

# Does the American Public Support Legislation to Reduce Greenhouse Gas Emissions?

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*Abstract: Despite efforts by some congressional legislators to pass laws to limit greenhouse gas emissions and reduce the use of fossil fuels, no such laws have yet been adopted. Is this failure to pass new laws attributable to a lack of public desire for such legislation? Data from national surveys support two answers to this question. First, large majorities of Americans have endorsed a variety of policies designed to reduce greenhouse gas emissions; second, policy support has been consistent across years and across scopes and types of policies. Popular policies include fuel economy and energy-efficiency standards, mandated use of renewable sources, and limitations on emissions by utilities and by businesses more generally. Support for policies has been price sensitive, and the American public appears to have been willing to pay enough money for these purposes to cover their costs. Consistent with these policy endorsements, surveys show that large majorities of Americans believe that global warming has been happening, that it is attributable to human activity, and that future warming will be a threat if unaddressed. Not surprisingly, these beliefs appear to have been important drivers of public support for policies designed to reform energy generation and use. Thus, it seems inappropriate to attribute lack of legislation to lack of public support in these arenas.*

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Recent years have seen a number of efforts in Congress to shift American energy generation away from fossil fuels and toward cleaner and renewable energy sources. For example, in early 2009, the Obama administration and members of Congress designed and enacted the American Recovery and Reinvestment Act, earmarking nearly \$80 billion in clean-energy investments. Projects included upgrading the national electricity grid to improve efficiency; assisting and encouraging the formation of clean-energy businesses through tax incentives; and investing in cleaner and more efficient forms of public transit, such as high-speed rail.

In June 2009, the House of Representatives passed the American Clean Energy and Security Act, which sought to place nationwide caps on green-

house gas emissions. This law targeted a 17 percent reduction of greenhouse gas emissions from 2005 levels by 2020 and an 83 percent reduction by 2050. It also mandated that 20 percent of American electricity be generated from renewable sources such as solar and wind power by 2020. The Senate did not vote on the Act, so it was not adopted into law. Since then, no significant efforts have been made in Congress, and leaders either have chosen not to discuss the issue or have opposed legislative efforts to facilitate development of a new energy economy.

One possible explanation for this turn of events is lack of public support. According to many observers, reduced use of fossil fuels and adoption of new technologies would be costly for consumers and would shortcut the process of recovering investments already made in infrastructure to produce energy from conventional sources. At a time when the nation's economy is struggling, it is easy to imagine that Americans might not be willing to take such steps, so shifting legislative focus to other policy arenas might appear to reflect public will.

In this essay, we explore whether public attitudes indeed discourage immediate movement toward a new energy economy. We examine attitudes in four broad categories: two on the consumption side, and two on the supply side. The consumption policies include setting higher standards for energy efficiency and taxing electricity and gasoline use in order to reduce consumption. The supply policies address the expansion of renewable energy sources and the reduction of businesses' emissions of air pollution in general and of greenhouse gases in particular.

We explore these issues using data from national surveys that we conducted between 1997 and 2012. Each survey involved a probability sample of American adults who were representative of the

nation. Interviews were done by telephone using "random digit dialing" to reach people with listed and unlisted telephone numbers. In the early years, only landline telephones were called. As the number of Americans reachable only by cellular telephone increased, we altered our approach to include both landlines and cell phones. The same question wordings were employed across the years to allow for tracking trends in opinions over time. Our survey research has been conducted collaboratively with news media organizations (for example, the Associated Press, ABC News, *The Washington Post*, *Time* magazine, and *New Scientist* magazine) and the nonpartisan think tank Resources for the Future. It has been funded by government agencies (for example, the National Science Foundation, the Environmental Protection Agency, the National Oceanic and Atmospheric Administration), a private foundation (the Electric Power Research Institute), and academic institutions (Stanford University and The Ohio State University). Data collection has been done by a variety of survey research firms, including Abt/SRBI, Ipsos Public Affairs, GfK, and TNS, and The Ohio State University's Center for Survey Research.

According to our surveys, large majorities of Americans have endorsed policies to limit the amount of air pollution in general, and greenhouse gas emissions in particular, that U.S. businesses produce. In October 1997, for example, 88 percent of respondents said the U.S. government should limit the amount of air pollution that U.S. businesses can produce; 91 percent expressed this opinion in February 1998; and in June 2010, the figure was 86 percent. Although the technical meaning of *air pollution* does not refer to greenhouse gases, we have learned over the years that Americans view this term as including

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greenhouse gas emissions as well. When respondents were asked in June 2010 whether the U.S. government should limit the amount of greenhouse gases thought to cause global warming that U.S. businesses can produce, 76 percent answered affirmatively. This figure was 74 percent in late 2010 and 77 percent in 2012.

