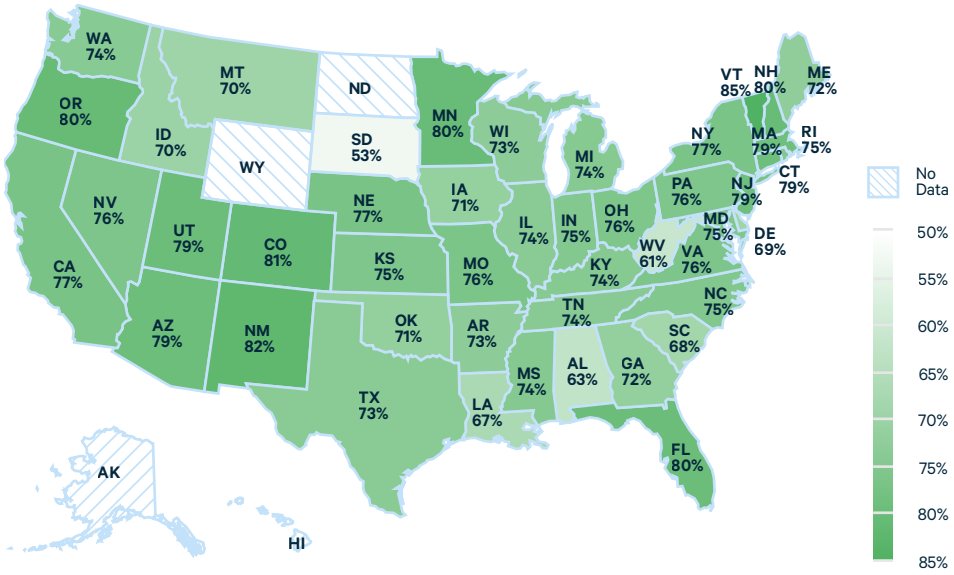
The global warming "issue public" is the group of citizens who are passionate about the issue; do a great deal of thinking, talking, and learning about the issue; contribute money to lobbying groups to influence public policy on the issue; attend rallies to express their opinions; write letters to elected representatives for the same purpose; and vote based on the issue. In 2020, the global warming issue public reached an all-time high of 25%—more than 50 million adults. The size of the issue public varied across the states. The largest issue public is in Rhode Island (33%), and the smallest is in South Dakota (9%). Some states in the western portion of the country, such as California (31%), Arizona (31%), and New Mexico (31%), also have high levels of passion on the issue.

Figure 6.08. Percentage of each state for whom warming is extremely important personally (2020)



At least 60% of the residents of all states report having at least a moderate amount of knowledge about global warming, except South Dakota, where 53% report at least a moderate amount of knowledge about global warming. Majorities of 80% or more exist in 7 states, led by Vermont (85%).

Figure 6.09. Percentage of each state who say they are highly knowledgeable about global warming (2020)

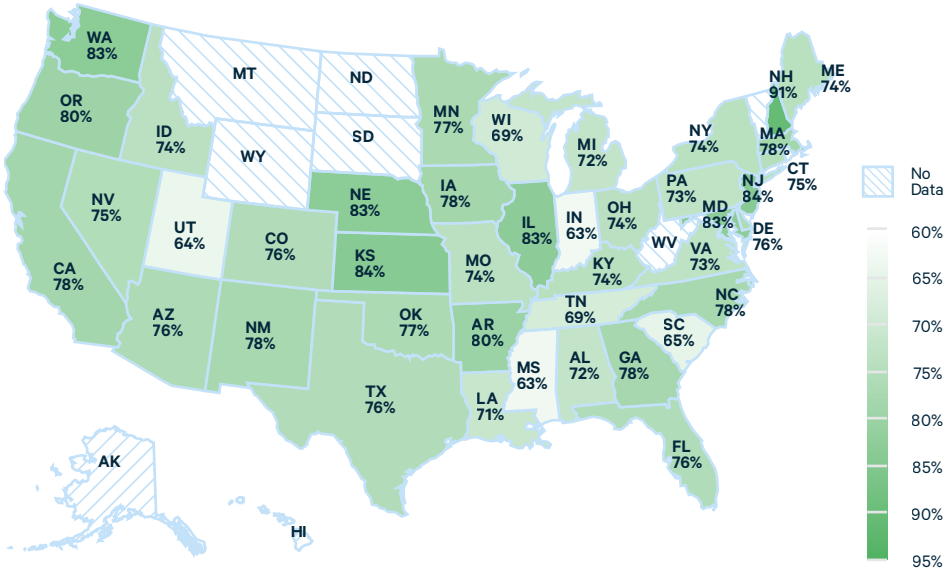


Willingness for Active Government Action on Global Warming

Public opinion on matters of policy is often more divisive than that regarding the principles. For example, whereas large majorities of Americans favor equal rights, smaller groups of people favor specific policies designed to achieve equal rights. This is sometimes called the principle-implementation gap (Dixon, Durrheim, and Thomae, 2017). Such a gap is not generally present on the issue of global warming, though some policies to reduce warming in the future are more popular than others.

Large majorities across all states (as of 2015) do not see international cooperation as a pre-requisite for American action on global warming. Majorities that range from 63% in Indiana and Mississippi to 91% in New Hampshire favor US action regardless of what other countries are doing to reduce their emissions.

Figure 6.10. Percentage of each state who believe the United States should take action on climate change regardless of what other countries do (2015)



Support for Emissions Reduction and Carbon Pricing Policies

Huge majorities of over 70% in every state favor restrictions on businesses' greenhouse gas emissions. These majorities range from a low of 71% in Mississippi to a high of 92% in Rhode Island. Majorities in all states also favor the government limiting power plant emissions. Support for government action to do so is no less than 68% in Utah, and support goes as high as 92% in Rhode Island.

Figure 6.11. Percentage of each state who believe the government should limit businesses' greenhouse gas emissions (2020)

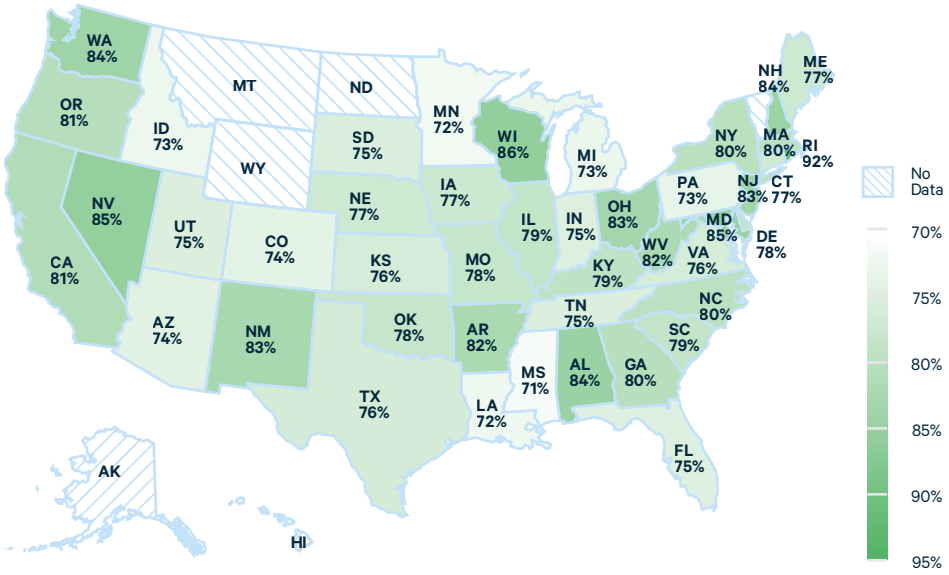
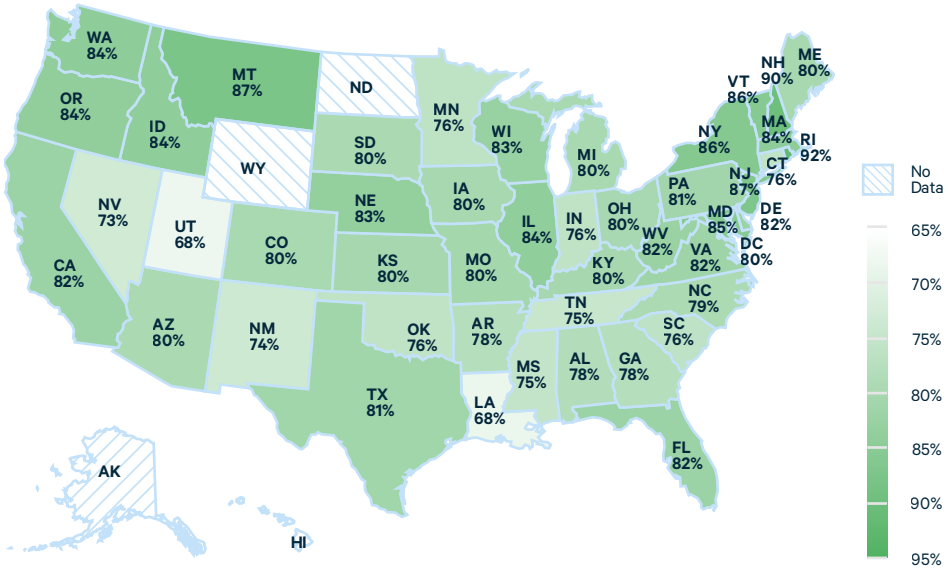


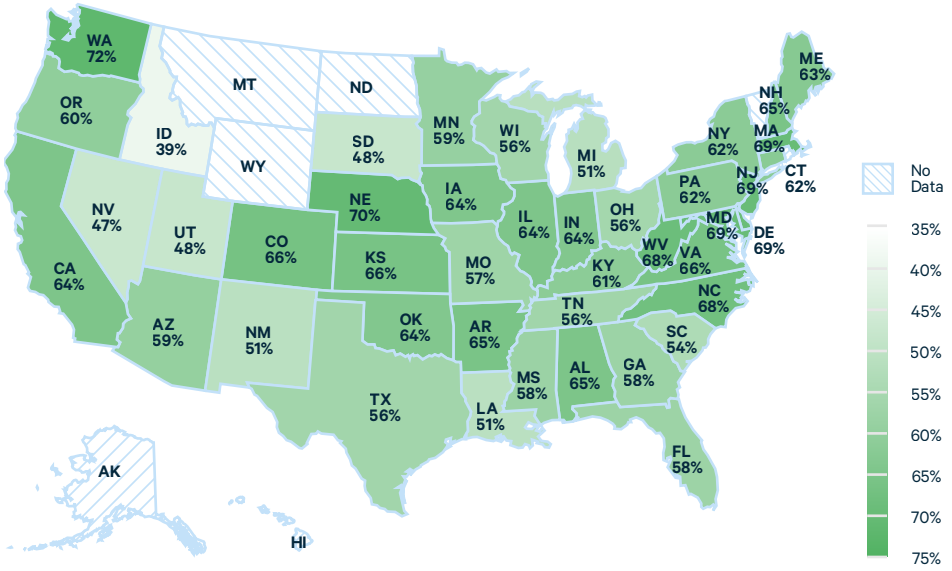
Figure 6.12. Percentage of each state who favor the government requiring/encouraging power plants to lower emissions (2020)




Huge majorities of over
70% in every state favor
restrictions on businesses'
greenhouse gas emissions.

Majorities of most states, but not all, favor a cap-and-trade system in which the government would sell permits to companies limiting the amount of greenhouse gases they can put out, while also allowing companies that emit more to purchase permits from companies that emit less. Relatively few are supportive of this in Western states like Idaho (39%), Nevada (47%), and Utah (48%). The program was much more popular in the Mid-Atlantic and Northeast regions. However, the highest levels of support are found in Washington (72%) and Nebraska (70%).

Figure 6.13. Percentage of each state who favor a national cap-and-trade program (2020)

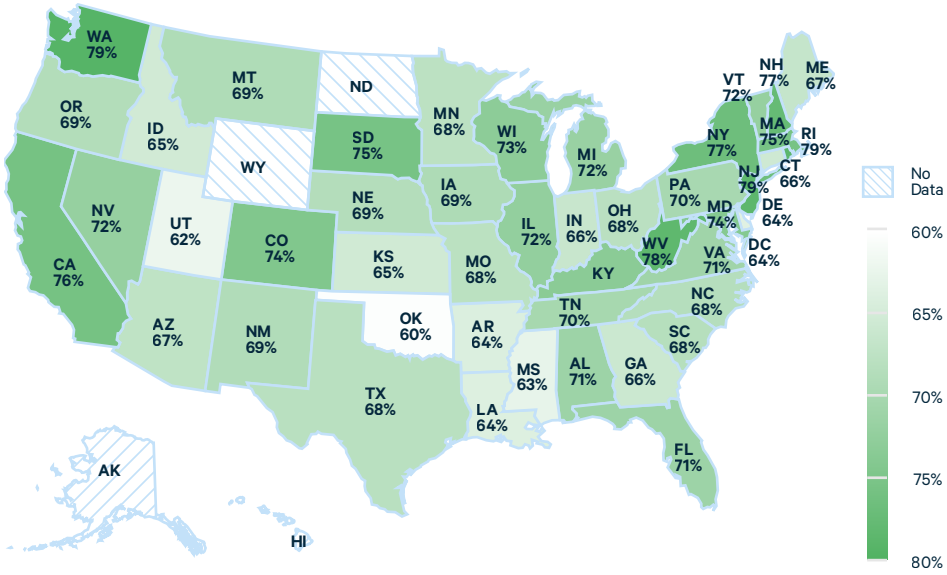


Regulations, Tax Incentives, and Taxes

Next, we turn to policies that fall into three broad categories: business regulations intended to reduce emissions, tax incentives for industries to innovate, and taxes on individuals intended to reduce energy consumption.

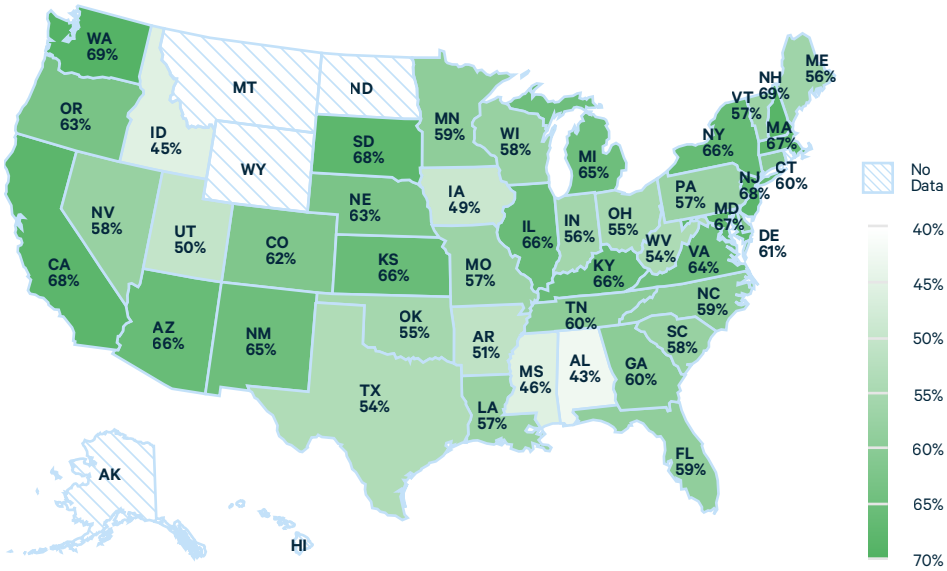
Looking first at business regulations and tax incentives to combat global warming, we find high levels of support across the states. On issues related to the automobile industry, majorities in nearly every state support policies intended to increase fuel efficiency standards. On the topic of increasing fuel economy requirements—known as Corporate Average Fuel Economy, or **CAFE Standards**—more than 60% of respondents in every state favor raising them. Support ranges from 60% in Oklahoma to 79% in Washington, New Jersey, and Rhode Island (see Figure 6.14).

Figure 6.14. Percentage of each state who favor the government requiring/encouraging higher fuel economy standards (2020)



As of 2015, government encouragement for the manufacturing of all-electric cars was supported by majorities in all but four states. Support ranges from 43% in Alabama to 69% in Washington and New Hampshire.

Figure 6.15. Percentage of each state who favor the government requiring/encouraging all-electric vehicles (2015)



Encouraging or requiring more energy-efficient appliances draws majority support in all states surveyed, with majorities ranging from 52% in Idaho to the upper-70s in Northeastern states like New Hampshire (78%), New York (78%), and New Jersey (77%). Support for increasing the energy efficiency of buildings drew similar support: supportive majorities range from the low-60s in Western and Southern states like Idaho (62%), Mississippi (64%), Utah (65%), and Arkansas (66%), to the low-80s in states like West Virginia (84%) and Maryland (83%).

