MILLER CENTER of PUBLIC AFFAIRS
UNIVERSITY of VIRGINIA
Gerald L. Baliles, Director

CLIMATE CHANGE AND AMERICAN PUBLIC OPINION: THE NATIONAL AND STATE PERSPECTIVE

Barry Rabe, University of Michigan
Christopher Borick, Muhlenberg College

Miller Center of Public Affairs, University of Virginia
December 10, 2008

OVERVIEW

As global warming continues to rise in prominence as a threat to the well-being of the United States, the beliefs, attitudes and preferences of Americans regarding this problem become ever more important. In its capacity as the planet's largest emitter of green house gases, the United States will play a primary role in any successful effort to manage climate change. Of course action by America governments at all levels will only come if the American public believes that global warming is indeed real, a significant threat and that the policies to address the problem are worth the costs of implementation. As the incoming Obama Adminstration and the 111th Congress begin to engage the issue of climate change in 2009, the public's preferences regarding action on this matter are sure to play an important role. And as the views of Americans help to guide the efforts to address global warming in Washington D.C., the leaders in state capitals and city halls will be looking towards their citizens' preferences regarding climate policy as they continue to play a prominent role in this matter.

Against this backdrop, the Miller Center at the University of Virginia, in conjunction with Muhlenberg College and the University of Michigan, present the findings of a survey of individuals at both national and state levels. This survey has been designed to measure American attitudes and beliefs regarding global warming. This release is part of the Miller Center's National Conference on Climate Governance in December of 2008. (A full methodological statement is included at the end of the report) Among the most notable aspects of this research effort is the project's inclusion of comparison data from individual states, and questions which delve into aspects of climate opinion that have not been explored deeply in previous research. In particular, the Miller Center's Climate Survey included a substantial battery of questions which examined the causes of individual belief in global warming and the roles of state and local governments in addressing this issue.

The findings from this survey indicate that Americans believe that global warming is real and that it is a serious problem facing the nation. These beliefs are drawn from a combination of personal observations of changes in the physical environment around and images of altered global environments. Americans believe that immediate government action is needed to deal with climate change and that governments at all levels of the federal system have responsibility to deal with the matter. United States citizens

generally embrace regulatory means by which alternative energy sources can be developed and energy efficiency achieved, although a substantial partisan divide challenges consensus on these matters. Americans are more unified in terms of tax increases to reduce consumption, although this unified position is in strong opposition to this policy approach It appears that beliefs and concerns aside, Americans are hesitant to dig into their pockets to address global warming, posing a complex environment for governments in the United States to formulate climate policy.

SECTION ONE: BELIEFS AND CONCERNS

A crucial element of public opinion regarding global warming is the public's belief that global warming is actually occurring. As the issue has evolved over the past two decades there has been significant debate in the public forum regarding the reality of global warming. While the scientific community has become more uniform in its acceptance of anthropogenic induced climate change, debates within the political and media realms have continued on. Nevertheless, over 7 out of 10 Americans in the Miller Center survey during September of 2008 indicated that there is solid evidence that the earth is warming. This finding is generally consistent with recent surveys by the Pew Center which found about 3 out of 4 Americans believe that evidence indicates that global warming is occurring.

TABLE ONE
"Is There Solid Evidence the Earth is Warming?"

	Pew June 2006	Pew Jan. 2007	Miller Center, Sept. 2008
Yes	70%	77%	72%
No	20%	17%	17%
Not Sure	10%	6%	11%

Source: Pew Research Center, UVA Miller Center

Looking more closely at how Americans of various political, economic, social and geographic distinctions view the issue of global warming, we find high levels of agreement regarding the issue. In particular we find small to moderate differences in terms of age, race, educational attainment and gender regarding belief that the planet is getting hotter. The only characteristic of our respondents that seemed to substantially impact their views on global warming was their partisan affiliation. The findings indicate that Virginia Democrats were 30% more likely than their Republican counterparts to indicate that there is solid evidence that the earth is getting warmer, with independent Americans 21% more likely than the nation's Republicans to hold that belief.