When the question was phrased specifically with regard to emissions produced by utilities during electricity generation, similarly high proportions of Americans endorsed limitations. In 2006 and 2007, 86 percent and 87 percent of respondents, respectively, said the federal government should reduce utilities' emissions. This figure was slightly lower in 2009, mid-2010, late 2010, early 2012, and mid-2012: 76 percent, 80 percent, 78 percent, 70 percent, and 78 percent, respectively.

In the literature on public opinion, researchers have observed what has been dubbed a *principle-implementation gap*. Whereas many people favor policies to achieve an outcome (for example, racial integration of schools) in principle, various specific policies to achieve that outcome (such as busing children to schools in neighborhoods far from their homes) receive only low levels of support. Thus, endorsement of the goal may appear disingenuous because no actual implementation methodology would be acceptable to the public.

This is not the case for emissions-reduction policies. In fact, according to our surveys, large majorities of Americans have favored government taking steps to promote higher energy-efficiency standards in a number of arenas (see Figure 1). For example, in 2006, 84 percent of survey respondents wanted the federal government to require by law, or encourage with tax breaks, the building of cars that use less gasoline.<sup>1</sup> This is clearly a huge number. Similarly sizable majorities of Americans that year favored govern-

ment's requiring or encouraging the building of appliances that use less electricity (82 percent) as well as building new homes and offices that use less energy to be heated and cooled (83 percent). These majorities shrank slightly between 2006 and 2010, shrank a bit more in 2011, and rebounded in 2012. None of the policies was ever opposed by a majority during this time period.

Similarly huge majorities have favored steps by the federal government to reduce the amount of greenhouse gas emissions generated when utilities produce electricity. In 2006, 86 percent of respondents favored requiring utilities, or encouraging them with tax breaks, to reduce the amount of greenhouse gases they emit (see Figure 1). Also in that year, 87 percent favored tax breaks for utilities that produce more electricity from water, wind, or sunlight (see Figure 2). These majorities were maintained between 2006 and 2010 and shrank somewhat after that.

One element of the American Clean Energy and Security Act is a government mandate that 20 percent of the nation's electricity be generated from clean, renewable sources by the year 2020. In a 2010 survey, 69 percent of American adults endorsed this notion, saying that the U.S. government should require all utilities to generate at least 20 percent of their electricity from water, wind, or solar power.

During a more limited set of years, we asked about two additional emissions-reduction policies that were endorsed by slightly smaller but nonetheless sizable majorities. The first addressed the sequestration of emissions from burning coal. Our survey question asked whether respondents favored or opposed the federal government's giving "tax breaks to companies that burn coal to make electricity if they use new methods to put the air pollution they generate into underground

Figure 1  
Percent of Respondents Who Said that Government Should Require or Encourage  
Various Policies Designed to Reduce Greenhouse Gas Emissions, 2006 – 2012

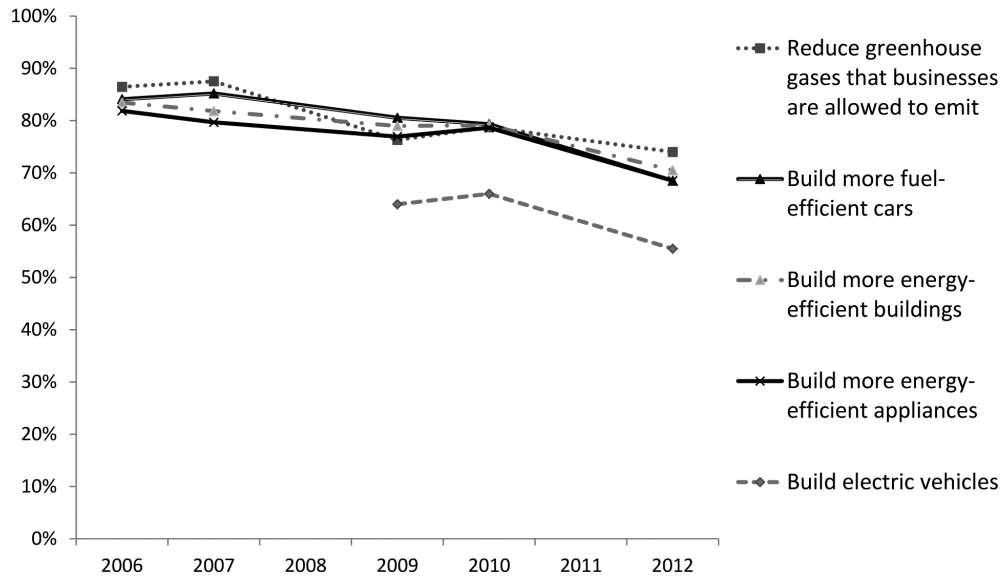
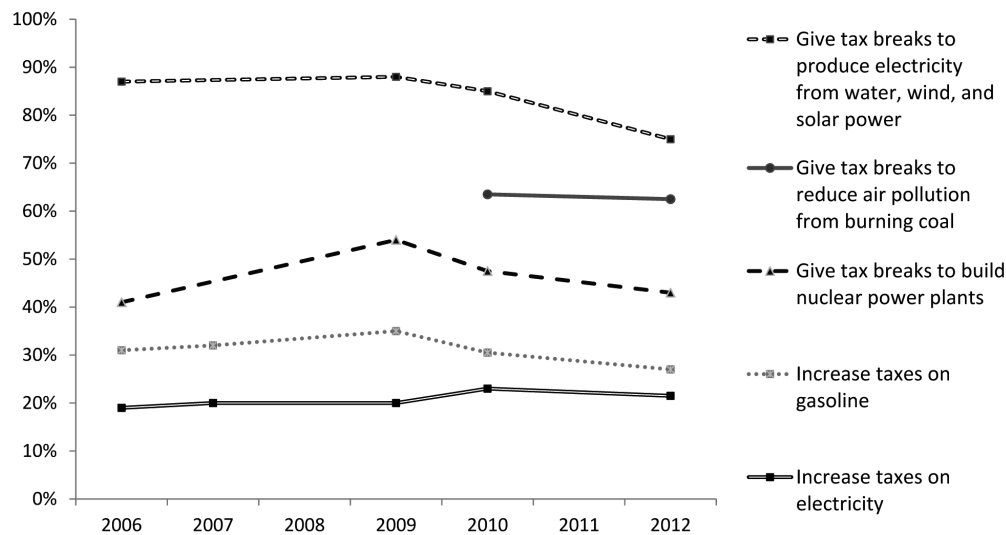