Figure 6.16. Percentage of each state who favor the government requiring/encouraging appliances that use less electricity (2020)

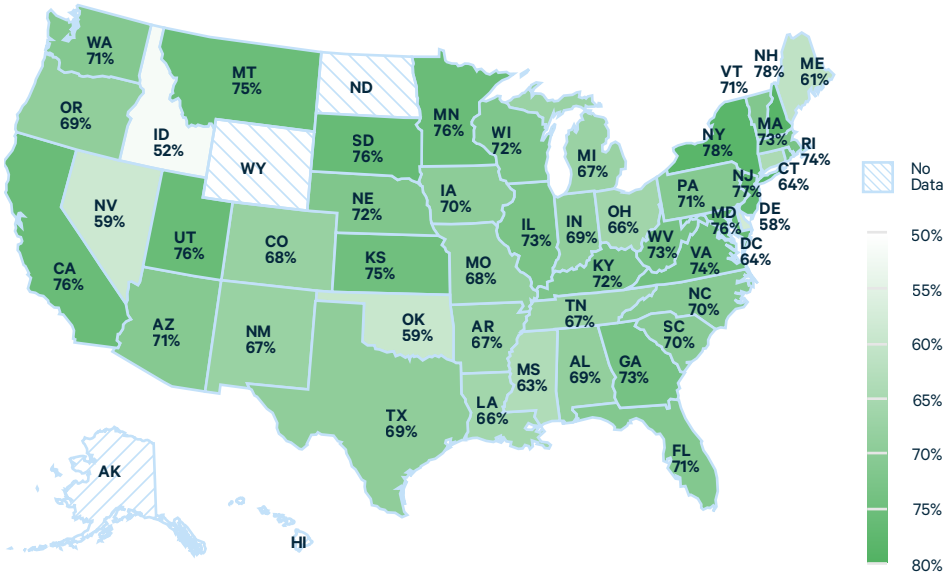
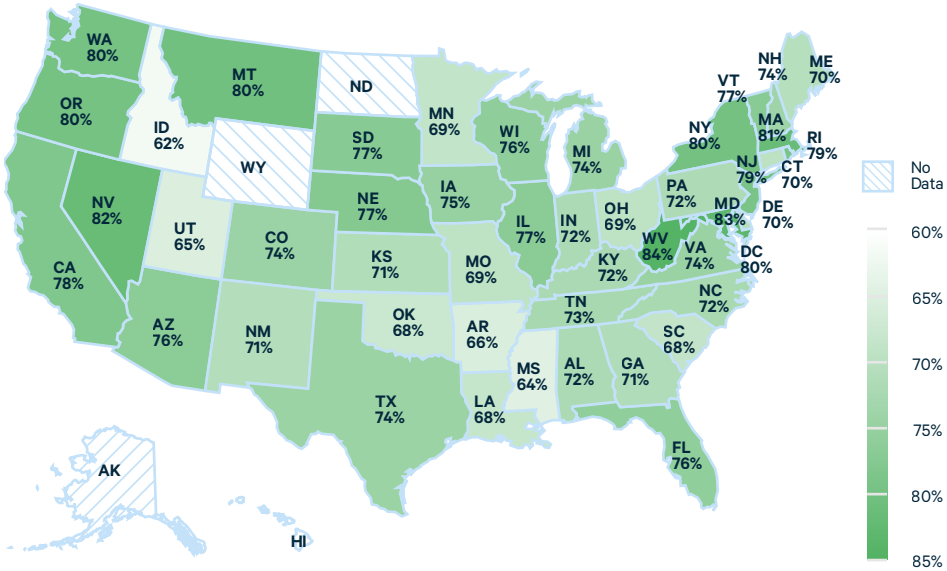


Figure 6.17. Percentage of each state who favor the government requiring/encouraging energy-efficient buildings (2020)



Majorities of all states favor tax breaks for utilities producing electricity from renewable sources. Even in Mississippi, the state with the weakest support, 71% of individuals favor these types of tax breaks, and support goes as high as 91% in Montana. Majorities in every state also support tax incentives to encourage the adoption of cleaner coal technologies. The majorities are the largest in coal-producing states like West Virginia (79%) and Kentucky (73%) and smallest in the states of Nevada (53%) and Vermont (54%). This pattern is consistent with the notion that coal-producing state residents would like to preserve their local industries by reducing the deleterious impact that those industries have on the environment.

Figure 6.18. Percentage of each state who favor tax breaks to produce renewable energy (2020)

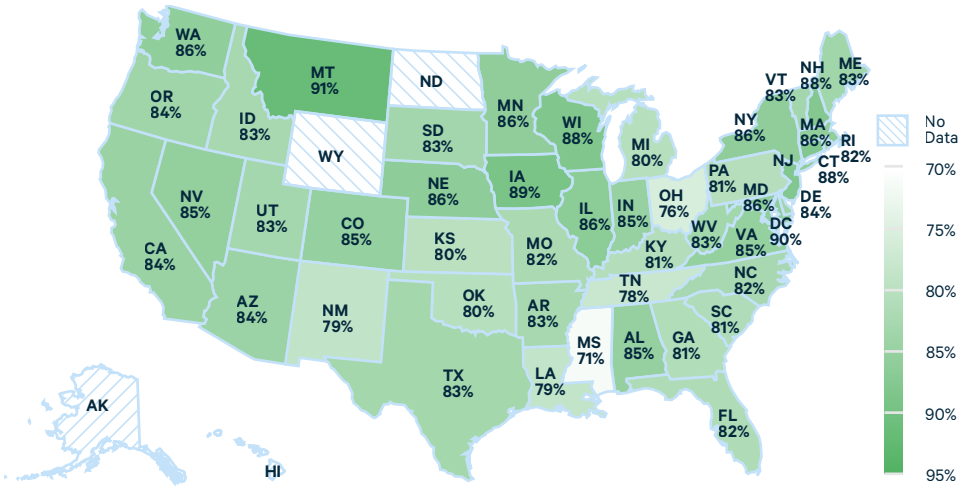
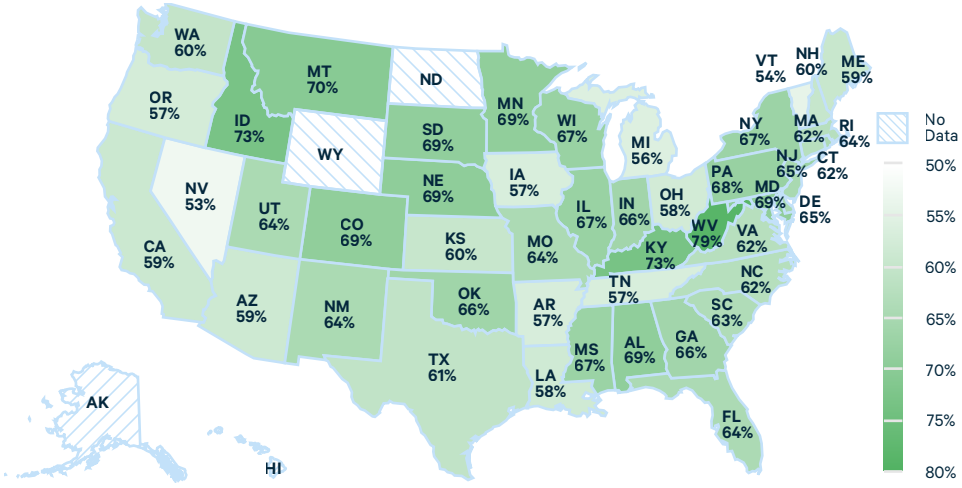


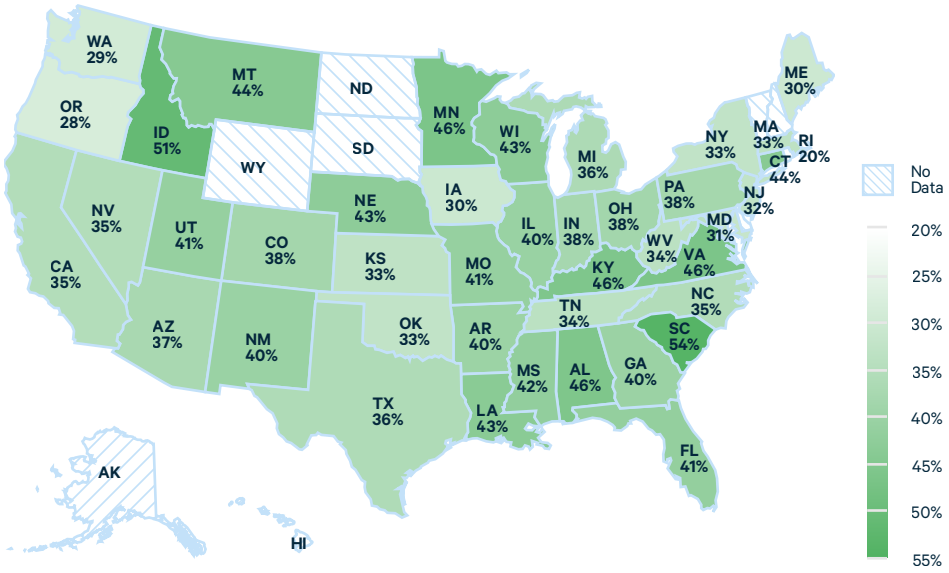
Figure 6.19. Percentage of each state who favor tax breaks to reduce air pollution from coal (2020)



Majorities in every state support tax incentives to encourage the adoption of cleaner coal technologies. The majorities are the largest in coal-producing states like West Virginia (79%) and Kentucky (73%).

Providing tax breaks to encourage the construction of more nuclear power plants is an unpopular policy. A minority of respondents in all states except Idaho (51%) and South Carolina (54%) favor such tax breaks. Opposition to nuclear power tax breaks is greatest in states in the Northeast and Northwest. Residents of Rhode Island manifested the lowest levels of support for tax breaks for building nuclear policy (20%), followed by Oregon (28%), Washington (29%), Maine (30%), and Iowa (30%).

Figure 6.20. Percentage of each state who favor tax breaks to build nuclear power plants (2020)



The least popular policies are those that would involve consumer tax increases intended simply to manipulate people's behavior with no stated use of the raised revenue. In no state did a majority of individuals favor increasing consumption taxes on electricity in order to cause people to use less of it, with support ranging from as low as 14% in New Hampshire and no higher than 37% in Colorado. Support for increasing taxes on gasoline in order to cause people to use less of it is slightly more popular. The minorities favoring this policy were especially small in rural states and Southern states, including Idaho (24%), Alabama (26%), South Carolina (26%), and Kansas (26%). Small majorities in favor appeared in some Western states like Colorado (57%) and Nevada (55%).

Figure 6.21. Percentage of each state who favor increased consumption taxes on electricity (2020)

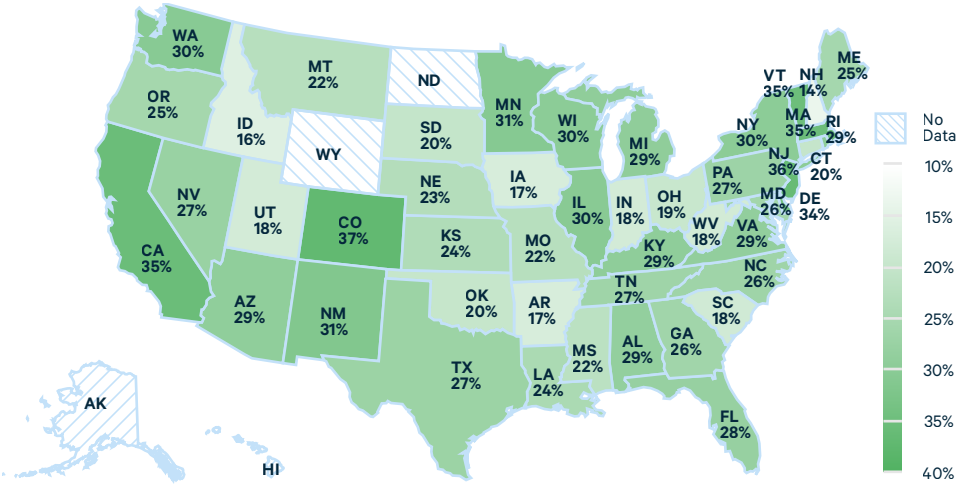
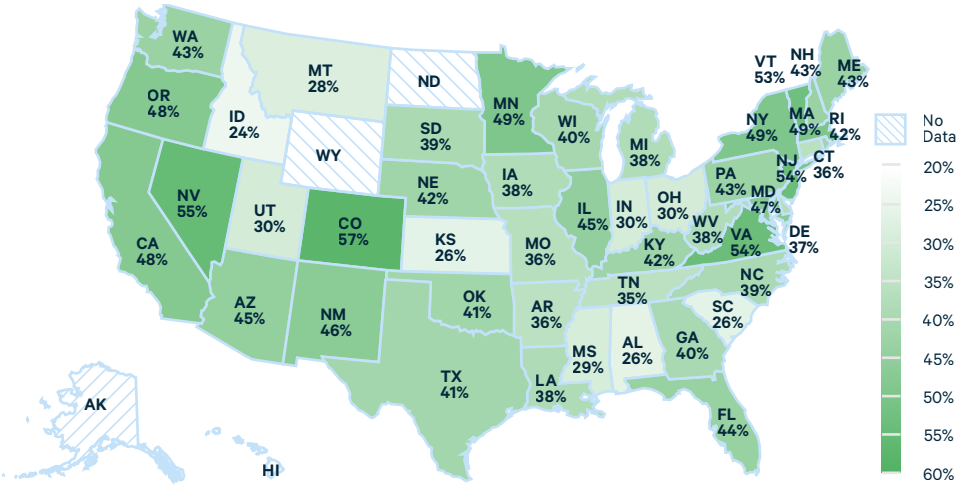


Figure 6.22. Percentage of each state who favor increased consumption taxes on gasoline (2020)



Correlates of State-Level Public Opinion

As the maps show, the public largely believes that climate change is real and a threat to society, but notable variation exists between the states. Some states are reliably more environmentally conscious than others, and the sizes of the majorities shift from question to question.

What might influence state-level variation? Several plausible explanations spring to mind. First, there exists a documented gap in green attitudes between Democrats and Republicans (Krosnick, Holbrook, and Visser 2000; Nisbet 2009; Malka, Krosnick, and Langer 2009), which might manifest as a red/blue divide at the state level.

Temperature may also explain the variation. Warmer states–states that have a higher average temperature over the years–may experience much hotter summers than other states, making residents especially aware of the heat and how more extreme heat disrupts their lives and costs them money. Therefore, people in warmer states may be more likely to believe that global warming has been happening and that if unchecked, it will be a serious problem, leading to a greater level of acceptance in fundamentals. A greater level of acceptance of fundamentals may in turn lead to attaching more personal importance to the issue of global warming and in turn becoming more engaged in the issue. On the other hand, people living in hot states might believe that they have already learned to adapt (by making air conditioning available in most buildings) and can and will adapt to more heat from continued warming. So these people may not manifest greater support for policies to reduce future global warming.

Individuals living in states that have experienced high levels of damage caused by climate-related disasters may be more motivated to take action on climate change, since the negative consequences of climate impacts are not an abstract danger but a real and persistent threat.

On the other hand, if people believe that government regulations to limit greenhouse gas emissions would cause prices to rise in ways that hurt the economy, then people living in these states that are especially economically vulnerable might be especially resistant to such regulations. For example, people living in states with lower individual incomes might be more likely to object to emissions-limiting laws, and people in higher income states may be more likely to favor those policies, because higher income serves as an economic buffer to absorb the potential costs of these policies. People living in states where gasoline or electricity prices are highest and commuting is most pervasive might feel especially vulnerable to increasing fuel prices, so people in these states might be most resistant to emissions-limiting regulations.

The mitigation policies examined in this section are designed to reduce greenhouse gas emissions and shift the nation's energy generation from coal, oil, and gas toward non-emitting sources. Therefore, these mitigation policies are likely to have more direct and stronger economic impacts on people in states in which a larger proportion of jobs are in the oil, coal, or gas sectors.

Coal production has been steadily **declining**, with increasingly more **coal power plants closing**, while natural gas production has been rapidly expanding. This shift has been attributed, in part, to higher cost of coal production compared to natural gas production, with economists and other scholars predicting that the decline in US coal production (closing coal power plants and reduced output from existing coal power plants) **is irreversible and will continue**. Confronting the continued contraction of the coal market and attributing natural gas production to be its main competitor on jobs, people in states with higher coal production may favor a complete switch toward clean energy rather than a more expanded natural gas production, thus conferring enhanced enthusiasm for the mitigation policies. By the same token, protecting the rising economic strength of natural gas production and perceiving that clean energy is a competitor to which they may lose their jobs, people in states with more natural gas production may be more likely to oppose a complete switch toward clean energy, thus dampening their support for the mitigation policies.

Method

To explore potential explanations for variations in state-level opinion, we estimated the parameters of seemingly unrelated ordinary least squares (OLS) regression equations predicting opinions about global warming in the states using the aforementioned factors. We categorized the 20 global warming opinions in 2020 into three types as discussed earlier: fundamentals, engagement, and policy support, and created an index of each by averaging the measures within each category, thus yielding an index of the seven measures of fundamentals of global warming, an index of the two measures that measure engagement on the issue, and an index of the 11 policy measures for which we have estimates of public opinion in 2020. Hawaii and North Dakota were excluded from the analysis because these two states have estimates for only one of the fundamentals and no measures of the engagement or policy opinions.

The predictors are percentage of votes for President Trump in the 2016 election, which is to capture each state's general political orientation; average temperature; economic damage due to climate disasters in the state; per capita income (to measure the economic buffer), consumer electricity costs and retail gasoline costs to measure energy costs; and the amount of coal production and natural gas production in the state (for the data sources and coding for these predictors, see the **technical report**).