TABLE TWO
Belief in Global Warming by Select Demographic Categories

	Yes	No	Not Sure
Overall	72%	17%	11%
Republican	53%	34%	13%

Democrat	83%	5%	11%
Independent	74%	17%	9%
Male	66%	24%	10%
Female	76%	12%	12%
White	68%	20%	12%
Non-Nonwhite	84%	7%	10%
College Educated	76%	16%	9%
Non-College	67%	18%	14%
18-44	75%	15%	11%
45-64	73%	18%	10%
65 and Older	68%	20%	12%

The Miller Center's survey found that belief in the warming of the planet is fairly consistent across various regions of the United States. More specifically, residents from four different states (Virginia, California, Mississippi and Pennsylvania) maintained very similar views on the issue of global warming, with about 7 out of 10 residents in these states indicating a belief that the earth's temperature is rising. Given the fairly significant economic, social and political differences across these states, the consistency of public opinion on global warming's existence is notable.

TABLE THREE
"Is There Solid Evidence the Earth is Warning?"

	Yes	No	Not Sure
National	72%	17%	11%
Pennsylvania	69%	16%	15%
Virginia	75%	13%	12%
Mississippi	69%	16%	14%
California	74%	12%	13%

Among those citizens who felt that strong evidence of warming did exist, a clear majority (58 percent) felt "very confident" of this fact and most of the remaining respondents were "fairly confident."

TABLE FOUR
"Are you very confident, fairly confident, not too confident or not confident at all that the average temperature on earth is increasing?"

Very Confident	58%
Fairly Confident	38%
Not Too Confident	4%
Not Confident at All	1%
Not Sure	1%

Respondents who concluded that global temperatures had been rising were also asked about the source of the increases, namely human activity such as the burning of fossil fuels as opposed to natural fluctuations in the Earth's climate. The largest subset of respondents (36 percent) attributed temperature rise to human activity, whereas 18 percent pointed to natural patterns and one third thought a combination of human and natural factors were responsible.

TABLE FIVE

" Is the earth getting warmer because of human activity such as burning fossil fuels or mostly because of natural patterns in the earth's environment?"

Human Activity	36%
Natural Patterns	18%
A Combination	41%
Not Sure	5%

Problem Severity

In addition to a widely held belief that the planet is getting warmer and that human activity is driving this change, we also found that most residents of the United States see global warming as a serious problem. Over nine out of 10 respondents who believe in global warming identified the issue as either a very serious (60 percent) or somewhat serious (32 percent) problem, with only two percent indicating that it is "not a problem." This level of respondents is higher than in some national and state surveys. (Table with other relevant surveys and discussant of demographic differences)

TABLE SIX

" In your view is global warming a very serious problem, somewhat serious, not too serious, or not a problem?"

Very Serious	60%
Somewhat Serious	32%
Not Too Serious	5%
Not a Problem	2%
Not Sure	<1%

The results across the four states included in the survey indicate significant differences in terms of the threat posed by global warming. While a majority of those believing in global warming in each state believe that this matter is a "very serious" problem, Californians were substantially more likely than residents of the other states to see climate change in this serious light.

TABLE SEVEN

" In your view is global warming a very serious problem, somewhat serious, not too serious, or not a problem?"

	Very Serious	Somewhat Serious	Not Too Serious	Not a Problem	Not Sure
National	60%	32%	5%	2%	<1%
Pennsylvania	52%	38%	6%	2%	2%
Virginia	61%	28%	6%	4%	1%
Mississippi	56%	32%	6%	3%	2%
California	73%	20%	4%	2%	2%

Not only do strong majorities of Americans view climate change as a problem but they also believe that immediate governmental action is necessary. We found that seven out of ten respondents who believe the earth is warming also believe that immediate action was needed. In contrast, only twenty percent felt that immediate governmental action was not necessary, while ten percent were not certain about this issue. Once again the survey results indicate a significant partisan affect regarding the need for government action to address global warming, with a substantial Democrat/Republican divide. This partisan gap is particularly notable because it occurs among individuals who share a belief that global warming is real. Thus, political beliefs shape both the underlying belief in the problem and demand for government intervention to solve climate problems.