Figure 2  
Percent of Respondents Endorsing Various Policies Designed to  
Reduce Greenhouse Gas Emissions, 2006 – 2012



Source: Figures created by authors.

storage areas instead of letting that air pollution go up the smokestacks at their factories.” The proportion of respondents supporting this policy was 64 percent in 2010 and 63 percent in 2012 (see Figure 2). The other policy addressed requiring or encouraging automobile manufacturers to produce cars that run completely on electricity. When we first asked about such a policy in 2009, 64 percent of respondents endorsed it, and that figure remained fairly constant through 2012 (see Figure 1).

Other emissions-reduction policies have been notably less popular, favored by only minorities of Americans (see Figure 2). For example, in 2006 just 41 percent of respondents favored giving federal tax breaks to companies to build nuclear power plants. And even fewer people supported tax increases imposed on consumers’ energy consumption simply to induce decreased consumption and without stipulating a use for the financial revenues that would be generated. Specifically, in 2006 only 19 percent of Americans favored increasing taxes on electricity to encourage people to use less of it, and only 31 percent favored increasing taxes on gasoline to do the same. Endorsement of these policies remained at about the same levels between 2006 and 2012.

A central piece of the American Clean Energy and Security Act is an economy-wide system in which the federal government sets a limit on the total amount of greenhouse gases that businesses can emit and issues tradable permits to companies restricting their individual emissions. Although Barack Obama and John McCain disagreed about many issues during the 2008 presidential election campaign, they agreed that the federal government should create such a “cap and trade” system.

During the months leading up to the 2008 presidential election, 59 percent of

Americans endorsed a cap-and-trade system when it was described as follows:

The government would issue permits limiting the amount of greenhouse gases companies can put out. Companies that did not use all their permits could sell them to other companies. The idea is that many companies would find ways to put out less greenhouse gases, because that would be cheaper than buying permits. Would you support or oppose this system?

Respondents who initially expressed opposition were then told: “A similar system has been effective in reducing emissions that cause acid rain. Knowing that it has worked in that case, would you support or oppose a cap-and-trade system for greenhouse gases?” Once this information was given, support rose to 74 percent, suggesting that some initial hesitation was based on uncertainty about whether the system would be effective.

In 2010, we asked a randomly selected half of the respondents about cap and trade, but we described the program slightly differently:

The government would issue permits limiting the amount of greenhouse gases companies can put out. Companies that did 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. This will cause companies to figure out the cheapest way to reduce greenhouse gas emissions. Would you favor or oppose this system?

When asked this form of the question, 65 percent of respondents said they favored the system. For another group of respondents, the following was added to the end of the question: “This type of permit system has worked successfully in the past to reduce the air pollution that

companies put out.” Of these individuals, 74 percent endorsed the system. Thus, again, majority support was apparent, and initial hesitation was apparently due in part to uncertainty about program effectiveness.