Predicting Fundamentals

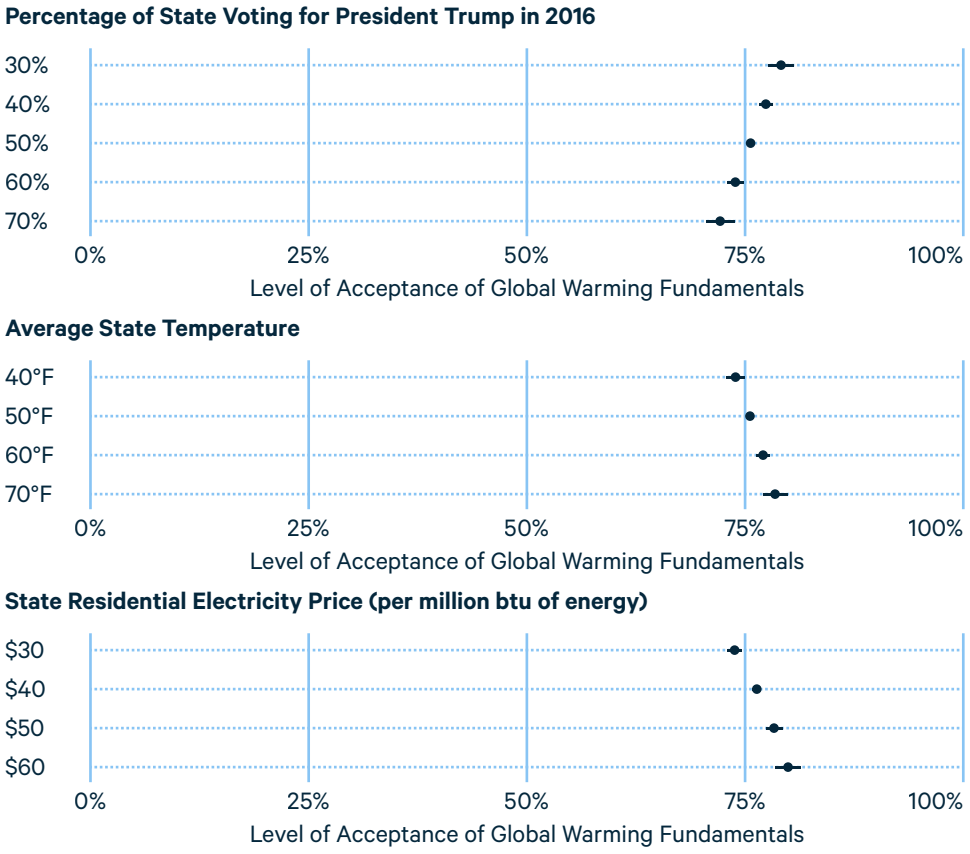
As expected, people in states that conferred more votes to President Trump in the 2016 election exhibited a lower level of acceptance of the fundamentals of global warming. The magnitude of the association of political orientation with the fundamentals is surprisingly small: a ten percentage points increase in the share of votes for President Trump in 2016 (ten percentage points was about the difference between Connecticut, in which President Trump received 41% of the votes, and Iowa, where President Trump received 51% of the votes) correlates with a decrease of 1.7 percentage points in the proportion of people accepting (or believing in) global warming fundamentals.

As expected, people in warmer states manifested more belief in fundamentals. The magnitude of the association of average temperature with fundamentals is considerable: a one-unit increase in the square root of average temperature (a one-unit increase in the square root of average temperature is about the difference between Texas, where the average temperature was 64.6 and its square root is 8, and Nevada, where the average temperature was 49.5 and its square root is 7) correlates with an increase of 2.2 percentage points in the proportion of people accepting (or believing in or embracing) global warming fundamentals.

Consistent with expectations, higher consumer electricity prices predict greater acceptance of global warming fundamentals. The magnitude of the influence of average temperature on fundamentals is markedly large: for every one percent increase in consumer energy prices, there is an 8.8 percentage point increase in the proportion of people accepting global warming fundamentals.

Other predictors, including per capita income, gas prices, economic damage due to climate disasters, and percentage of national coal and natural gas production attributable to the state, were not significantly related to more people accepting global warming fundamentals.

Figure 6.23. Predictors of acceptance of global warming fundamentals (2020)



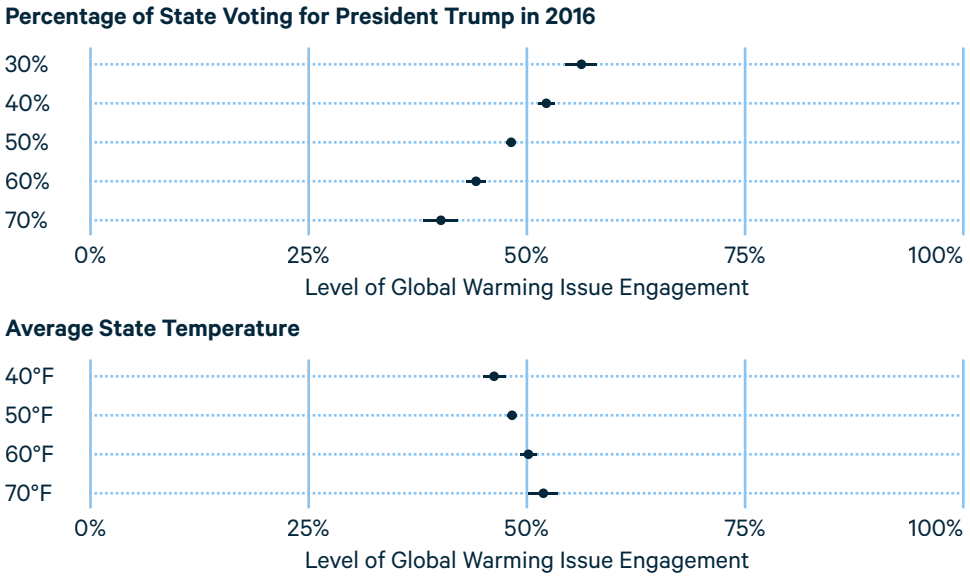
Predicting Engagement

As expected, people in states that conferred more votes to President Trump in the 2016 election exhibited a lower level of engagement in the issue of global warming. A ten-percentage-point increase in the share of votes for President Trump in 2016 (ten percentage points was about the difference between Connecticut and Iowa) correlates with a decrease of 4.0 percentage points in engagement.

As expected, people in warmer states are more engaged in the issue of global warming. The magnitude of the association of average temperature with issue engagement is sizable: a one-unit increase in the square root of average temperature (a one-unit increase in the square root of average temperature was about the difference between Texas and Nevada) correlates with an increase of 2.8 percentage points in issue engagement.

The remaining predictors in the model were not significantly related to level of engagement on global warming. These included per capita income, residential energy prices, gas prices, economic damage due to climate disasters, and percentage of national coal and natural gas production attributable to the state.

Figure 6.24. Predictors of global warming issue engagement (2020)



Predicting Policy Support

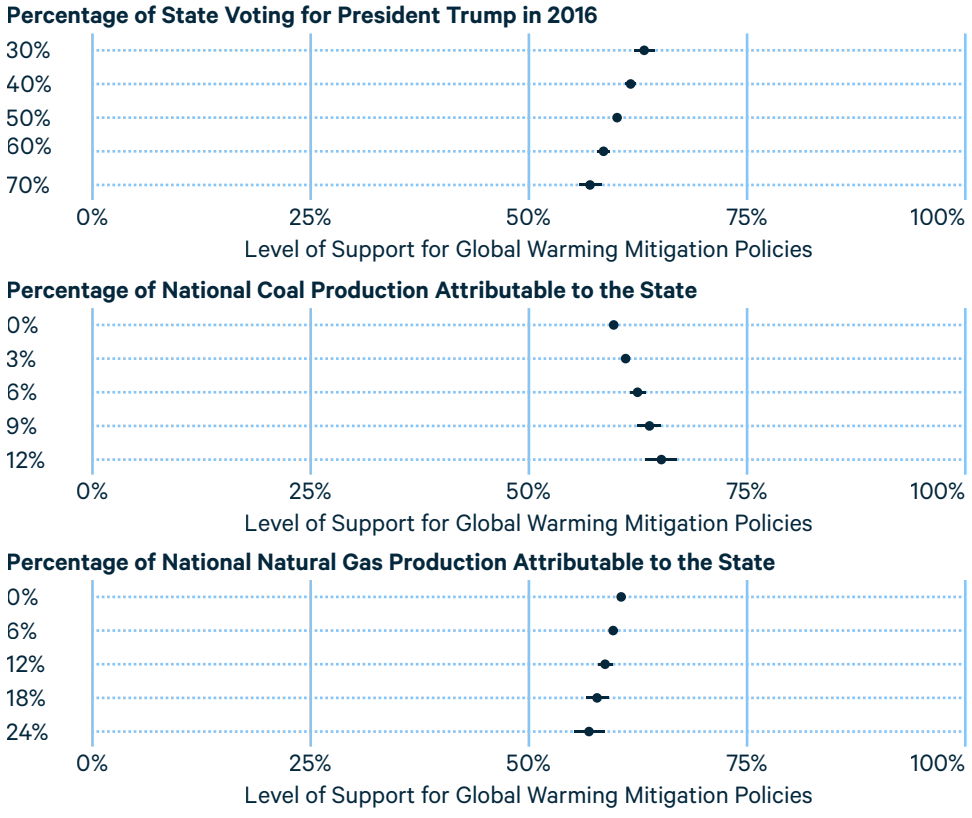
As expected, people in states that conferred more votes to President Trump in the 2016 election exhibited a lower level of support for mitigation policies to reduce future global warming. The magnitude of the influence of political orientation on engagement is relatively small: a ten-percentage-point increase in the shares of votes for President Trump in 2016 (ten percentage points was about the difference between Connecticut and Iowa) correlates with a decrease of 1.6 percentage points in support for the mitigation polices.

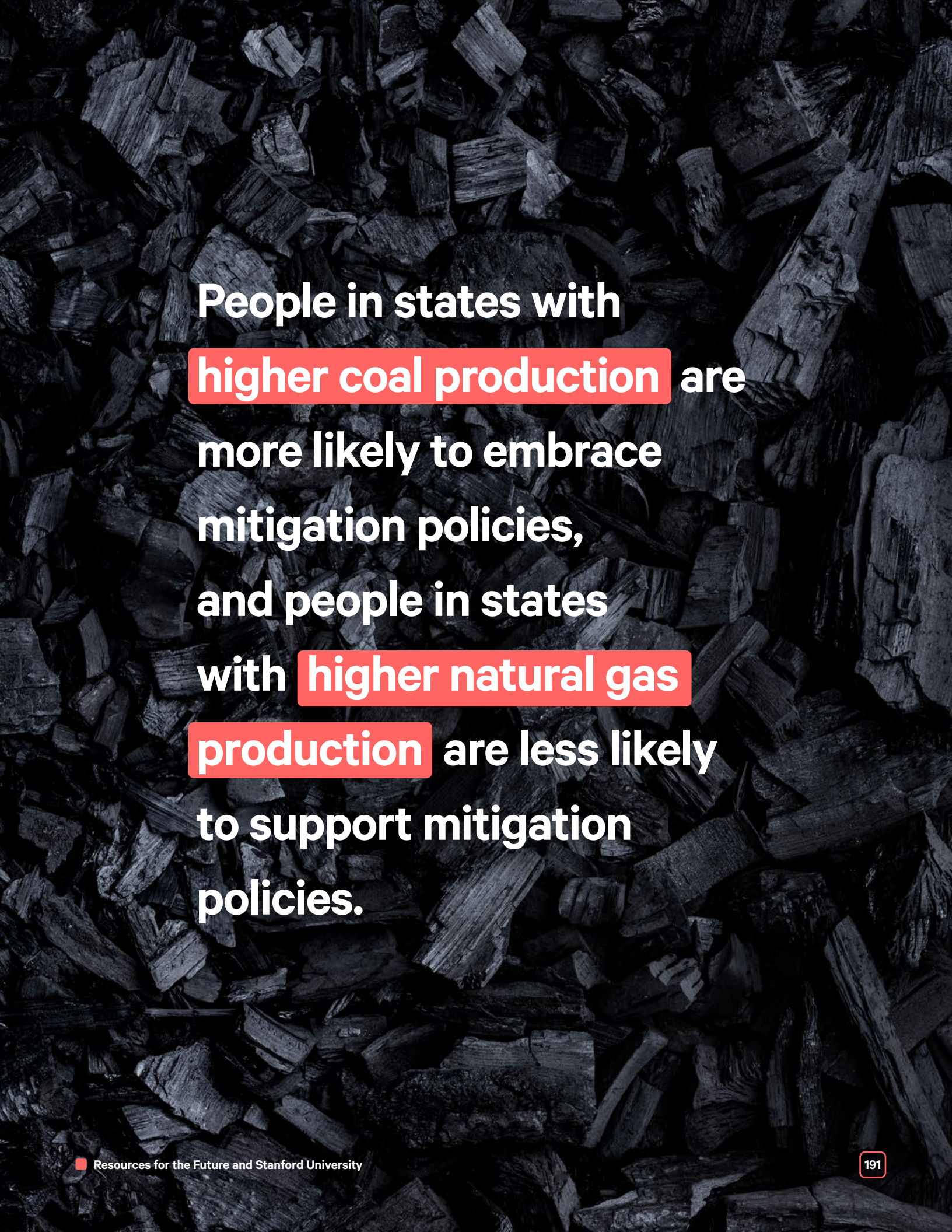
Also consistent with expectations, higher-income states are more supportive of mitigation policies. The magnitude of the influence of income on policy support is quite large: for every one percent increase in consumer income, there is an associated 6.0 percentage point increase in the level of favoring those mitigation policies.

As hypothesized, people in states with higher coal production are more likely to embrace mitigation policies, and people in states with higher natural gas production are less likely to support mitigation policies. The magnitude of the influence of coal production on policy support is larger than that of natural gas production. For a two percentage point increase in coal production (approximately the difference between Texas, which has 3.3 percent in coal production and Montana, which has 5.1 percent in coal production), there is an approximately one percentage point increase in the level of favoring those mitigation policies. Likewise, a ten percentage point increase in natural gas production (approximately the difference between Oklahoma, which has 9.3 percent in natural gas production and Pennsylvania, which has 19.5 percent in natural gas production), there is an approximately 1.5 percentage point decrease in the level of favoring those mitigation policies.

The remaining predictors, including average state temperature, per capita income, residential energy prices, gas prices, and economic damage due to climate disasters, were not significantly related to more people favoring those mitigation policies.

Figure 6.25. Predictors of support for global warming mitigation policies (2020)




People in states with higher coal production are more likely to embrace mitigation policies, and people in states with higher natural gas production are less likely to support mitigation policies.

Representation of Public Opinion in Government

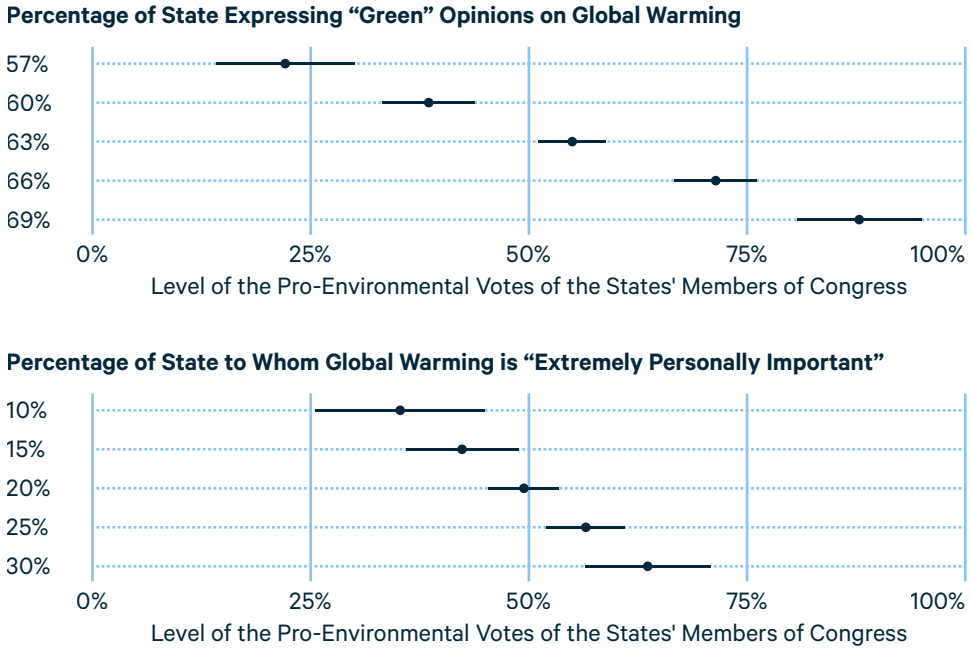
To what degree are the public opinion differences between states reflected in the voting behavior of their elected representatives in the US Congress? To assess the strength of this connection, we tested two models of representation simultaneously. The first model proposes that the opinions of all residents of a state might influence policymakers via surveys of representative samples of those individuals. The greener the state as a whole, the more likely its representatives might be to vote for policies intended to protect the natural environment. The second model proposes that members of the issue public may send signals directly and indirectly to elected representatives (via phones calls, letters, emails, visits to their offices, and participation in town halls). Thus, because the global warming issue public is more than 90% on the green side of the issue, the larger the issue public in a state, the more likely their representatives might be to vote for policies intended to protect the natural environment.

To test these models, we used these two attributes of each state (the entire population's endorsement of mitigation policies and the size of the issue public) to predict green voting by members of Congress. The latter was gauged using the score for each member in the first session of the 116th Congress from the League of Conservation Voters (LCV). This LCV scorecard is based on the consensus of experts from approximately 20 environmental and conservation organizations who selected the key votes on which members of Congress should be scored, on climate change, energy, public health, public lands use and wildlife conservation, and spending for environmental programs (LCV 2019).

All US Senators and all House members were assigned a score ranging from 0 to 100, with 0 meaning the least pro-environmental voting and 100 meaning the most pro-environmental voting.[1] Each state produced three voting scores to be predicted: one for each of the two US Senators representing the state, and another the average of the scores of all the members of US House for the state. A total of 46 states were included in this analysis because they each had sufficient numbers of survey respondents to generate reliable measures of opinions.

An ordinary least squares regression predicting pro-environment voting in Congress lends support to both models of public representation in Congress (see Table 3 of the **technical report**). As expected, the larger the majority in the state endorsing global warming mitigation policies, the more likely their representatives were to vote for green policies. Every percentage point increase in green policy views was associated with a nearly 5.4-point increase in the grade assigned to the legislator by the LCV. And the larger the global warming issue public in the state, the more likely their representatives were to vote for green policies. Every extra percentage point of people in a state for whom global warming is personally extremely important was associated with a roughly 1.46-point increase in the LCV score.

Figure 6.26. PPredicting voting behavior of US Members of Congress using their constituencies' opinions (2020)



Conclusion

There are various pieces of good news for democracy in America in this section of our report. First, we have demonstrated the operation of a new statistical technique to combine survey data collected over decades from representative national samples asked the identical question to generate statistics of normative value for elected representatives. Instead of paying for one high quality survey in each state to generate reliable numbers, at substantial expense, it is possible to aggregate and disaggregate national survey data to yield needed characterizations of almost all states in the country. The ADT can be implemented, using the same methods employed here, to generate measures of state-based public opinion on a wide variety of issues of interest to legislators, as long as survey organizations have invested in conducting national surveys according to best practices and measuring opinions comparably.

Second, on the issue of global warming, we see here easily interpretable signals to policymakers about how their constituents would like them to vote on policy issues related to global warming. The maps characterize opinion in each state on each issue, and these distributions of opinions clearly differ across issues. Regarding some policies, majorities, large majorities, or huge majorities are in favor. Regarding other policies, sizable majorities are opposed. This is just the sort of guidance that policymakers can use if they wish to shape their voting decisions according to the will of their constituents.

Furthermore, the map showing the size of the issue public in each state is informative to policymakers as well. If they choose to act upon the desires of a passionate—and growing—base of climate action supporters, the numbers they need to see are in that map. As we showed in earlier sections of this report, at the time of elections, these are the individuals who can be roused to vote for a candidate who takes green positions on global warming. The issue public across the American states can inform a senator who espouses such positions on the size of the coalition of supporters he or she is likely to build from doing so. Aggregating other coalitions of voters by taking specific stands on other policy issues can be a pathway to electoral victory. Thus, candidates running for office have more incentive to spend time talking about endorsement of green policies in states where the issue public is larger.

Additional good news comes from evidence of the validity of the numbers in the maps. We tested a variety of hypotheses about the possible correlates of endorsement of fundamentals, engagement in the issue, and support for mitigation policies, and support for a number of these hypotheses appeared. This is substantively interesting for understanding how the physical and economic context of a state can shape the opinions of its residents. These sensible relations also reinforce confidence in the validity of the estimates produced by the ADT, because those estimates were produced completely independently of the values of the predictors used to test these hypotheses.

Still more good news comes from the evidence that voting in the US Congress reflects public opinion. Specifically, we saw that the larger the majority of state residents who endorse mitigation policies, the more likely elected representatives were to vote for policies like them. And in addition, the larger the global warming issue public in a state, the more likely its members of Congress were to vote in green ways. If we had seen no such relations, that would have raised serious questions about whether public opinion has played any role in shaping federal policymaking. However, the fact that such relations do appear provides reassurance and incentives to Americans to express their opinions in surveys and directly to their legislations.

It is interesting to note that roll call votes are the byproduct of agenda setting by Senate and House leaders, who may choose not to bring drafted legislation up for a vote if they are worried that it will show representatives to be out of step with their constituents (Cox and McCubbins 1993; 2005). Through this procedural activity, policymakers have demonstrated a desire to not only use their votes to reflect the will of their district or state, but also to avoid voting on issues that might undermine or contradict the popular opinion of the constituents that they represent.

To be sure, examples of disconnect—of legislators who appear out-of-step with their constituents on global warming—do exist. Such disconnects are evidence of the breakdown of democratic representation in those states, and may result from forces, and sometimes very strong forces, other than public opinion influencing legislators' behavior. We should not presume that legislators will always vote as the majority of their constituents want, because even if public opinion does exert an influence, campaign contributions, party leaders and the White House, educational efforts of lobbying experts, logrolling, and other forces can and do shape the votes of members of Congress as well (Jacobs and Shapiro, 2000).

Thus, disconnects between public opinion and policymaker voting persist and should come as no surprise. But as we have seen here, at least on the issue of global warming, the views of general publics and of issue publics appear to be reflected in, though not determinative of, the policymaking process.


On the issue of global warming, we see here easily interpretable signals to policymakers about how their constituents would like them to vote on policy issues related to global warming.

Climate Insights 2020: Conclusion

All of the evidence in this report characterizes American public opinion just before the Biden administration took office. The president's decision to focus a great deal of his initial policymaking efforts on climate change via executive orders is, in spirit, very much in line with this report's evidence that the American public is supportive of government efforts to reduce future greenhouse gas emissions, is willing to pay money to allow that to happen, and places priority on such efforts. In this sense, the administration's efforts are in sync with the public's will at the moment.

With this report as a backdrop, it will be fascinating to watch events unfold during the coming years. If the administration's efforts are met with support from important players in the private sector, who have often said they wish for predictability, continuity, and measurable success in climate policy, those efforts may win public approval. And if the successes are visible quickly enough, environmental policies may buoy public support for these Democratic initiatives leading up to midterm congressional elections. The **announcement** by General Motors of their intention to manufacture only all-electric vehicles by 2035, as well as the recent **announcement** that 75 CEOs expressed support to continue American participation in the Paris Agreement, might be viewed as signals that industry is on board with the sorts of shifts that the administration is pushing.

In this light, we might predict an ironic shift when we conduct our next survey. During the last 23 years, our surveys have consistently shown about two thirds of Americans want the federal government to do more on climate change. If the Biden administration is perceived to have stepped up government efforts on climate change considerably, our next survey might show fewer people saying they want more action from government and more people asking to maintain the status quo. A knee-jerk interpretation of fewer people asking for more effort might be seen as a signal of decreased public support for efforts to attenuate climate change when in fact, the shift is a signal of satisfaction from the public about the administration's stepped-up efforts. We shall see.

However, we might observe other changes as America emerges from the COVID-19 crisis. Public perceptions of the administration's success may be colored by a return to business as usual. As more and more Americans are vaccinated and begin to travel and socialize more, we will see more emissions from cars, busses, passenger planes, and trains. As the economy picks back up, factories and fossil fuel companies may increase production. All this might seem to suggest that the administration's efforts to reduce emissions are not successful. Therefore, it will be important for researchers such as the experts at RFF to help the public understand whether the changes we observe in emissions in the future reflect successful Biden policies or whether those policies did not achieve their goals. It's easy to envision the critique: "Despite expensive efforts to reduce greenhouse gas emissions in America, the Biden administration has presided over the sharpest increase in emissions in modern history!" If the Biden administration

does implement successful emissions-reducing policies, but yet emissions do see a sharp increase, it will be a considerable challenge to present easy-to-understand and difficult-to-refute evidence that such increases would have been much greater without policies in place.

But regardless of all that, the evidence in this report suggests that large majorities of Americans are probably already pleased about the administration's efforts to reduce future emissions and are likely to reward the Democrats for these efforts in 2022. An interesting question looking ahead is who on Capitol Hill will join in supporting these efforts and who may enjoy public esteem as a result.

References

ABC News and Ipsos. 2020. While American Public Supports Police Reform, Reckoning with Confederate Past Is More Complicated. Washington, DC: Ipsos.

ABC News, Stanford University, and Resources for the Future. 2018. Public Attitudes on Global Warming. **https://www.langerresearch.com/wp-content/uploads/1198a1Global-Warming.pdf**

Abramson, J., & Desai, S. 1993. Purchase involvement of new car buyers: A descriptive study. American Journal of Business, 2(8), 13-2.

Allen, Troy D. 2007. Katrina: Race, Class, and Poverty—Reflections and Analysis. Journal of Black Studies 37(4): 466-468. [doi: 10.1177/0021934706296184]

Arslanagic, Maja, Pestek, Almir, & Kadic-Maglajlic, Selma. 2014. Perceptions of health food packaging information: Do men and women perceive differently? Procedia – Social and Behavioral Sciences, 109, 78-82.

Bajtelsmit, Vickie, L., & Bernasek, Alexandra. 1996. Why do women invest differently than man? Financial Counseling and Planning, 7, 1-10.

Barbarossa, C., Beckmann, S.S., De Pelsmacker, P., Moons, I., & Gwozdz, W. 2015. A self-identity based model of electric car adoption intention: A cross-cultural comparative study. Journal of Environmental Psychology, 42, 149-160.

Beggan, J. 1992. On the social nature of nonsocial perception: The mere ownership effect. Journal of Personality and Social Psychology, 62 (2), 229–237.

Biden, Joe. 2020. The Biden plan for a clean energy revolution and environmental justice. Accessed on October 7, 2020 at **https://joebiden.com/climate-plan/#**.

Blakewell, C., & Mitchell, Vincent-Wayne. 2006. Male versus female consumer decision making styles. Journal of Business Research, 59, 1297-1300.

Callegaro, Mario, Ana Villar, David Yeager, and Jon A. Krosnick. "A Critical Review of Studies Investigating the Quality of Data Obtained with Online Panels Based on Probability and Nonprobability Samples" in Online Panel Research: A Data Quality Perspective, Mario Callegaro, Reg Baker, Jelke Bethlehem, Anja Goritz, Jon A. Krosnick, Paul Lavrakas, eds. (Wiley & Sons, New York, 2014), pp. 23-53.

Carley, S., Krause, R.M., Lane, B.W., & Graham, J.D. 2013. Intent to purchase a plug-in electric vehicle: A survey of early impressions in large US cities. Transportation Research Part D, 18, 39-45.

CBS News. 2020. Americans Weigh In on Issues Before the Supreme Court—CBS News Poll. New York, NY: CBS Corporation.

Chang, Linchiat and Jon A. Krosnick. 2009. "National Surveys Via RDD Telephone Interviewing Versus the Internet: Comparing Sample Representativeness and Response Quality," Public Opinion Quarterly, 73(4): 641–678.

Chong, Dennis, and James N. Druckman. 2007. Framing Public Opinion in Competitive Democracies. The American Political Science Review 101(4): 637-655. [doi: 10.2307/27644476]

Cornesse, Carina, Annelies G. Blom, David Dutwin, Jon A. Krosnick, Edith D. DeLeeuw, Stephane Legleye, Josh Pasek, Darren Pennay, Benjamin Phillips, Joseph W. Sakshaug, Bella Struminskaya, and Alexander Wenz. 2020. "A Review of Conceptual Approaches and Empirical Evidence on Probability and Nonprobability Sample Survey Research." Journal of Survey Statistics and Methodology, 8(1): 4-36.

Cox, Gary W. and Mathew D. McCubbins. 1993. Legislative Leviathan: Party Government in the House. Berkeley: University of California Press.

Cox, Gary W. and Mathew D. McCubbins. 2005. Setting the Agenda: Responsible Party Government in the US House of Representatives. New York: Cambridge University Press.

Dahl, Robert A. 1989. Democracy and Its Critics. New Haven: Yale University Press.

Dixon, John, Kevin Durrheim, and Manuela Thomae. 2017. "The Principle-Implementation Gap in Attitudes toward Racial Equality (and How to Close It)." Political Psychology, 38: 91-126

Downs, Anthony. 1957. An Economic Theory of Democracy. New York: Harper.

Eckel, Catherine C., & Grossman, Philip J. 2008. Men, women, and risk Aversion: Experimental evidence. Handbook of Experimental Economics Results, 1, 1061-1073.

EPA. 2020. Inventory Of US Greenhouse Gas Emissions And Sinks | US EPA. Accessed on October 15, 2020, at **https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks**

Ewing, G. O., & Sarigollu, E. 2000. Assessing consumer preferences for clean-fuel vehicles: A discreate choice experiment. Journal of Public Policy and Marketing, 19(1), 106-118.

Gallup. 2020. Party Affiliation.

Guiltinan, J. 2010. Consumer durables replacement decision-making: An overview and research agenda. Marketing Letters, 21, 163-174.

Hulland, John, Hans Baumgartner, and Keith Marion Smith. 2018. "Marketing Survey Research Best Practices: Evidence and Recommendations from a Review of JAMS Articles." Journal of the Academy of Marketing Science, 17(1): 92-108.

Husser, John, Kaye Usry, and Owen Covington. 2018. The Impact of Hurricane Florence on North Carolina Voters. Elon, NC: Elon University. https://www.elon.edu/u/elon-poll/wp-content/uploads/sites/819/2019/01/Elon-Poll-Report-101118.pdf

Intergovernmental Panel on Climate Change (IPCC). 2014. Climate Change 2014 Synthesis Report: Fifth Assessment Report. https://ar5-syr.ipcc.ch/topic_summary.php

IPCC Working Group 2. 2014. North America. In Climate Change 2014: Impacts, Adaptation, and Vulnerability Part B: Regional Aspects—Contribution of Working Group II to the FIfth Assessment of the Intergovernmental Panel on Climate Change. Cambridge, UK and New York, NY: Cambridge University Press. 1439-1498. https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartB_FINAL.pdf

Jacobs, Lawrence R. and Robert Shapiro. 2000. Politicians Don't Pander: Political Manipulation and the Loss of Democratic Responsiveness. Chicago: University of Chicago Press.

Jansson, J., Nordlund, A., & Westin, K 2017. Examining drivers of sustainable consumption: The influence of norms and opinion leadership on electric vehicle adoption in Sweden. Journal of Cleaner Production, 154, 176-187.

Kahan, Dan M. 2017. The "Gateway Belief" Illusion: Reanalyzing the Results of a Scientific-consensus Messaging Study. Journal of Science Communication 16(5): 1—20. [doi: 10.2139/ssrn.2779661]

Kahn, Matthew and Matthew Kotchen. 2010. Business Cycle Effects on Concern about Climate Change: The Chilling Effect of Recession. Climate Change Economics 2(3): 257—273. [doi:10.1142/S2010007811000292].

Kahn, Matthew and Matthew Kotchen. 2010. Trends in Environmental Concern as Revealed by Google Searches: The Chilling Effects of Recession. Vox EU through the Centre for Economic Policy Research. **https://voxeu.org/article/concern-environment-luxury-good-evidence-google-searches**.

Kahneman, Daniel; Knetsch, Jack L.; Thaler, Richard H. 1990. Experimental tests of the endowment effect and the Coase Theorem. Journal of Political Economy, 98 (6), 1325–1348

Kahneman. D. 2003. Maps of bounded rationality: Psychology for behavioral economics. American Economics Review, 93(5), 1449-1475.

Kaiser Family Foundation. KFF Health Tracking Poll—May 2020. San Francisco, CA: KFF.

Kerr, John R. and Marc S. Wilson. 2018. Perceptions of Scientific Consensus Do Not Predict Later Beliefs about the Reality of Climate Change: A Test of the Gateway Belief Model Using Cross-lagged Panel Analysis. Journal of Environmental Psychology 59: 107-110. [doi: 10.1016/j.jenvp.2018.08.012]

Kiewiet, D. Roderick. 1983. Macroeconomics and Micropolitics: The Electoral Effects of Economic Issues. Chicago, IL: University of Chicago Press.

Kinder, Donald R. and D. Roderick Kiewiet. 1981. Sociotropic Politics: The American Case. British Journal of Political Science 11(20): 129—161. [doi: 10.1017/S0007123400002544].

Kinder, Donald R., and Lynn M. Sanders. 1990. Mimicking Political Debate within Survey Questions: The Case of White Opinion on Affirmative Action for Blacks. Social Cognition 8(1):73–103. [doi: 10.1521/soco.1990.8.1.73]

Kolodny, Lora. 2020. Biden and Trump agreed on at least one thing in debate: Support for electric vehicles. Accessed on October 7, 2020, at **https://www.cnbc.com/2020/09/30/trump-and-biden-both-say-they-support-electric-vehicles-in-debate.html**.