This conclusion was reinforced by another, similar experiment. In March 2009, among a nationally representative sample of Americans who completed surveys online,<sup>2</sup> one-quarter of the respondents, chosen randomly, were asked to vote for or against a cap-and-trade program in which the permits would be sold to companies (instead of simply issued, as specified in the experiments described above). Fifty-six percent of respondents voted for the program. This proportion increased to 62 percent among another random subset of respondents who also read this additional information about the program’s effectiveness:

This kind of policy, where the government limits a certain type of air pollution and gives out permits to companies that they can buy and sell, has worked successfully in the past to reduce the amount of air pollution that companies put out. For example, in 1990, the federal government passed a law like this, called the Clean Air Act, which caused companies to put out a lot less of the air pollution that causes acid rain.<sup>3</sup>

One possible explanation for the slightly lower levels of popularity observed in this survey is that the permits are described as being sold rather than issued. When described as being sold, respondents might perceive the permits as generating revenue for the federal government, and presumably increasing the costs of goods and services to consumers given the pass-through of the expense to companies.

In the above study’s description of the cap-and-trade program, respondents were not told what would be done with the revenue generated through the sale of

permits. To explore whether disposition of revenues affects people’s willingness to endorse cap and trade, we tested the appeal of a so-called cap-and-dividend program. Another randomly selected one-quarter of respondents in the March 2009 survey were told about cap and trade but were not told about past effectiveness. Instead, they were told: “All the money raised from selling permits would be returned to American taxpayers. A refund would be given on each income tax return filed with the federal government.” Of these respondents, 57 percent voted for cap and trade. This number is not significantly different from the proportion who endorsed the program without this information (56 percent), meaning that the transformation from “cap and trade” to “cap and dividend” did not increase the public appeal of the policy.<sup>4</sup>

This conclusion was supported by results from another experiment we conducted in a 2008 Internet survey of a non-representative sample of volunteers. Some of the respondents (chosen randomly) were provided a description of cap and trade and were told that the permits would be given away to companies. Another group of respondents (also chosen randomly) was instead told that the permits would be auctioned. The proportion of respondents endorsing cap and trade was not significantly different in the two conditions; therefore, federal revenue generation did not seem to increase the appeal of cap and trade.

Interestingly, public reluctance to support cap and trade is driven in part by the presence of a trading system in the policy. We observed this phenomenon in a survey conducted in April 2007 with a representative national sample of Americans who completed surveys via the Internet. Respondents were asked to evaluate two different policy approaches for reducing emissions from electricity generation

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and gasoline consumption by 5 percent by the year 2020. The first was a cap-and-trade system, the second a less complex system that simply capped emissions without a permit-trading system. The percent of respondents endorsing the mandated cap was considerably higher than the percent endorsing the cap-and-trade system. Thus, mandated emissions-reduction policies were the more popular option.

The survey questions measuring support for some of the emissions-reduction policies outlined above described each policy without mentioning that the goal was to reduce future global warming. Specifically, respondents were asked: "For each of the following, please tell me whether you favor or oppose the federal government doing it"; one of the named policies was to "give companies tax breaks to build nuclear power plants." Given that survey respondents may not have understood that such policies are intended to reduce future global warming, we speculated that making such a link explicit could have changed the distribution of responses.

We explored this possibility in an experiment embedded in our 2010 survey. Half of the respondents (selected randomly) were asked about five policies (ranging from very popular to very unpopular) with no mention of global warming. For the other half of the respondents, the introduction to the question sequence stated: "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." Thus, the primary purpose of each policy was made explicit.

Linking relatively unpopular consumption taxes and the construction of nuclear power plants to global warming reduction had no impact on support for such policies. Among respondents who did not hear the added introduction, 22 percent favored taxes on electricity to reduce con-

sumption, and 28 percent favored taxes on gasoline to do the same. Identical figures appeared among respondents who did hear the introduction. Among respondents who did not hear the introduction, 45 percent favored tax breaks to encourage nuclear power plant construction, and this figure was 51 percent among people who heard the added introduction, not a statistically significant difference ( $p = 0.44$ ). Thus, global warming reduction did not make these unpalatable policies any more appealing.

Likewise, explicitly linking renewable power use to global warming did not alter the appeal of alternative energy. Among respondents who did not hear the added introduction, 82 percent favored giving tax breaks to utilities to produce more electricity from water, wind, and solar power. This figure rose to 87 percent among people who heard the introduction, which, again, is not a significant difference ( $p = 0.17$ ). The same trend appeared with regard to support for carbon sequestration: among people who did not hear the added introduction, 61 percent favored it, whereas 70 percent of respondents who did hear the introduction favored it (again, not statistically significant). Thus, it appears that linking these policies more explicitly to global warming did not notably alter their popularity.

One might imagine that the very limited support for consumer taxes on gasoline and electricity is the result of public reluctance to pay for reductions in greenhouse gas emissions. And perhaps, one might speculate, public endorsement of mandates and tax incentives to alter business practices has been so high because survey respondents imagined that these policies would not cost them any money.

To explore this possibility, we conducted an experiment in our 2012 survey. A randomly selected half of the respondents

were asked to evaluate four of the most popular emissions-reduction policies using question wording that made no mention of the increased consumer costs that were likely to result from the policies. The other half of the respondents were asked the same questions, but the questions were preceded by the following introduction: “Each of these changes would increase the amount of money that you pay for things you buy.”

Adding this introduction had no significant impact on the distribution of responses. For example, among the respondents who did not hear the explicit reference to increased consumer costs, 74 percent endorsed federal government efforts to increase automobile fuel-efficiency standards. The figure was 70 percent among people who were told about the effect on the price of consumer goods – not a significant difference ( $p = 0.69$ ). Similarly, when asked about U.S. government actions to lower the amount of greenhouse gas emissions that utilities release, 77 percent endorsed the policy when not told about price increases on consumer goods, and 78 percent did so when told about increases to consumer prices – again, an insignificant difference ( $p = 0.61$ ).

Because the new question wording specified neither how much people would have to pay in order to achieve emissions reductions nor the size of those reductions, this approach to measuring respondents’ willingness to incur costs raised the question of how people would respond if given specific figures. To address this concern, we conducted between-subjects experiments in which we asked questions that made both the costs and the benefits explicit. In these experiments, we observed the price sensitivity that economists would expect to see.

For example, in November 2010, after the current economic recession was well

under way, we randomly assigned one-third of the respondents to be asked if they would vote for or against a law that would reduce air pollution by 85 percent by 2050 and that would cost each household an extra \$75 per year on average. Sixty-six percent of respondents voted for this law. Among randomly selected respondents who were instead told that the annual cost would be \$150 per household, endorsement dropped slightly, to 58 percent. And among the remaining respondents who were told that the cost would be \$250 per year, support dropped to 41 percent.

This pattern of price sensitivity was also evident in surveys we conducted with representative samples of residents in Florida, Maine, and Massachusetts in July 2010. Of the total respondents from the three states, 63 percent voted for a law to reduce air pollution by 85 percent by 2050, even if it cost individual households an extra \$75 per year on average. Support dropped slightly to 53 percent among respondents who were told that the annual cost would be \$150. And support dropped further, to 48 percent, among people told that the cost would be \$250 per year.

Similar price sensitivity was observed in an April 2007 survey. A nationally representative sample of American adults was asked about requiring electric utilities to produce low-carbon electricity to reduce greenhouse gas emissions by 5 percent by 2020. A randomly selected subset of respondents was told that the law would cost an extra \$24 annually in increased electricity costs, and 75 percent endorsed the law. This number was about the same (73 percent) among respondents who were told that the price would be \$120 per year, and it dropped considerably, as we expected, to 50 percent among people who were told that the annual cost would be \$840.

Was public willingness to pay sufficient to cover the actual cost of the described

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emissions reduction? To answer this question, we can apply the Turnbull calculation method<sup>5</sup> to our survey data to calculate the nation's willingness to pay for an 85 percent reduction in national emissions by 2050. The Turnbull method is designed to yield a lower-bound estimate of total willingness to pay. For example, using the data we collected in 2010, we can produce estimates based on the following logic:

- Sixty-six percent of respondents voted in favor of the program at a cost of \$75 per household. Because \$75 was the lowest price we asked about, the Turnbull method assumes that everyone who voted against the program at this cost was willing to pay \$0 (even though these respondents might have revealed some willingness to pay if we had asked them about a price between \$0 and \$75).
- Because 58 percent of respondents voted for the program at a cost of \$150, the Turnbull method assumes that 8 percent of respondents (the difference between 66 percent and 58 percent) were willing to pay \$75 (even though maximum willingness to pay among some or all of these respondents might have been between \$75 and \$150).
- Because 41 percent of respondents voted for the program at a cost of \$250, the Turnbull method assumes that 17 percent of respondents (the difference between 58 percent and 41 percent) were willing to pay \$150 (even though maximum willingness to pay among some or all of these respondents might have been between \$150 and \$250).
- Because \$250 was the highest price we asked about, the Turnbull method assumes that the 41 percent of respondents who voted for the program at that price were willing to pay no more than that price (even though they might

have revealed a willingness to pay a higher price if we had asked about that).

Having assigned each respondent a willingness to pay, we can calculate the average willingness to pay across all Americans, which turns out to be \$134. We can then multiply this number by the total number of households in the nation (117 million in 2010) to yield a total willingness to pay for the country: \$15.7 billion per year.