Krosnick, Jon A. 1990. "Government Policy and Citizen Passion: A Study of Issue Publics in Contemporary America." Political Behavior 12(1): 59-92. [doi: 10.1007/BF00992332]

Krosnick, Jon A., Allyson L. Holbrook, and Penny S. Visser. 2000. "The Impact of the Fall 1997 Debate about Global Warming on American Public Opinion." Public Understanding of Science, 9(3): 239-260.

Krosnick, Jon A., Allyson L. Holbrook, Laura Lowe, and Penny S. Visser. 2006. "The Origins and Consequences of Democratic Citizens' Policy Agendas: A Study of Popular Concern about Global Warming." Climatic Change, 77: 7-43.

Kvaloy, Berit, Henning Finseraas, and Ola Listhaug. 2012. The Publics' Concern for Global Warming: A Cross-national Study of 47 Countries. Journal of Peace Research 49(1): 11-22. [doi: 10.1177/0022343311425841]

Lau, Richard. R., and Caroline Heldman. 2009. Self-interest, Symbolic Attitudes, and Support for Public Policy: A Multilevel Analysis. Political Psychology 30(4): 513-537. [doi: 10.1111/j.1467-9221.2009.00713.x]

LCV 2019. 2019 National Environmental LCV Scorecard – First Session of the 116th Congress. Available from scorecard.lcv.org.

Lewis-Beck, Michael, and Martin Paldam. 2000. Economic Voting: An Introduction. Electoral Studies 19(2): 113-121. [doi: 10.1016/S0261-3794(99)00042-6]

Lewis-Beck, Michael, and Martin Paldam. 2000. Economic Voting: An Introduction. Electoral Studies 19(2): 113-121. [doi: 10.1016/S0261-3794(99)00042-6]

Lupia, Arthur, and Mathew D. McCubbins. 1998. The Democratic Dilemma: Can Citizens Learn What They Need to Know? Cambridge, UK: Cambridge University Press.

MacInnis, Bo, Jon A Krosnick, Annabell S Ho, and Mu-Jung Cho. 2018 "The Accuracy of Measurements with Probability and Nonprobability Survey Samples: Replication and Extension," Public Opinion Quarterly, 82(4): 707–744.

Malka, Ariel, Jon A. Krosnick, and Gary Langer. "The Association of Knowledge with Concern about Global Warming: Trusted Information Sources Shape Public Thinking." Risk Analysis, 29(5): 633-647.

Maslow, Abraham H. 1943. A Theory of Human Motivation. Psychological Review 50(4): 370–96. [doi:10.1037/h0054346]

Maslow, Abraham H. 1954. Motivation and Personality. New York, NY: Harper & Row.

Nisbet, Matthew C. 2009. "Communicating Climate Change: Why Frames Matter for Public Engagement," Environment: Science and Policy for Sustainable Development, 51(2): 12-23

Noel, Lance, Benjamin K. Sovacool. 2016. Why did Better Place Fail?: Range anxiety, interpretive flexibility, and electric vehicle promotion in Denmark and Israel. Energy Policy, 94, 377-386.

Page, Benjamin I. and Robert Y. Shapiro. 1992. The Rational Public: Fifty Years of Trends in Americans' Policy Preferences. Chicago, Il: University of Chicago Press.

Petty, Richard E. and Jon A. Krosnick. 1995. Attitude Strength: An Overview. In Ohio State University Series on Attitudes and Persuasion, Vol. 4. Attitude Strength: Antecedents and Consequences. Mahwah, NJ: Lawrence Erlbaum Associates, Inc., 1-24.

Pew Research Center. December 2019. In a Politically Polarized Era, Sharp Divides in Both Partisan Coalitions. Washington, DC: Pew Research Center.

Pew Research Center. October 2019. Partisan Antipathy: More Intense, More Personal. Washington, DC: Pew Research Center.

Popovich, Nadja, Livia Albeck-Ripka, and Kendra Pierre-Louis. 2020. The Trump Administration is Reversing 100 Environmental Rules. Here's the Full List. New York Times, July 15.

Quinnipiac University. 2020. 68% Say Discrimination Against Black Americans A "Serious Problem," Quinnipiac University National Poll Finds; Slight Majority Support Removing Confederate Statues. Hamden, CT: Quinnipiac University Polls.

Sandvik, Hanno. 2008. Public Concern over Global Warming Correlates Negatively with National Wealth. Climate Change 90: 333-341. [doi: 10.1007/s10584-008-9429-6]

Scott, Stephens L., James D. McIver, Ralph E.J. Boerner, and Christopher J. Fetting. 2012. Effects of Forest Fuel-Reduction Treatments in the United States. Bioscience 62(6): 549-560. [doi: 10.1525/bio.2012.62.6.6]

Sears, David O., Richard R. Lau, Tom R. Tyler, and Harris M. Allen. 1980. Self-interest vs. Symbolic Politics in Policy Attitudes and Presidential Voting. American Political Science Review 74(3): 670–684. [doi: 10.2307/1958149]

Sears, David. O., and Carolyn L. Funk. 1990. The Limited Effect of Economic Self-interest on the Political Attitudes of the Mass Public. Journal of Behavioral Economics 19(3): 247-271. [doi: 10.1016/0090-5720(90)90030-B]

The White House (Office of the Press Secretary). 2016. FACT SHEET: The Recovery Act Made The Largest Single Investment In Clean Energy In History, Driving The Deployment Of Clean Energy, Promoting Energy Efficiency, And Supporting Manufacturing. Washington, DC: The White House.

Tversky, Amos, and Daniel Kahneman. 1981. The Framing of Decisions and the Psychology of Choice. Science 211(4481): 453–458. [doi: 10.1126/science.7455683]

van der Linden, Sander L., Anthony A. Leiserowitz, Geoffrey D. Feinberg, and Edward W. Maibach. 2015. The Scientific Consensus on Climate Change as a Gateway Belief: Experimental Evidence. PLoS One 10(2). [doi: 10.1371/journal.pone.0118489]

Villar, Ana and Jon A. Krosnick. 2011. Global Warming vs. Climate Change, Taxes vs. Prices: Does Word Choice Matter? Climatic Change 105: 1–12. [doi:10.1007/s10584-010-9882-x]

Weber, Elke U. 2015. What Shapes Perceptions of Climate Change? New Research since 2010. WIREs Climate Change 7(1): 125-134. [doi: 10.1002/wcc.377]

Yeager, David S., Jon A. Krosnick, Linchiat Chang, Harold S. Javitz, Matthew S. Levendusky, Alberto Simpser, and Rui Wang. 2011. “Comparing the Accuracy of RDD Telephone Surveys and Internet Surveys Conducted with Probability and Non-probability Samples.” Public Opinion Quarterly, 75(4): 709–747.

Zaller, John R. 1992. The Nature and Origins of Mass Opinion. Cambridge, UK: Cambridge University Press.

Appendix A. Survey Question Wording

Overall Trends

Figure 2: Percentage of Americans who believe Earth's temperature has probably been increasing over the past 100 years

> **Question asked**: What is your personal opinion? Do you think that the world's temperature probably has been going up over the past 100 years, or do you think this probably has not been happening?

Figure 3. Of the Americans who believe Earth's temperature has or has not been increasing, percentage who are extremely or very sure

> **Question asked**: [If the respondent's answer to the question corresponding with figure 2 as "probably has not been happening,"] How sure are you that the world's temperature has not been going up over the past 100 years—extremely sure, very sure, somewhat sure, or not sure at all?

Figure 4. Percentage of Americans who think Earth's temperature will probably go up over the next 100 years

> **Question asked**: If nothing is done to prevent it, do you think the world's temperature probably will go up over the next 100 years, or do you think the world's temperature probably will not go up over the next 100 years?

Figure 5. Of the Americans who think Earth's temperature will or will not go up over the next 100 years, percentage who are extremely or very sure

> **Question asked**: [If the respondent's answer to question corresponding with Figure 2 was "probably has been happening,"] How sure are you that the world's temperature has been going up over the past 100 years—extremely sure, very sure, somewhat sure, or not sure at all?

Figure 6. Percentage of Americans who believe human action has been at least partly causing global warming

> **Questions asked**:
>
> **If the respondent thought the earth was warming**: If the world's temperature did increase over the past 100 years, do you think this increase was caused mostly by things people did, mostly by natural causes, or about equally by things people did and by natural causes?
>
> **If the respondent did not think that the earth was warming**: Assuming it's happening, do you think a rise in the world's temperature would have been caused mostly by things people do, mostly by natural causes, or about equally by things people do and by natural causes?

Figure 7. Percentage of Americans who believe the increase in global temperatures over the past 100 years was good or bad

> **Questions asked:**
>
> **If the respondent thought that the earth was warming**: Do you think the increase in the world's temperature over the past 100 years is good, bad, or neither good nor bad?
>
> **If the respondent did not think that the earth was warming**: If the world's temperature did increase over the past 100 years, do you think that that increase would be good, bad, or neither good nor bad?

Figure 8. Percentage of Americans who believe a 5°F global temperature increase in 75 years would be "bad"

> **Question asked:** If the world's average temperature is about five degrees Fahrenheit higher 75 years from now than it is now, overall, do you lean toward thinking it would be good, lean toward thinking it would be bad, or don't you lean either way?

Figure 9. Percentage of Americans who believe global warming will be a very or somewhat serious problem for the United States or the world

> **Questions asked:**
>
> **United States:** If nothing is done to reduce global warming in the future, how serious of a problem do you think it will be for THE UNITED STATES—very serious, somewhat serious, not so serious, or not serious at all?
>
> **World:** If nothing is done to reduce global warming in the future, how serious of a problem do you think it will be for THE WORLD—very serious, somewhat serious, not so serious, or not serious at all?

Figure 10. Percentage of Americans who think that global warming will hurt/help future generations or hurt/help them personally at least a moderate amount

Questions asked:

Help future generations: [Assuming it's happening,] If nothing is done to reduce global warming in the future, how much do you think it will help future generations—a great deal, a lot, a moderate amount, a little, or not at all?

Hurt future generations: [Assuming it's happening,] If nothing is done to reduce global warming in the future, how much do you think it will hurt future generations—a great deal, a lot, a moderate amount, a little, or not at all?

Help personally: [Assuming it's happening,] If nothing is done to reduce global warming in the future, how much do you think it will help you personally—a great deal, a lot, a moderate amount, a little or not at all?

Hurt personally: [Assuming it's happening,] If nothing is done to reduce global warming in the future, how much do you think it will hurt you personally—a great deal, a lot, a moderate amount, a little, or not at all?

Figure 11. Percentage of Americans who feel they know at least a moderate amount about global warming

Question asked: How much do you feel you know about global warming—a lot, a moderate amount, a little, or nothing?

Figure 12. Percentage of Americans who have very or extremely strong opinions on global warming

Question asked: How strong are your opinions on the issue of global warming—extremely strong, very strong, somewhat strong, not too strong, or not strong at all?

Figure 13. Percentage of Americans who think global warming is extremely personally important (the global warming "issue public")

Question asked: How important is the issue of global warming to you personally—extremely important, very important, somewhat important, not too important, or not at all important?

Figure 14. Percentage of Americans who believe governments, businesses, or average people should do "at least a moderate amount" to deal with global warming

Questions asked:

US government: How much do you think the US government should do about global warming—a great deal, a lot, a moderate amount, a little, or nothing?

Foreign governments: How much do you think governments in other countries should do about global warming—a great deal, a lot, a moderate amount, a little, or nothing?

US businesses: How much do you think US businesses should do about global warming—a great deal, a lot, a moderate amount, a little, or nothing?

Average people: How much do you think average people should do about global warming—a great deal, a lot, a moderate amount, a little, or nothing?

Figure 15. Percentage of Americans who believe that governments, businesses, or average people are currently doing "at least a moderate amount" to deal with global warming

Questions asked:

US government: How much do you think the US government is doing now to deal with global warming- a great deal, a lot, a moderate amount, a little, or nothing?

Foreign governments: How much do you think governments in other countries are doing about global warming—a great deal, a lot, a moderate amount, a little, or nothing?

US businesses: How much do you think US businesses are doing about global warming—a great deal, a lot, a moderate amount, a little, or nothing?

Average people: How much do you think average people are doing now to deal with global warming? A great deal, a lot, a moderate amount, a little, or nothing?

Figure 16. Percentage of Americans who believe that governments, businesses, or average people should do more to deal with global warming

The results that correspond with this figure were created by comparing the question "How much do you think X should do about global warming?" (Figure 14) to the question asked in Figure 15, "How much do you think X is doing now to deal with global warming?"

Figure 17. Percentage of Americans who believe that they have seen effects of global warming

Question asked: Do you think you have seen any effects of global warming happening already, either in person or through television, radio, newspapers, magazines, or the Internet, or you think you haven't seen any effects of global warming in any of these ways?

Figure 18. Percentage of Americans who think weather patterns or average world temperatures have been more unstable or temperatures have increased over the last three years

Questions asked:

Weather patterns: As far as you know, would you say that weather patterns around the world have been more stable/unstable[1] in the last three years than before that, more unstable/stable, or about the same?

Average world temperatures: As far as you know, would you say that average temperatures around the world have been higher/lower[2] in the last three years than before that, lower/higher, or about the same?

County level: As far as you know, would you say that weather patterns in the county where you live have been more stable/unstable[3] in the last three years than before that, more unstable/stable, or about the same?

Figure 19. Percentage of Americans who trust what scientists say about the environment at least a moderate amount

Question asked: How much do you trust the things that scientists say about the environment—completely, a lot, a moderate amount, a little, or not at all?

Figure 20. Percentage of Americans who believe that more than, less than, or exactly 50% of climate scientists believe that global warming has been happening

Question asked: If you were to guess, about what percent of the scientists who study the world's climate believe that the world's temperature has been going up over the last 100 years? You can answer with a number between zero percent and one hundred percent.[4]

For more information on question wording and survey methodology, follow these links:

Overall Trends: **Question Wording**

Natural Disasters

Figure 1. Percentage of Americans who believe that they have seen effects of global warming

Question asked: Do you think you have seen any effects of global warming happening already, either in person or through television, radio, newspapers, magazines, or the Internet, or you think you haven't seen any effects of global warming in any of these ways?

Figure 3. Percentage of Americans who favor wildfire adaptation policies

Questions asked:
In many parts of the western US, wildfires have been happening throughout history, but during the last 40 years, wildfires have been happening more often and have been doing more and more damage each year to buildings and killing more people.

Scientists who study wildfires believe that in the coming years, those fires will happen more often and will be more damaging, [RANDOM HALF OF RESPONDENTS: because global warming has been causing the land and the air to be dryer for long periods of time, so they burn more easily.]

Next, I'll list some things that the federal government and state governments can do to try to reduce the damage that wildfires will do in the future. For each

1 Half of the sample was asked the question with "stable," the other half of the sample was asked the question with "unstable."

2 Half of the sample was asked whether temperatures have been higher in the last three years, and half of the sample was asked whether they have been lower. They were asked the opposite word in the second part of the question.

3 Half of the sample was asked the question with "stable," the other half of the sample was asked the question with "unstable."

4 Respondents who answered 50% to the question were asked, "Did you say 50 percent because you think about half of those scientists believe that, or did you say 50 percent because you're not sure how many scientists believe that?", and respondents who answered "about half of those scientists believe that" were coded 50%, and respondents who answered "not sure how many scientists believe that" were asked, "If you were to guess, how many of the scientists who study the world's temperature believe that the world's temperature has been going up over the last 100 years? All, most, about half, a few, or none?" Respondents who said "all", "most", "about half", "a few", or "none" in answer to Q22y were coded 100%, 75%, 50%, 25%, and 0% for Q22, and respondents who said "don't know" or refused to answer were coded "don't know" or "refused."

one, please tell me whether you think government should or should not do it. [Can do one or more]

Requiring fire insurance: First, government can require homeowners and business owners in risky areas to buy insurance that will pay for fixing damage caused by fires. Do you think that government should or should not do this?

Paying people to move: Government can offer to pay people money if they agree to move away from living near where fires are likely to happen. Do you think that government should or should not do this?

Prohibiting development near fire-prone areas: Government can make it illegal to build new buildings near where fires are likely to happen. Do you think that government should or should not do this?

Removing dead vegetation in forests: Government can remove large amounts of dead plants and trees in forests, so there is less to burn. Do you think that government should or should not do this?

Helping those who lose homes: After wildfires happen, government can help people who lose their homes and businesses to get a place to live. Do you think that government should or should not do this?

Increasing the number of firefighters: Government can increase the number of firefighters who can put the fires out. Do you think that government should or should not do this?

New fire-resistant building standards: Government can require that when people build new buildings, the buildings need to be made in a way that doesn't burn easily. Do you think that government should or should not do this?

Figure 4. Percentage of Americans who favor flood adaptation policies

Questions asked:

Severe storms cause flooding along the coasts of the US and inland as well. These floods tend to happen in the same places and kill people, damage homes, businesses, roads, crops, and other things. During the last 40 years, these floods have been happening more often and have been doing more and more damage each year.

Scientists who study flooding believe that in the coming years, those floods will happen more often and will be more damaging, [RANDOM HALF: because global warming is causing storms to be bigger, to last longer, and to do more damage]

I'd like to tell you about some things that the federal government and state governments can do to try to reduce the damage that future flooding will do. For each one, please tell me whether you think the government should or should not do it.

Requiring flood insurance: First, government can require homeowners and business owners in risky areas to buy insurance that will pay for future flood damages. Do you think that government should or should not do this?

Prohibiting development in flood-prone areas: Government can make it illegal to build new buildings in risky areas. Do you think that government should or should not do this?

Paying people to move: Government can offer to pay people money if they agree to move their homes and businesses away from risky areas. Do you think that government should or should not do this?

Helping those who lose homes: After floods happen, government can help people who lose their homes and businesses to floods. Do you think that government should or should not do this?

New building codes: Government can require that when people build new buildings in risky areas, the buildings need to be made in a way that doesn't get damaged easily by floods. Do you think that government should or should not do this?

Construction encouraging quicker water drainage: Government can do construction work so that water will drain more quickly in risky areas. Do you think that government should or should not do this?

Figure 7. Americans' opinions on who should take action to reduce wildfire damage

Question asked: Do you think that doing things to reduce damage by wildfires should be done mainly by the federal government in Washington, mainly by the governments of the states where fires are likely to happen, or by both the federal government and the state governments?

Figure 8. Americans' opinions on who should take action to reduce flood damage

Question asked: Do you think that doing things to reduce damage by floods should be done mainly by the federal government in Washington, mainly by the governments of the states where fires are likely to happen, or by both the federal government and the state governments?

Figure 9. Percentage of Americans who think the US government should pay for part of the cost of natural disaster insurance for poor families living in risky areas

Question asked: Government can pay for some of the cost of this type of insurance for poor families. Do you think that government should or should not do this?

Figure 10. Americans' opinions on which taxpayers should pay for the cost of preventing damage from fires

Question asked: How do you think the costs of preventing damage from fires should be paid for? By people living in dangerous areas paying higher taxes, or by everyone in America paying higher taxes, including people who do not live in dangerous areas?

Figure 11. Americans' opinions on which taxpayers should pay for the cost of preventing damage from floods

Question asked: How do you think the costs of preventing damage from floods should be paid for? By people living in risky areas paying higher taxes, or by everyone in America paying higher taxes, including people who do not live in risky areas?

Figure 13. Percentage of Americans who believe Earth's temperature "has probably been increasing" over past 100 years

Question asked: What is your personal opinion? Do you think that the world's temperature probably has been going up over the past 100 years, or do you think this probably has not been happening?

For more information on question wording and survey methodology, follow these links:

Natural Disasters: **Technical Report** | **Question Wording**

Policies and Politics

For Figures 2—6: For the next few items, please tell me for each one whether it's something the government should require by law to try to reduce future global warming, should encourage with tax breaks but not require, or stay out of entirely. Each of these changes [would/could] increase the amount of money that you pay for things you buy. ...First...Next...

Figure 2. Percentage of Americans who think the US government should either require or give tax breaks to lower greenhouse gas emissions from power plants

Question asked: Lowering the amount of greenhouse gases that power plants are allowed to release into the air?

Figure 3. Percentage of Americans who think the US government should either require or give tax breaks to construct more energy-efficient cars

Question asked: Building cars that use less gasoline?

Figure 4. Percentage of Americans who think the US government should either require or give tax breaks to develop more energy-efficient appliances

Question asked: Building air conditioners, refrigerators, and other appliances that use less electricity?

Figure 5. Percentage of Americans who think the US government should either require or give tax breaks to have more energy-efficient buildings

Question asked: Building new homes and offices that use less energy for heating and cooling?

Figure 6. Percentage of Americans who think the government should charge companies a tax for every ton of greenhouse gases they emit (2020)

Questions asked[5]:

When companies burn oil, coal, and natural gas, they put greenhouse gases into the air. The federal government can charge these companies a tax for every ton of greenhouse gases they put out. This will cause the companies to put out less greenhouse gases. The companies may pass along this cost to the public, by charging higher prices for some of the things people buy. Do you think the government should or should not charge companies this tax?

b/c/d. When companies burn oil, coal, and natural gas, they put greenhouse gases into the air. The federal government can charge these companies a tax for every ton of greenhouse gases they put out. This will cause the companies to put out less greenhouse gases. The companies may pass along this cost to the public, by charging higher prices for some of the things people buy. The government will give the money from the companies back to all American adults and children, divided equally. If each person would get

5 Respondents were randomly assigned to be asked each of these four versions of the questions.

[$800/$600/$200] on average next year, and the amount would get bigger each year after that, do you think the government should or should not charge companies this tax?

Figure 7. Percentage of Americans who favored a cap-and-dividend policy

Question asked: There's a proposed system called "cap and trade." The government would sell permits to companies limiting the amount of greenhouse gases they can put out. Companies that do not use all their permits could sell them to other companies. Companies that need more permits can buy them, or these companies can pay money to reduce the amount of greenhouse gases that other people or organizations put out. Economists say that this system is likely to cause companies to figure out the cheapest way to reduce greenhouse gas emissions. The money the government makes from selling the permits would be returned to all Americans equally by reducing the amount of income taxes they pay. Would you favor or oppose this cap and trade system?

For Figures 1 and 8 and 11—For each of the following, please tell me whether you favor or oppose it as a way for the federal government to try to reduce future global warming. Each of these changes would increase the amount of money that you pay for things you buy.

Figure 1. Percentage of Americans who think the US government should give utilities tax breaks to produce electricity from water, wind, and solar power

Question asked: Giving companies tax breaks to produce more electricity from water, wind, and solar power?

Figure 8. Percentage of Americans who favor the US government giving tax breaks to companies to reduce air pollution from burning coal

Question asked: Giving tax breaks to companies that burn coal to make electricity if they use new methods to reduce the air pollution being released from their smokestacks?

Figure 9. Percentage of Americans who favor the US government giving tax breaks to companies to build nuclear power plants

Question asked: Giving companies tax breaks to build nuclear power plants?

Figure 10. Percentage of Americans who believe that the US government should increase taxes on electricity to cause people to use less

Question asked: Increasing taxes on electricity so people use less of it?

Figure 11. Percentage of Americans who believe that the US government should increase taxes on gasoline to cause people to use less

Question asked: Increasing taxes on gasoline so people either drive less, or buy cars that use less gas?

Figure 12. Percentage of Americans who believe that the US government taking action on global warming will help or hurt the US economy or the respondent's state's economy

Questions asked:

US economy: Do you think that the United States doing things to reduce global warming in the future would hurt the US economy, would help the economy, or would have no effect on the US economy?

State: Do you think that the United States doing things to reduce global warming in the future would hurt the economy in the State where you live, would help the economy in the State where you live, or would have no effect on the economy in the State where you live?

Figure 13. Percentage of Americans who believe that the government taking action on global warming will decrease the number of jobs in the country or the respondent's state

Questions asked:

Country: Do you think that the United States doing things to reduce global warming in the future would cause there to be more jobs around the country, would cause there to be fewer jobs, or would not affect the number of jobs for people around the country?

State: Do you think that the United States doing things to reduce global warming in the future would cause there to be more jobs for people in the State where you live, would cause there to be fewer jobs in the State where you live, or wouldn't affect the number of jobs for people in the State where you live?

Figure 14. Percentage of Americans who believe that the US government taking action on global warming will affect the amount of money they have or their chances of having a good-paying job

Questions asked:

Amount of money: Do you think that the United States doing things to reduce global warming in the future would cause you to have more money, would cause you to have less money, or would not affect the amount of money you have?

Likelihood of having a good-paying job: Do you think that the United States doing things to reduce global warming in the future would make it (more) likely that you have a good-paying job, would make it (less) likely that you have a good-paying job, or would not affect whether you have a good-paying job?

Figure 15. Percentage of Americans who believe the federal stimulus packages should include creating new jobs and new technologies to reduce future global warming (2020)

Questions asked: This past March, the US Congress decided to spend 2 trillion dollars of government money to help American businesses and workers get through the current economic crisis. The Congress is now considering spending more money for this purpose. Some of that money could go to creating jobs and new technologies to reduce future global warming. Do you think that the government should or should not do that?

If the answer to the previous question was "should":

Creating new jobs and new technologies to reduce future global warming: Do you think the government should or should not spend money helping companies to use new ways of making electricity that put out less greenhouse gases?

Planting large numbers of trees to absorb and store greenhouse gases: Do you think the government should or should not spend money planting large numbers of trees to absorb and store greenhouse gases?

Helping invent new ways of making electricity that put out less greenhouse gases: Do you think the government s hould or should not spend money helping invent new ways of making electricity that put out less greenhouse gases?

Figure 16. Percentage of Americans who think the government should spend money during the economic crisis to help companies act in various ways to support the economy and environment (2020)

Questions asked: This past March, the US Congress decided to spend 2 trillion dollars of government money to help American businesses and workers get through the current economic crisis. The Congress is now considering spending more money for this purpose. Some of that money could go to creating jobs and new technologies to reduce future global warming. Do you think that the government should or should not do that?

If the answer to the previous question was "should":

Make more cars and trucks that run on electricity: Do you think the government should or should not spend money helping companies to make cars and trucks that run only on electricity?

Install charging equipment in parking lots for electric cars and trucks: Do you think the government should or should not spend money helping companies to install new equipment in parking spots around the country for charging cars and trucks that run only on electricity?

Strengthen oil and gas pipelines to reduce leaking and pollution: Do you think the government should or should not spend money helping companies to strengthen oil and gas pipelines to reduce leaking and pollution?

Make smaller, longer-lasting batteries: Do you think the government should or should not spend money helping companies to make batteries that are smaller and last longer?

Devise more energy-efficient ways to produce electricity: Do you think the government should or should not spend money helping companies to use new ways of making electricity that put out less greenhouse gases?

Figure 17. Percentage of Americans who think the government should spend money helping people install solar panels on the roofs of houses or apartments (August 2020)

Question asked: This past March, the US Congress decided to spend 2 trillion dollars of government money to help American businesses and workers get through the current economic crisis. The Congress is now considering spending more money for this purpose. Some of that money could go to creating jobs and new technologies to reduce future global warming. Do you think that the government should or should not do that?

If the answer to the previous question was "should": Do you think the government should or should not spend money helping people to install solar panels on the roofs of houses or apartment buildings that they own?

Figure 20. Percentage of Americans who support various policies implemented by the Obama administration that the Trump administration rolled back or was working to roll back

Questions asked[6]:

Paris Agreement:

No elite cue present: "In 2015, the United States signed and agreement with 192 other countries to try to reduce the amount of greenhouse gasses they put out. The United States said that by the year 2025, its greenhouse gasses will be 25% less than were put out in 2005. If the US does not succeed in doing this, there will be no penalty. Do you think the US should or should not continue to try to do this?"

President Obama was mentioned: "When he was president, Barack Obama signed an agreement with 192 other countries to try to reduce the amount of greenhouse gasses they put out. The United States said that by the year 2025, its greenhouse gasses will be 25% less than were put out in 2005. If the US does not succeed in doing this, there will be no penalty. Do you think the US should or should not continue to try to do this?"

President Trump was mentioned: "Last year, President Trump announced that the United States will withdraw from an agreement it signed in 2015 with 192 other countries. The countries committed to try to reduce the amount of greenhouse gasses they put out. The United States said that by the year 2025, its greenhouse gasses will be 25% less than were put out in 2005. If the US does not succeed in doing this, there will be no penalty. Do you think the US should or should not withdraw from the agreement?"

Both President Obama and President Trump were mentioned: "When he was president, Barack Obama signed an agreement with 192 other countries to try to reduce the amount of greenhouse gasses they put out. The United States said that by the year 2025, its greenhouse gasses will be 25% less than were put out in 2005. If the US does not succeed in doing this, there will be no penalty. Last year, President Trump announced that the United States will withdraw from the agreement. Do you think the US should or should not withdraw from the agreement?"

Clean Power Plan:

No elite cue present: "Do you think that the federal government should or should not require that by ten years from now, power plants in America must put out 30% less greenhouse gases than they did in 2005?"

President Obama was mentioned: "When he was president, Barack Obama issued a rule requiring that by ten years from now, power plants in America must put out 30%less greenhouse gases than they did in 2005. Do you think the federal government should or should not require this?"

President Trump was mentioned: "Last year, President Trump cancelled a government rule requiring that by ten years from now, power plants in America must put out 30% less greenhouse gases than they did in 2005. Do you think that that rule should or should not have been cancelled?"

Both President Obama and President Trump were mentioned: "When he was president, Barack Obama issued a rule requiring that by ten years from now, power plants in America must put out 30% less greenhouse gases than they did in 2005. Last year, President Trump cancelled that rule. Do you think that that rule should or should not have been cancelled?"

Cutting GHG emissions by 40% by 2025:

No elite cue present: "Do you think that by five years from now, the federal government should or should not be required to put out 40% less greenhouse gasses than it did in 2015?"

President Obama was mentioned: "When he was president, Barack Obama issued a rule that by five years from now, the federal government must put out 40% less greenhouses gases than it did in 2015. Do you think the federal government should or should not do this?"

President Trump was mentioned: "Last year, President Trump cancelled a government rule requiring that by five years from now, the federal government must put out 40% less greenhouses gases than it did in 2015. Do you think that that rule should or should not have been cancelled?"

Both President Obama and President Trump were mentioned: "When he was president, Barack Obama issued a rule that by five years from now, the federal government must put out 40% less greenhouses gases than it did in 2015. Last year, President Trump cancelled that rule. Do you think that that rule should or should not have been cancelled?"

6 Respondents were randomly selected to be asked one of the experimental conditions. Two groups out of five were asked the same question in which no elite cues were present for the topics pertaining to the Paris Agreement, Clean Power Plan, and cutting GHG emissions by 40% by 2025.

Increasing CAFE standards:

No elite cue present: "Do you think that beginning in the year 2025, the federal government should or should not require that all new cars and trucks made in the United States must get at least 55 miles per gallon of gasoline?"

No elite cue present: "Do you think that beginning in the year 2025, the federal government should or should not require that all new cars and trucks made in the United States must get at least 40 miles per gallon of gasoline?"

President Obama was mentioned: "When he was president, Barack Obama issued a federal rule requiring that, beginning in the year 2025, all new cars and trucks made in the United States must get at least 55 miles per gallon of gasoline. Do you think the federal government should or should not require this?"

President Trump was mentioned: "This year, President Trump issued a federal rule requiring that, beginning in the year 2025, all new cars and trucks made in the United States must get at least 40 miles per gallon of gasoline. Do you think the federal government should or should not require this?"

Both President Obama and President Trump were mentioned: "When he was president, Barack Obama issued a federal rule requiring that, beginning in the year 2025, all new cars and trucks made in the United States must get at least 55 miles per gallon of gasoline. Last month, President Trump lowered the requirement, so cars and trucks must get at least 40 miles per gallon of gasoline. Do you think that President Trump should or should not lower the requirement?"

Figure 22. Impact on voting of hearing a candidate make a "green" or "not-green" statement (2020)

Questions asked:

"Green" statement: Next, I will read you a statement that could be made by someone who wants to be a United States Senator. Here is the statement:

"I believe that global warming has been happening for the past 100 years, mainly because we have been burning fossil fuels and putting out greenhouse gasses. Now is the time for us to be using new forms of energy that are made in America and will be renewable forever. We can manufacture better cars that use less gasoline and build better appliances that use less electricity. We need to transform the outdated ways of generating energy into new ones that create jobs and entire industries, and stop the damage we've been doing to the environment."

If a candidate says this, would this make you more likely to vote for this candidate, less likely to vote for this candidate, or would it not affect how likely you would be to vote for this candidate?

"Not-green" statement: Next, I will read you a statement that could be made by someone who wants to be a United States Senator. Here is the statement:

"The science on global warming is a hoax and is an attempt to perpetrate a fraud on the American people. I don't buy into the whole man-caused global warming mantra. We must spend no effort to deal with something that is not a problem at all. We should not invest in windmills and solar panels as alternative energy sources. Instead, we should continue to focus on our traditional sources of energy: coal, oil, and natural gas. We should expand energy production in our country, including continuing to mine our coal and doing more drilling for oil here at home."

If a candidate says this, would this make you more likely to vote for this candidate, less likely to vote for this candidate, or would it not affect how likely you would be to vote for this candidate?

Policies and Politics: **Technical Report** | **Question Wording**

Partisan Divide

All questions asked in the "Partisan Divide" section are included in the appendices above. This chapter analyzes the same questions from other demographic perspectives.

For more information on question wording and survey methodology, follow these links:

Partisan Divide: **Technical Report** | **Question Wording**

Electric Vehicles

Figure 2. Americans' beliefs about how serious a problem global warming will be for the United States

Question asked: If nothing is done to reduce global warming in the future, how serious of a problem do you think it will be for THE UNITED STATES—very serious, somewhat serious, not so serious, or not serious at all?

Figure 3. How much Americans think driving an all-electric car helps the environment

Question asked: As compared to driving a car that runs on gasoline, how much do you think that driving an all-electric car helps the environment? A great deal, a lot, a moderate amount, a little, or not at all?

Figure 4. How likely Americans think it is that EV batteries will catch on fire

Question asked: How likely do you think it is that the batteries in cars that run only on electricity will catch on fire? Extremely likely, very likely, moderately likely, slightly likely, or not likely at all?

Figure 5. Americans' beliefs about maintenance costs of EVs relative to gasoline-powered cars

Question asked: As compared to cars that run on gasoline, do you think that people who own cars that run only on electricity spend more money to repair them and keep them running, spend less money on that, or spend about the same amount of money?