Is this figure enough to cover the costs of an 85 percent reduction in national emissions by 2050? The Environmental Protection Agency (EPA) conducted an analysis of the economic costs of the American Power Act to achieve the mitigation goals of reducing greenhouse gas emissions by 17 percent in 2020 and by 83 percent in 2050. The EPA estimated that the per-household cost would be between \$79 and \$146 (in 2005 dollars) if the Act were to be implemented, with a total cost between \$10.8 billion and \$20.2 billion per year (in 2010 dollars).<sup>6</sup> Using the 2010 survey data, the lower-bound estimate of total public willingness to pay (\$15.7 billion) is squarely within the EPA's range of \$10.8 billion to \$20.2 billion. Thus, according to this measurement approach, Americans were willing to pay the price.

Some opponents of the policies outlined above have argued that, amid a national recession, this is not the time to incur such costs. This argument has often been justified by claims that reducing future global warming would hurt the nation's economy and eliminate jobs. But the high levels of support these policies have received in recent years suggest that this argument has not been convincing to Americans. Indeed, our data offer direct evidence consistent with that conclusion.

Specifically, in mid-2010, only 20 percent of respondents surveyed said that taking

actions to reduce future global warming would hurt the U.S. economy, and only 18 percent said that doing so would reduce the number of jobs around the country. These numbers were nearly identical – 23 percent and 18 percent, respectively – in late 2010. In fact, in mid-2010, a majority of respondents (56 percent) said that taking actions to reduce future global warming would have a positive effect on the U.S. economy, and 50 percent said that efforts to reduce warming would create jobs and increase employment nationwide. These numbers were 53 percent and 48 percent, respectively, in late 2010.

The same beliefs have been expressed with regard to state economies. In late 2010, only 19 percent of respondents said that U.S. efforts to do something about global warming would reduce the number of jobs in their state, and only 21 percent said that doing so would hurt their state's economy. A plurality, 45 percent, said that such actions would bring jobs to the state in which they lived, and 48 percent said that these actions would help their state's economy.

The substantial public support we observed for a range of policy approaches may result from a variety of considerations. For example, support for using solar, wind, and water to generate electricity might be driven by (1) a desire to limit American dependence on foreign nations for oil; (2) a desire to use unlimited sources rather than relying on finite quantities of oil, coal, and natural gas; or (3) a desire to reduce emissions of particulate matter that result from burning organic materials. Indeed, even support for legislation explicitly intended to reduce greenhouse gas emissions might be driven by a desire to rely on alternative energy sources for reasons having nothing to do with global warming. However, it is also possible that the policy support

described above is indeed a function of the desire to reduce future global warming and its perceived likely effects.

In order for the latter assertion to hold, one necessary precondition must be – and has been – met: in all the surveys we have conducted dating back to the 1990s, large majorities of Americans have said they believe that the planet has been gradually warming over the last hundred years; that if such warming has been occurring, it has been caused by human activity; and that, if unchecked, global warming will be harmful to people now and in the future and will be a serious problem for the nation and the world.

According to each of the surveys conducted between 2006 and 2012, more than three in four Americans said they believed that the world's temperature has probably been going up for the past hundred years: 85 percent in 2006 and 84 percent in 2007. The proportion dropped slightly to 80 percent in 2008, dropped a bit more the next year, later rose slightly, and then dropped slightly once more. Through all these small ups and downs, large majorities expressed belief in past warming. When asked whether future warming will occur if nothing is done to stop it, 75 percent responded affirmatively in 2010, and 72 percent did so in both 2011 and 2012. Likewise, large majorities found human activity responsible for warming: 80 percent in 2006, 83 percent in 2007, 78 percent in 2008, 69 percent in 2009, 75 percent in 2010, 72 percent in 2011, and 77 percent in 2012.

When asked whether warming of five degrees Fahrenheit over the next seventy-five years would be good, bad, or neither good nor bad, 64 percent said “bad” in 2007, followed by 61 percent in 2008, 54 percent in 2009, 59 percent in mid-2010, 56 percent in late 2010, and 53 percent in 2012. When asked how much global warming is likely to hurt future generations, 64

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percent said “a great deal” or “a lot” in mid-2010, and 60 percent expressed this view in late 2010. Huge majorities said that global warming was a “very serious” or “somewhat serious” national problem: 82 percent in 2006, 85 percent in 2007, 84 percent in 2008, 73 percent in 2009, 78 percent in mid-2010, 75 percent in late 2010, and 79 percent in 2012.