Figure 6. Americans' beliefs about whether the electricity to drive an EV one mile costs more, less, or the same as gas to drive a gasoline-powered vehicle one mile

Question asked: People who drive cars that run only on electricity have to pay for the electricity to charge the cars' batteries. As compared to the cost of gasoline to drive one mile, do you think the cost of electricity to drive one mile is more, less, or the same?

Figure 7. Percentage of Americans who think EVs lose value faster, more slowly, or at the same rate as gasoline-powered vehicles

Question asked: As you may know, the more miles a car has been driven, the less money the owner can sell it for. As compared to cars that run on gasoline, do you think the value of cars that run only on electricity goes down faster over the years, goes down more slowly, or goes down about equally fast?

Figure 8. Americans' beliefs about whether EVs accelerate more quickly or more slowly than gasoline-powered vehicles

Question asked: As compared to cars that run on gasoline, do you think that the engines of cars that run only on electricity can speed up more quickly, speed up more slowly, or speed up about equally fast?

Figure 9. Americans' beliefs about how difficult it is to find an EV charging station

Question asked: How difficult do you think it is for people who drive cars that run only on electricity to find places to charge them up when they need to be charged? Extremely difficult, very difficult, moderately difficult, slightly difficult, or not difficult at all?

Figure 10. Americans' beliefs about how many mechanics can fix EVs

Question asked: How many car mechanics would you guess can fix cars that run only on electricity? All of them, most of them, about half of them, a few of them, or none of them?

Figure 11. Percentage of Americans who have or have not driven an EV or known someone who has

Question asked: As far as you know, have you or anyone you know personally ever driven a car or truck that runs only on electricity and not on gasoline, or has that not happened?

Figure 12. Percentage of Americans who will or will not consider buying an EV

Questions asked:

Do you think you will buy a car in the future, or do you think you will not do that?

If previous answer was "will": When you buy a car next, do you think you will consider buying a car that runs only on electricity, or do you think you won't consider buying that type of car?

For more information on question wording and survey methodology, follow these links:

Electric Vehicles: **Technical Report** | **Question Wording**

Opinion in the States

All questions asked in the "Opinion in the States" section are included in the appendices above. This chapter analyzes the same questions from other demographic perspectives.

For more information on question wording and survey methodology, follow these links:

Opinion in the States: **Technical Report**

Appendix B. State-Level Public Opinion Data

Estimates of State-Level Public Opinion

Table A.1. Estimates of Public Opinion on Fundamentals and Engagement on Global Warming

	FUNDAMENTALS							ENGAGEMENT	
	Believe global warming has been happening	Believe that the earth will warm in the future	Believe past warming has been caused by humans	Believe warming will be a serious problem for the US	Believe warming will be a serious problem for the world	Believe 5 degrees of warming will be bad	Believe the government should do more to address global warming	Warming is extremely personally important	Highly knowledge-able about global warming
AL	74.90%	66.85%	76.46%	78.05%	81.52%	64.38%	61.65%	15.35%	62.54%
AK	---	---	---	---	---	---	---	---	---
AZ	82.63%	78.59%	81.28%	79.31%	82.16%	71.97%	74.62%	30.62%	79.24%
AR	76.99%	70.34%	75.70%	75.18%	78.02%	64.44%	61.84%	23.63%	72.80%
CA	82.21%	79.66%	85.81%	82.86%	86.53%	74.82%	72.57%	31.00%	76.66%
CO	76.86%	71.30%	81.83%	77.65%	74.35%	70.56%	64.51%	23.73%	80.94%
CT	81.58%	74.34%	81.79%	80.73%	83.14%	73.02%	71.62%	21.16%	79.14%
DE	83.75%	72.96%	79.75%	83.33%	83.84%	63.18%	66.99%	18.99%	69.36%
DC	84.44%	---	92.04%	---	---	---	---	---	---
FL	82.90%	80.72%	81.43%	82.00%	82.78%	71.42%	68.38%	29.95%	79.64%
GA	80.03%	70.76%	76.21%	75.46%	72.64%	63.91%	64.63%	23.08%	71.51%
HI	88.00%	---	---	---	---	---	---	---	---
ID	75.37%	60.58%	78.16%	60.27%	61.75%	58.30%	52.82%	13.94%	69.75%
IL	81.16%	77.00%	86.19%	82.17%	82.89%	70.36%	69.13%	28.85%	73.50%
IN	76.00%	67.63%	80.38%	73.14%	76.03%	62.02%	61.49%	22.14%	74.87%
IA	79.66%	76.88%	86.63%	78.10%	83.74%	69.90%	66.65%	10.90%	71.17%
KS	74.78%	80.91%	75.95%	76.59%	80.54%	66.42%	64.58%	18.93%	75.48%
KY	75.84%	66.20%	81.78%	76.97%	78.86%	67.60%	61.93%	31.42%	74.26%
LA	79.42%	70.96%	74.62%	72.10%	73.23%	62.67%	61.00%	21.81%	66.92%
ME	84.03%	80.39%	82.55%	79.29%	83.03%	70.26%	70.38%	25.03%	72.31%
MD	81.92%	84.74%	88.36%	84.10%	91.38%	74.82%	71.34%	24.94%	75.29%
MA	87.53%	80.54%	85.76%	85.30%	87.15%	76.44%	73.73%	28.66%	78.81%
MI	75.87%	71.77%	80.58%	78.72%	79.98%	64.89%	64.34%	22.73%	74.29%
MN	81.13%	72.62%	80.31%	72.46%	78.40%	64.93%	60.67%	21.02%	80.01%
MS	79.41%	79.71%	72.90%	79.16%	73.39%	68.55%	69.39%	21.97%	74.38%
MO	78.42%	73.57%	79.11%	78.33%	75.73%	63.30%	62.24%	22.51%	76.17%
MT	76.62%	---	85.26%	71.06%	75.81%	68.63%	63.34%	17.99%	69.52%
NE	78.96%	73.76%	85.13%	78.41%	79.24%	64.67%	70.06%	11.70%	76.84%

	FUNDAMENTALS							ENGAGEMENT	
	Believe global warming has been happening	Believe that the earth will warm in the future	Believe past warming has been caused by humans	Believe warming will be a serious problem for the US	Believe warming will be a serious problem for the world	Believe 5 degrees of warming will be bad	Believe the government should do more to address global warming	Warming is extremely personally important	Highly knowledge-able about global warming
NV	84.42%	77.17%	76.95%	79.74%	83.65%	68.16%	59.77%	28.03%	75.93%
NH	82.25%	75.82%	90.55%	87.09%	87.22%	71.93%	67.69%	26.04%	80.10%
NJ	82.87%	82.40%	85.58%	87.75%	89.03%	74.57%	76.78%	30.96%	78.91%
NM	87.14%	76.72%	82.50%	81.92%	85.61%	76.84%	72.40%	30.80%	81.80%
NY	83.86%	79.93%	86.50%	81.89%	84.41%	69.64%	73.77%	27.30%	76.50%
NC	77.48%	79.28%	84.34%	79.72%	80.56%	67.60%	72.30%	27.40%	75.13%
ND	77.57%	---	---	---	---	---	---	---	---
OH	73.55%	71.91%	78.64%	77.85%	78.40%	65.94%	64.22%	19.40%	75.62%
OK	86.37%	71.74%	77.49%	76.18%	69.09%	68.17%	66.30%	19.69%	71.38%
OR	78.30%	76.54%	83.92%	77.90%	81.87%	66.32%	71.10%	24.61%	80.45%
PA	78.59%	75.12%	81.61%	77.97%	79.36%	65.50%	67.05%	21.17%	75.79%
RI	84.82%	85.72%	90.73%	94.19%	91.51%	73.36%	82.28%	32.73%	75.09%
SC	80.53%	75.17%	76.30%	82.73%	82.65%	73.60%	67.50%	25.88%	68.29%
SD	80.71%	74.01%	78.95%	83.32%	88.60%	80.38%	63.31%	9.04%	53.13%
TN	78.83%	75.83%	78.69%	76.22%	79.59%	66.16%	63.76%	26.78%	73.63%
TX	82.55%	72.17%	77.23%	78.42%	80.89%	69.33%	67.64%	25.52%	73.36%
UT	71.39%	60.85%	71.49%	65.74%	69.91%	55.23%	53.92%	14.98%	79.35%
VT	84.44%	85.17%	83.43%	85.11%	83.89%	76.59%	65.07%	26.29%	84.54%
VA	80.10%	71.84%	82.07%	77.34%	79.77%	71.99%	66.55%	19.47%	75.87%
WA	82.60%	74.72%	82.56%	78.21%	85.00%	70.61%	66.39%	24.16%	74.03%
WV	78.22%	76.23%	77.47%	79.59%	79.66%	64.95%	64.11%	13.53%	61.11%
WI	76.81%	68.44%	82.37%	73.93%	79.04%	65.07%	66.80%	18.91%	72.84%
WY	--	--	--	--	--	--	--	--	--

Table A.2. Estimates of Public Opinion on Global Warming Policies

	Believe the US should take action regardless of what other countries do (2015)	Believe the government should limit businesses' greenhouse gas emissions	Believe the government should lower power plant emissions	Favor a national cap-and-trade program	Favor higher fuel economy standards	Favor all-electric vehicles (2015)	Favor appliances that use less electricity
AL	71.91%	84.26%	78.08%	64.79%	71.16%	42.56%	68.63%
AK	---	---	---	---	---	---	---
AZ	76.21%	74.31%	79.64%	59.24%	67.33%	65.85%	70.84%
AR	79.82%	82.23%	77.73%	65.33%	64.07%	50.96%	66.88%
CA	78.36%	81.20%	81.88%	64.46%	75.68%	67.87%	75.58%
CO	75.51%	74.04%	79.80%	66.34%	74.35%	61.83%	67.67%
CT	74.94%	76.92%	75.61%	61.89%	65.60%	60.23%	64.15%
DE	76.16%	78.45%	82.03%	69.05%	63.58%	60.78%	57.77%
DC	---	---	80.47%	---	68.13%	---	64.43%
FL	75.58%	74.84%	81.89%	57.52%	71.23%	58.82%	71.17%
GA	77.75%	80.30%	77.79%	57.62%	65.91%	59.80%	73.35%
HI	---	---	---	---	---	---	---
ID	73.79%	72.61%	84.18%	39.18%	65.33%	45.40%	51.51%
IL	82.77%	78.69%	84.01%	64.46%	72.31%	65.60%	72.74%
IN	62.94%	74.93%	75.75%	63.55%	66.34%	55.75%	68.90%
IA	78.30%	77.43%	79.98%	64.07%	69.15%	49.08%	69.58%
KS	83.88%	76.10%	80.20%	65.93%	65.35%	65.72%	74.54%
KY	74.33%	79.33%	80.16%	61.43%	73.30%	65.81%	72.21%
LA	71.16%	72.39%	68.41%	50.83%	63.86%	57.36%	65.93%
ME	74.06%	77.10%	80.01%	62.52%	66.61%	56.40%	60.99%
MD	82.65%	84.66%	85.40%	69.15%	73.93%	67.14%	76.25%
MA	78.11%	79.68%	84.26%	69.50%	75.45%	67.32%	72.86%
MI	72.14%	72.75%	79.77%	51.29%	71.73%	64.87%	67.27%
MN	77.14%	72.03%	76.21%	58.85%	67.69%	59.18%	75.60%
MS	63.06%	71.25%	75.24%	57.91%	62.68%	45.52%	63.48%
MO	73.76%	78.08%	80.47%	57.16%	67.77%	56.79%	68.08%
MT	---	---	87.38%	---	69.14%	---	75.40%
NE	83.06%	77.16%	83.35%	70.18%	68.63%	62.61%	71.75%
NV	75.39%	85.25%	73.11%	47.42%	72.04%	57.58%	58.77%
NH	90.63%	84.21%	89.88%	65.28%	77.45%	68.59%	78.36%
NJ	83.63%	83.41%	86.88%	69.30%	78.52%	67.95%	77.00%
NM	77.65%	82.53%	73.51%	50.73%	68.89%	64.90%	67.39%
NY	74.13%	79.87%	85.95%	61.55%	76.57%	66.17%	78.15%
NC	77.54%	79.71%	79.40%	67.51%	68.39%	59.20%	70.41%

	Believe the US should take action regardless of what other countries do (2015)	Believe the government should limit businesses' greenhouse gas emissions	Believe the government should lower power plant emissions	Favor a national cap-and-trade program	Favor higher fuel economy standards	Favor all-electric vehicles (2015)	Favor appliances that use less electricity
ND	---	---	---	---	---	---	---
OH	73.72%	83.03%	79.86%	55.72%	67.89%	55.06%	66.05%
OK	76.79%	78.19%	75.82%	63.54%	60.25%	55.39%	59.42%
OR	79.67%	80.53%	83.91%	60.29%	68.72%	63.03%	68.86%
PA	72.60%	73.37%	81.03%	61.53%	69.86%	57.32%	70.93%
RI	---	92.23%	91.74%	---	78.62%	---	73.51%
SC	64.88%	78.59%	76.08%	53.52%	68.34%	57.57%	70.17%
SD	---	75.38%	79.63%	47.80%	75.48%	67.66%	76.14%
TN	68.52%	75.00%	74.55%	56.41%	70.07%	59.63%	67.29%
TX	75.54%	76.26%	81.12%	56.34%	68.04%	53.62%	69.14%
UT	64.10%	75.00%	67.98%	47.83%	62.20%	50.26%	75.76%
VT	---	---	85.80%	---	72.03%	57.01%	71.36%
VA	73.13%	76.10%	81.72%	65.92%	70.94%	64.46%	74.18%
WA	83.08%	83.68%	84.39%	71.63%	79.30%	69.14%	71.08%
WV	---	82.00%	82.16%	68.46%	78.30%	53.98%	73.06%
WI	69.29%	85.51%	82.67%	56.29%	72.98%	57.63%	71.91%
WY	--	--	--	--	--	--	--

Table A.3. Estimates of Public Opinion on Global Warming Policies (Continued)

	Favor energy-efficient buildings	Favor tax breaks to produce renewable energy	Favor tax breaks to reduce air pollution from coal	Favor tax breaks to build nuclear power plants	Favor increased consumption taxes on electricity	Favor increase consumption taxes on gasoline
AL	71.85%	84.97%	69.00%	45.56%	28.52%	26.02%
AK	---	---	---	---	---	---
AZ	76.35%	84.13%	58.63%	37.25%	29.03%	44.54%
AR	65.54%	82.60%	56.88%	39.91%	16.91%	35.53%
CA	78.11%	84.42%	59.04%	35.27%	35.39%	47.84%
CO	74.05%	85.12%	68.90%	38.28%	36.91%	57.47%
CT	69.52%	87.83%	62.41%	43.91%	19.88%	36.10%
DE	70.28%	83.63%	64.53%	---	34.00%	37.24%
DC	80.04%	90.37%	---	---	---	---
FL	75.84%	81.50%	64.28%	41.39%	27.89%	43.64%
GA	71.10%	81.02%	66.04%	40.14%	26.06%	39.56%
HI	---	---	---	---	---	---
ID	61.69%	82.53%	72.91%	50.83%	15.63%	24.09%
IL	76.55%	86.46%	67.36%	40.36%	30.34%	44.63%
IN	71.89%	84.90%	66.03%	37.76%	17.58%	29.83%
IA	74.89%	88.87%	56.65%	30.43%	16.81%	37.91%
KS	70.97%	79.87%	59.62%	32.81%	23.52%	26.21%
KY	72.14%	80.68%	73.19%	45.50%	29.21%	42.13%
LA	68.05%	78.65%	58.16%	43.46%	24.43%	38.26%
ME	70.35%	83.49%	59.41%	30.18%	25.44%	43.14%
MD	83.12%	85.95%	69.14%	31.46%	25.68%	46.97%
MA	81.48%	85.63%	62.25%	33.05%	35.16%	49.49%
MI	74.37%	80.36%	55.94%	36.43%	29.11%	38.14%
MN	68.66%	85.93%	68.86%	46.16%	30.72%	49.21%
MS	64.38%	71.22%	67.13%	41.84%	21.64%	29.30%
MO	69.33%	82.20%	64.33%	40.99%	22.44%	36.40%
MT	80.10%	91.49%	70.39%	44.07%	22.25%	28.14%
NE	77.43%	86.24%	69.22%	42.74%	22.87%	41.75%
NV	81.60%	85.33%	52.57%	35.17%	27.46%	54.85%
NH	73.76%	87.64%	59.66%	---	13.53%	43.14%
NJ	78.93%	87.77%	64.81%	32.50%	35.98%	53.57%
NM	70.79%	78.85%	64.43%	40.17%	31.46%	46.50%
NY	79.83%	85.89%	66.93%	32.53%	29.72%	49.17%
NC	72.34%	82.40%	62.48%	35.46%	26.47%	39.28%
ND	---	---	---	---	---	---