To explore whether beliefs about global warming might motivate support for emissions-reduction policies, we estimated the parameters of regression equations (see Table 1). We constructed an index of respondent “greenness” on global warming using five measures: namely, belief that global warming has been happening, that it has been caused by humans, that it will be bad, that it will be a serious problem for the nation, and that it will be a serious problem for the world. This index was normalized to be a continuous variable from 0 (the least green) to 1 (the most green). Measures of endorsement of emissions-reduction policies in four categories were also constructed and normalized to be continuous scores ranging from 0 (the least endorsement) to 1 (the most endorsement). Data from the mid-2010 and late-2010 surveys were used to estimate parameters because of the completeness of the energy policy measures included in those surveys.

As we expected, global warming greenness predicted support for emissions-reduction policies in each of the four categories. For every 10 percentage-point increase in the public’s global warming greenness, we observed a 1.5 percentage-point increase in endorsement of policies for fuel economy and energy-efficiency standards (see row 1, column 1 in Table 1); a 2.5 percentage-point increase in public endorsement of energy-consumption tax policies (see row 1, column 2 in Table 1); a 1 percentage-point increase in public endorsement of policies related to alter-

native energy sources (see row 1, column 3 in Table 1); and a 3.5 percentage-point increase in public endorsement of emissions-reduction policies (see row 1, column 4 in Table 1). When we combined all the energy policies together, for every 10 percentage-point increase in the public’s global warming greenness, we observed a 1.8 percentage-point increase in public endorsement of the policies in general (see row 1, column 5 in Table 1).

Taken together, the body of evidence that we have reviewed here paints a compelling portrait of public opinion. For years, most Americans have endorsed a range of U.S. government policies designed to reduce greenhouse gas emissions and have been willing to pay for the implementation of such policies. To date, despite the national recession, most Americans have apparently been unconvinced that such policies would hurt the U.S. economy or their state’s economy. Certainly, some types of policies have appealed to very few Americans, including consumer taxes designed simply to reduce consumption, with no specificity about the uses of the funds that would be raised by the federal government and no indication of what level of emissions reductions would be achieved. But policies that involve either government mandates or tax incentives to businesses have proven very popular with the public, even when the financial costs involved are made explicit. Americans are not willing to pay an unlimited amount of money for emissions reduction, and people do manifest the price sensitivity that economists would expect. But willingness to pay appears to be sufficient to fund a great deal of effort.

In light of our survey results, it seems unfair to blame the public for lack of legislative progress in limiting greenhouse gas emissions. Indeed, public support for

Table 1  
Greenness in Global Warming Beliefs as a Predictor of Energy Policy Support<sup>7</sup>

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Predictor	Support for Each Category of Energy Policies				Support for All Energy Policies (5)
	Energy Efficiency Standards (1)	Gas Consumption Taxes (2)	Alternative Energy Sources (3)	Emissions Reduction (4)	
Global Warming Greenness	0.15*** (0.04)	0.25*** (0.03)	0.10*** (0.04)	0.35*** (0.03)	0.18*** (0.02)
Democrat	0.04 (0.02)	0.01 (0.03)	0.05** (0.02)	0.04** (0.02)	0.03** (0.01)
Republican	0.01 (0.03)	-0.04 (0.02)	0.03 (0.03)	-0.01 (0.02)	0.00 (0.01)
Liberal	-0.03 (0.03)	0.11*** (0.03)	0.00 (0.02)	-0.03 (0.02)	-0.00 (0.01)
Conservative	0.03 (0.03)	-0.06** (0.03)	-0.01 (0.03)	-0.03 (0.02)	-0.01 (0.01)
Female	-0.03 (0.02)	-0.00 (0.02)	-0.04** (0.02)	0.05*** (0.02)	-0.02* (0.01)
Hispanic	-0.08** (0.04)	0.13*** (0.04)	0.04 (0.04)	0.01 (0.03)	0.00 (0.02)
Black	-0.09** (0.04)	0.04 (0.04)	-0.00 (0.04)	-0.02 (0.02)	-0.04** (0.02)
High school graduate	-0.01 (0.04)	0.02 (0.04)	-0.01 (0.04)	-0.00 (0.04)	0.00 (0.02)
Some college	-0.01 (0.04)	0.00 (0.04)	0.04 (0.04)	-0.01 (0.04)	0.01 (0.02)
College graduate	0.02 (0.03)	0.14*** (0.04)	0.05 (0.04)	-0.01 (0.04)	0.05* (0.02)
Age 25 – 34	0.05 (0.04)	-0.09** (0.04)	0.01 (0.04)	-0.01 (0.03)	0.01 (0.02)
Age 35 – 44	0.05 (0.04)	-0.05 (0.04)	-0.01 (0.04)	-0.04 (0.03)	-0.00 (0.02)
Age 45 – 54	0.05 (0.04)	-0.09** (0.04)	-0.04 (0.04)	-0.06* (0.03)	-0.02 (0.02)
Age 55 – 64	-0.01 (0.04)	-0.03 (0.04)	-0.01 (0.04)	-0.11*** (0.03)	-0.03* (0.02)
Age 65 or older	-0.04 (0.04)	-0.01 (0.04)	-0.05 (0.04)	-0.07*** (0.03)	-0.03* (0.02)
Midwest	0.00 (0.03)	-0.02 (0.03)	-0.02 (0.03)	-0.00 (0.02)	-0.00 (0.02)
South	-0.03 (0.03)	-0.03 (0.03)	-0.04 (0.03)	0.01 (0.02)	-0.02 (0.02)
West	0.01 (0.03)	0.01 (0.03)	-0.05* (0.03)	0.02 (0.02)	0.00 (0.02)
November 2010 survey	-0.00 (0.02)	0.04* (0.02)	-0.01 (0.02)	0.08*** (0.02)	0.02** (0.01)
N	2,001	2,001	2,001	2,001	2,001
R <sup>2</sup>	0.051	0.170	0.041	0.223	0.149