	Favor energy-efficient buildings	Favor tax breaks to produce renewable energy	Favor tax breaks to reduce air pollution from coal	Favor tax breaks to build nuclear power plants	Favor increased consumption taxes on electricity	Favor increase consumption taxes on gasoline
OH	69.43%	75.62%	57.70%	38.44%	19.43%	30.08%
OK	67.60%	80.41%	66.34%	32.53%	19.79%	41.49%
OR	79.55%	83.57%	57.39%	28.13%	25.49%	47.93%
PA	71.61%	80.53%	67.63%	38.13%	26.77%	42.81%
RI	78.82%	82.40%	64.06%	20.30%	29.50%	41.64%
SC	68.49%	81.14%	63.48%	53.75%	17.95%	26.17%
SD	77.05%	83.02%	68.77%	---	20.05%	39.43%
TN	72.57%	77.73%	56.63%	33.63%	26.51%	35.46%
TX	74.23%	82.93%	60.64%	35.96%	27.03%	41.04%
UT	65.02%	82.78%	64.42%	40.95%	17.55%	30.07%
VT	76.79%	82.97%	54.08%	---	35.09%	53.03%
VA	74.44%	85.24%	62.32%	46.19%	28.73%	53.77%
WA	79.74%	85.78%	60.16%	29.07%	30.38%	43.12%
WV	84.38%	83.31%	78.60%	33.57%	17.71%	37.76%
WI	75.97%	87.97%	67.35%	42.77%	29.66%	40.29%
WY	--	--	--	--	--	--

Standard Errors of State-Level Public Opinion Estimates

Table A.4. Standard Errors of Estimates of Public Opinion on Fundamentals and Engagement on Global Warming

	FUNDAMENTALS							ENGAGEMENT	
	Believe global warming has been happening	Believe that the earth will warm in the future	Believe past warming has been caused by humans	Believe warming will be a serious problem for the US	Believe warming will be a serious problem for the world	Believe 5 degrees of warming will be bad	Believe the government should do more to address global warming	Warming is extremely personally important	Highly knowledgeable about global warming
AL	3.28%	5.35%	3.78%	3.76%	4.10%	4.94%	4.63%	3.52%	4.78%
AK	---	---	---	---	---	---	---	---	---
AZ	2.00%	3.95%	2.44%	3.17%	3.52%	4.27%	3.55%	4.68%	3.30%
AR	3.58%	5.57%	4.26%	4.36%	5.23%	5.40%	4.87%	4.49%	4.27%
CA	1.72%	2.12%	1.54%	1.70%	1.64%	2.23%	2.16%	2.55%	2.19%
CO	3.32%	5.16%	3.09%	3.64%	4.47%	4.51%	4.40%	4.16%	3.18%
CT	3.18%	5.88%	3.55%	3.81%	4.23%	4.99%	4.45%	4.45%	3.81%
DE	3.86%	5.73%	4.65%	4.36%	4.59%	6.54%	7.60%	5.49%	6.58%
DC	4.74%	---	3.96%	---	---	---	---	---	---
FL	1.79%	2.36%	1.91%	1.83%	1.95%	2.47%	2.39%	2.81%	2.28%
GA	2.49%	3.98%	2.94%	3.18%	4.01%	3.90%	3.56%	3.61%	3.41%
HI	4.74%	---	---	---	---	---	---	---	---
ID	4.36%	6.78%	4.43%	5.93%	6.81%	6.57%	6.49%	4.20%	5.41%
IL	2.22%	3.16%	1.96%	2.34%	2.72%	3.27%	3.04%	3.45%	2.98%
IN	2.87%	4.36%	2.78%	3.53%	4.01%	4.35%	3.87%	3.57%	3.32%
IA	3.27%	5.80%	3.01%	3.85%	4.18%	5.13%	4.70%	2.88%	4.45%
KS	3.93%	4.55%	4.07%	3.91%	4.45%	5.71%	4.92%	4.98%	4.08%
KY	3.12%	4.89%	2.91%	3.36%	3.80%	4.45%	4.36%	5.04%	3.82%
LA	3.39%	5.78%	4.09%	4.39%	5.30%	5.59%	4.89%	4.44%	4.85%
ME	2.17%	4.99%	2.31%	2.58%	2.35%	2.98%	2.87%	3.19%	5.01%
MD	2.68%	3.27%	2.09%	2.72%	2.58%	3.90%	3.64%	3.89%	3.37%
MA	1.63%	3.49%	1.87%	1.91%	1.82%	2.51%	2.45%	3.20%	2.88%
MI	2.65%	3.76%	2.48%	2.75%	3.13%	3.78%	3.43%	3.30%	3.20%
MN	2.55%	4.27%	2.94%	3.58%	3.80%	4.34%	3.97%	4.35%	2.93%
MS	3.50%	5.18%	4.46%	4.12%	5.58%	5.44%	4.79%	5.39%	4.55%
MO	2.86%	4.24%	3.18%	3.06%	4.01%	4.48%	3.98%	3.75%	3.40%
MT	4.87%	---	4.16%	6.15%	6.72%	7.91%	6.72%	6.09%	6.71%
NE	3.83%	7.95%	3.67%	4.65%	5.73%	6.49%	5.52%	4.26%	4.74%
NV	3.91%	5.72%	5.43%	4.86%	5.31%	7.05%	6.75%	7.71%	5.64%
NH	4.06%	6.68%	2.94%	3.81%	4.52%	5.89%	5.65%	5.73%	4.30%
NJ	2.20%	2.80%	2.06%	1.86%	2.06%	2.97%	2.80%	3.71%	2.79%

	FUNDAMENTALS							ENGAGEMENT	
	Believe global warming has been happening	Believe that the earth will warm in the future	Believe past warming has been caused by humans	Believe warming will be a serious problem for the US	Believe warming will be a serious problem for the world	Believe 5 degrees of warming will be bad	Believe the government should do more to address global warming	Warming is extremely personally important	Highly knowledgeable about global warming
NM	3.38%	6.38%	4.01%	4.38%	4.24%	5.07%	4.92%	5.77%	3.99%
NY	1.83%	2.51%	1.74%	2.12%	2.28%	2.90%	2.49%	2.92%	2.43%
NC	2.51%	3.10%	2.09%	2.61%	3.07%	3.52%	2.95%	3.27%	2.91%
ND	6.25%	---	---	---	---	---	---	---	---
OH	2.63%	3.50%	2.48%	2.52%	3.02%	3.38%	3.06%	2.85%	2.65%
OK	2.34%	5.22%	3.53%	3.84%	5.12%	4.80%	4.34%	3.94%	3.96%
OR	2.85%	3.67%	2.59%	3.25%	3.25%	4.20%	3.56%	4.07%	2.87%
PA	2.21%	3.07%	2.16%	2.43%	2.75%	3.23%	2.85%	2.65%	2.54%
RI	4.62%	5.33%	3.17%	2.61%	3.99%	7.60%	5.65%	6.93%	6.41%
SC	3.07%	4.68%	3.88%	3.46%	4.41%	4.57%	4.54%	4.28%	4.59%
SD	4.88%	6.81%	5.77%	4.86%	4.60%	5.44%	7.48%	4.35%	8.32%
TN	2.67%	3.44%	2.81%	3.02%	3.15%	3.65%	3.45%	3.60%	3.05%
TX	1.77%	2.85%	2.24%	2.17%	2.16%	2.77%	2.56%	2.61%	2.51%
UT	4.21%	6.56%	4.79%	5.26%	6.07%	5.96%	5.78%	4.25%	4.18%
VT	4.50%	5.90%	5.00%	5.13%	6.36%	6.40%	6.68%	6.15%	4.81%
VA	2.45%	3.70%	2.37%	2.88%	3.32%	3.47%	3.35%	3.02%	2.98%
WA	2.30%	3.72%	2.54%	2.84%	2.73%	3.71%	3.61%	3.29%	3.20%
WV	3.95%	6.56%	4.88%	4.97%	6.05%	7.03%	6.18%	4.54%	6.34%
WI	2.88%	4.88%	2.76%	3.33%	3.42%	4.19%	3.64%	3.30%	3.35%
WY	---	---	---	---	---	---	---	---	---

Table A.5. Standard Errors of Public Opinion on Global Warming Policies

	Believe the US should take action regardless of what other countries do (2015)	Believe the government should limit businesses' greenhouse gas emissions	Believe the government should lower power plant emissions	Favor a national cap-and-trade program	Favor higher fuel economy standards	Favor all-electric vehicles (2015)	Favor appliances that use less electricity
AL	5.90%	3.94%	3.98%	5.81%	4.36%	5.59%	4.57%
AK	---	---	---	---	---	---	---
AZ	4.89%	4.60%	2.64%	5.48%	3.22%	4.75%	4.06%
AR	5.09%	4.62%	4.55%	6.52%	4.98%	6.23%	5.08%
CA	2.26%	2.06%	1.90%	2.68%	2.05%	2.42%	2.10%
CO	5.13%	4.67%	3.59%	5.31%	3.89%	5.30%	4.60%
CT	5.57%	5.59%	4.76%	7.00%	5.27%	6.18%	5.56%
DE	5.79%	5.04%	4.44%	6.58%	8.84%	6.22%	8.30%
DC	---	---	6.38%	---	8.01%	---	---
FL	2.44%	2.56%	1.99%	2.98%	2.44%	2.81%	2.46%
GA	3.99%	3.54%	3.12%	4.66%	3.65%	4.24%	3.36%
HI	---	---	---	---	---	---	---
ID	6.34%	6.51%	4.19%	7.56%	5.84%	7.86%	6.72%
IL	3.06%	3.06%	2.38%	3.92%	3.04%	3.69%	3.06%
IN	5.34%	4.25%	3.39%	4.96%	3.83%	4.67%	3.84%
IA	5.72%	5.64%	4.41%	6.51%	5.11%	6.20%	5.25%
KS	4.43%	5.05%	3.68%	6.72%	4.97%	5.60%	4.15%
KY	4.78%	3.80%	3.24%	5.42%	3.91%	5.08%	4.00%
LA	6.43%	5.76%	5.05%	6.97%	5.19%	6.49%	5.13%
ME	2.80%	2.85%	2.62%	3.38%	3.38%	3.35%	3.46%
MD	4.04%	3.74%	3.09%	4.82%	3.90%	4.74%	3.83%
MA	2.45%	2.44%	2.11%	3.01%	2.67%	2.92%	2.76%
MI	4.46%	3.90%	2.67%	4.68%	3.13%	3.97%	3.42%
MN	4.61%	4.46%	3.44%	5.24%	3.87%	4.91%	3.58%
MS	7.83%	6.54%	4.56%	7.24%	5.13%	6.37%	5.41%
MO	4.85%	4.27%	3.21%	4.88%	3.93%	5.27%	4.03%
MT	---	---	4.40%	---	6.60%	---	6.33%
NE	5.76%	6.15%	4.28%	6.90%	6.45%	6.85%	6.49%
NV	7.98%	5.12%	6.29%	8.84%	5.71%	8.38%	7.31%
NH	4.53%	5.34%	3.15%	7.86%	4.95%	6.44%	5.13%
NJ	2.93%	2.82%	2.19%	3.88%	2.84%	3.70%	2.96%
NM	6.50%	5.37%	5.80%	7.47%	5.89%	6.64%	6.49%
NY	3.51%	2.70%	1.89%	3.54%	2.49%	3.21%	2.40%
NC	3.72%	3.19%	2.74%	4.11%	3.18%	3.81%	3.18%

	Believe the US should take action regardless of what other countries do (2015)	Believe the government should limit businesses' greenhouse gas emissions	Believe the government should lower power plant emissions	Favor a national cap-and-trade program	Favor higher fuel economy standards	Favor all-electric vehicles (2015)	Favor appliances that use less electricity
ND	---	---	---	---	---	---	---
OH	3.65%	2.79%	2.47%	4.08%	3.05%	3.68%	3.12%
OK	5.24%	4.72%	3.94%	5.69%	4.71%	5.56%	5.12%
OR	4.44%	3.48%	2.77%	4.80%	4.15%	4.90%	4.16%
PA	3.57%	3.36%	2.36%	3.71%	2.87%	3.49%	2.77%
RI	---	3.53%	3.33%	---	6.09%	---	6.74%
SC	7.21%	5.49%	4.33%	6.87%	4.70%	5.85%	4.68%
SD	---	7.00%	6.04%	8.87%	6.68%	7.69%	6.45%
TN	3.99%	3.57%	3.33%	4.22%	3.47%	3.85%	3.61%
TX	2.94%	2.70%	2.13%	3.33%	2.70%	3.18%	2.65%
UT	7.07%	5.91%	5.06%	7.58%	5.48%	6.39%	4.59%
VT	---	---	5.49%	---	7.42%	8.60%	7.35%
VA	4.14%	3.70%	2.76%	4.10%	3.45%	4.00%	3.12%
WA	3.29%	2.89%	2.53%	3.95%	2.88%	4.21%	3.75%
WV	---	6.07%	5.02%	7.43%	5.54%	8.49%	5.94%
WI	5.11%	2.68%	2.80%	4.93%	3.65%	4.79%	3.61%
WY	---	---	---	---	---	---	---

Table A.6. Standard Errors of Public Opinion on Global Warming Policies (Continued)

	Favor energy-efficient buildings	Favor tax breaks to produce renewable energy	Favor tax breaks to reduce air pollution from coal	Favor tax breaks to build nuclear power plants	Favor increased consumption taxes on electricity	Favor increase consumption taxes on gasoline
AL	4.33%	3.30%	4.86%	5.48%	4.70%	4.23%
AK	---	---	---	---	---	---
AZ	3.59%	3.12%	4.80%	4.76%	4.55%	4.84%
AR	5.15%	4.24%	5.92%	6.58%	4.72%	5.48%
CA	1.96%	1.76%	2.57%	2.50%	2.68%	2.62%
CO	4.16%	3.06%	4.48%	5.19%	5.25%	4.82%
CT	5.35%	3.35%	5.89%	5.86%	4.22%	5.17%
DE	---	4.49%	6.05%	10.12%	6.93%	7.11%
DC	---	4.47%	---	8.86%	8.72%	8.54%
FL	2.25%	2.02%	2.66%	2.77%	2.71%	2.88%
GA	3.50%	2.99%	3.93%	4.13%	3.71%	4.01%
HI	---	---	---	---	---	---
ID	6.55%	4.09%	5.92%	8.09%	5.35%	6.16%
IL	2.82%	2.21%	3.48%	3.89%	3.68%	3.75%
IN	3.63%	2.66%	4.09%	4.27%	3.20%	3.94%
IA	4.99%	2.93%	5.92%	6.11%	4.28%	5.44%
KS	4.79%	3.97%	5.80%	5.46%	4.99%	4.57%
KY	4.05%	3.68%	4.39%	5.44%	5.38%	5.33%
LA	4.91%	4.12%	5.67%	5.73%	4.95%	5.48%
ME	3.20%	2.40%	3.24%	2.95%	3.02%	3.34%
MD	3.29%	2.72%	4.18%	4.20%	4.24%	4.52%
MA	2.23%	2.00%	3.03%	2.85%	3.26%	3.12%
MI	3.00%	2.83%	3.92%	3.64%	3.75%	3.72%
MN	3.95%	2.86%	4.11%	4.76%	4.44%	4.55%
MS	5.41%	5.50%	6.15%	6.01%	6.15%	6.18%
MO	3.97%	3.19%	4.49%	4.62%	4.09%	4.39%
MT	5.83%	3.02%	7.88%	7.93%	7.72%	7.17%
NE	6.19%	4.07%	6.48%	7.69%	6.38%	7.47%
NV	4.73%	5.14%	7.79%	6.91%	7.99%	7.66%
NH	5.37%	3.69%	6.60%	---	4.49%	6.53%
NJ	2.95%	2.06%	3.70%	3.75%	4.03%	3.85%
NM	6.45%	5.11%	6.28%	7.03%	6.65%	6.87%
NY	2.35%	1.95%	2.94%	2.92%	3.11%	3.12%
NC	3.10%	2.52%	3.67%	3.62%	3.38%	3.70%
ND	---	---	---	---	---	---

	Favor energy-efficient buildings	Favor tax breaks to produce renewable energy	Favor tax breaks to reduce air pollution from coal	Favor tax breaks to build nuclear power plants	Favor increased consumption taxes on electricity	Favor increase consumption taxes on gasoline
OH	3.08%	2.93%	3.56%	3.44%	2.78%	3.26%
OK	4.55%	3.96%	5.10%	4.92%	3.88%	5.36%
OR	3.21%	2.94%	4.59%	4.41%	4.16%	4.46%
PA	2.82%	2.41%	3.09%	3.17%	2.99%	3.21%
RI	5.96%	5.32%	7.70%	6.83%	7.82%	8.20%
SC	4.76%	4.00%	5.24%	5.35%	4.07%	4.12%
SD	6.51%	5.39%	7.61%	10.30%	7.51%	---
TN	3.40%	2.95%	3.81%	4.05%	3.56%	3.67%
TX	2.48%	1.95%	2.90%	2.84%	2.77%	2.95%
UT	5.33%	3.86%	5.70%	6.04%	4.92%	5.36%
VT	6.47%	5.48%	7.80%	8.17%	7.34%	---
VA	3.16%	2.48%	3.82%	4.00%	3.61%	3.80%
WA	2.91%	2.64%	4.17%	3.59%	3.79%	3.95%
WV	5.17%	4.91%	6.11%	6.86%	5.22%	7.11%
WI	3.52%	2.63%	4.24%	4.67%	4.23%	4.17%
WY	---	---	---	---	---	---