such policies seems to be not only present but prevalent – much more so than for policies that the federal government currently implements in many other arenas. Why, then, has legislative action been so limited with regard to reduction of greenhouse gas emissions? One possibility is that legislators have thus far chosen to ignore the will of their constituents when voting on legislation in this arena. But

another possibility is that legislators have been unaware of the magnitude of the public consensus on these issues. We hope that this essay helps U.S. leaders and the American public to better understand prevailing opinions on emissions reduction, and thereby to enhance the functioning of representative democracy in this country.

#### ENDNOTES

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<sup>1</sup> When asked a different question in 2008, 78 percent of the public said that the federal government should make fuel-efficiency standards for cars stricter than they were at that time.

<sup>2</sup> The data were collected via the Face-to-Face Recruited Internet Survey Platform (FFRISP). Face-to-face recruiting was done with a national area probability sample of American households that had been offered a free laptop (or its equivalent value in cash), high-speed Internet access at home (if the home did not have it already), and regular cash payments in exchange for completing monthly questionnaires for a year. The FFRISP began with one thousand panelists, who were recruited between June and October 2008. The data described here were collected during the sixth wave, initiated in March 2009.

<sup>3</sup> One might wonder whether these findings occurred simply because the survey question offered an argument in favor of cap and trade, not because of the specific nature of that argument. We explored this possibility in an Internet survey conducted with a nonrepresentative sample of research participants in 2008. Among a randomly selected subset of the respondents who were asked about cap and trade with no argument in favor of it, 41 percent voted for the program. Among a random subset of the respondents who were also told that economists had conducted much research showing that such a policy is the least costly way to reduce greenhouse gas emissions, endorsement was not significantly different: 46 percent. Another random subset of the respondents was instead reassured that the government could accurately monitor emissions and enforce the cap; endorsement was again about the same: 45 percent. But when the final random subset of the respondents was told that cap and trade had worked effectively in the past, endorsement rose significantly, to 54 percent. Thus, adding other arguments did not increase public support for cap and trade; only the effectiveness argument did so. These findings also suggest that hesitation with regard to cap and trade was not driven by concerns about whether emissions can be monitored or whether cap and trade is truly the most desirable emissions-reduction method.

<sup>4</sup> Among another one-quarter of respondents who were told about both the past effectiveness of cap and trade and that revenues would be returned to Americans, endorsement was 65

percent – not significantly different from the 62 percent of people who were told only about effectiveness. These results reinforce the conclusion that the “cap and dividend” framing does not enhance support.

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<sup>5</sup> Bruce Turnbull, “The Empirical Distribution Function with Arbitrarily Grouped, Censored and Truncated Data,” *Journal of the Royal Statistical Society: Series B* 38 (1976): 290 – 295.

<sup>6</sup> To calculate this estimate, we first took the lower bound of \$79 in 2005 dollars, inflated it to 2010 dollars (to match the year of the survey) using an annual consumer price index of 3.4 percent – that is,  $\$79 \times 1.034^5 = \$93$  – and then multiplied \$93 by 117 million households, yielding \$10.8 billion for the lower bound. The upper bound of \$20.2 billion is based on the per-household annual cost of \$146.

<sup>7</sup> \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Cell entries are coefficient estimates (with standard errors given in parentheses) from ordinary least square regressions predicting policy support (coded to range from 0, the least support, to 1, the most support) among respondents to the June 2010 and November 2010 Stanford Global Warming national surveys, adjusting with sampling weights. Greenness is an index of global warming beliefs, including beliefs that global warming has been happening, that it has been caused by humans, that it will be bad, that it will be a serious problem for the nation, and that it will be a serious problem for the world. All other predictors were dichotomous variables. Omitted categories were: male, independent, moderate, non-Hispanic, white, age 18 – 24, less than high school graduates, and people in the Northeast.