TABLE EIGHT

"Do you or do you not think global warming requires immediate government action"

	Yes	**No**	**Not Sure**
Overall	**70%**	**20%**	**10%**
Republican	**49%**	**44%**	**7%**
Democrat	**83%**	**12%**	**6%**
Independent	**67%**	**20%**	**13%**

SECTION TWO: THE REASONS FOR BELIEF

As the previous section has demonstrated, most Americans believe that the Earth is warming and that human activities have contributed to these changes. What is not clearly known are the reasons why individuals throughout the United States believe that the Earth is warming. Other national studies have not explored this facet of public opinion in great detail. Thus this project attempts to measure the impact that a number of factors may have played in influencing Americans' views of the existence of global warming.

First, we asked Americans to identify the primary factor that caused them to believe that the earth is warming. This question was asked in an open ended format to allow respondents the opportunity to

provide unprompted answers. The results show that Americans identify three factors as most responsible for their belief in global warming. About 1 in 5 individuals who believe that the planet is warming indicated that melting glaciers and polar ice has had the largest role in establishing their view on the matter. Another 1 in 5 identified their personal observations of warmer temperatures in their local communities as the largest contributing factor to their belief in global warming, with just under a fifth of Americans citing changing weather patterns and more intense storms as the key reasons they believe in global warming. A full breakdown of the factors identified is listed in Table Nine below.

TABLE NINE
"What is the primary factor that has caused you to believe that temperatures on earth are increasing?"

Factor	Percent Responding
Melting Glaciers and Polar Ice	19%
Warmer Local Temperatures/ Personal Observation	19%
Changing Weather Patterns/ Stronger Storms	18%
Media Coverage/ Literature on Issue	15%
Scientific Research	9%
Al Gore Documentary	2%
Pollution/ Human Activity	4%
Declining Species	<1%
Natural Patterns	<1%
Not Sure/No Specific Reason	12%
Other	<1%

When individuals were asked to indicate the impact of various factors on their belief in global warming a trend similar to the results from the open ended question is observed. Declining glaciers and polar ice along with warmer local temperatures were among the issues most identified as strongly affecting individual beliefs in global warming. Individuals also noted weather events and patterns such as severe droughts and hurricanes as having a strong impact on their acceptance of global warming.

The survey results at the state level indicated a number of significant differences in terms of the factors that lead individuals to believe in climate change. For example, residents of Mississippi were significantly more likely than the national average to report that the strength of hurricanes hitting the United States had a strong effect on their belief in global warming. This finding may be expected given the recent history of large hurricanes hitting the Gulf Coast. Similarly, in states such as California and Mississippi which have been hit with severe droughts in recent years, residents are much more likely than the national average to cite this factor as a strong reason for their belief in a warming planet. Conversely, Mississippi residents were less likely than the national average to note that computer models strongly affected their belief in global warming, while Californians were more likely than other Americans to claim that Al Gore's documentary "An Inconvenient Truth" had a major impact on their views about the reality of global warming.

TABLE TEN
Factors Strongly Affecting Individual Belief in Global Warming
By States

	National	PA	VA	MS	CA
Declining Glaciers and Polar Ice	63%	58%	63%	48%	68%
Warmer Temperatures in Your Area	42%	37%	39%	56%	44%
Computer Models that Indicate Warming	30%	31%	30%	23%	32%
The Strength of Hurricanes	47%	50%	46%	64%	51%
Al Gore's Documentary	21%	22%	20%	17%	30%
Milder Winters in Your Area	36%	45%	40%	54%	29%
Declining Numbers of Polar Bears	40%	42%	35%	34%	44%
Severe Droughts in Areas of the U.S.	47%	49%	45%	55%	58%

Although a majority of Americans now believe in global warming, about 1 out of 5 individuals in the United States does not believe that the planet is warming. In the Miller Center survey respondents who indicated that they do not belief the earth is warming were asked for the primary reason that underlies this position. The results show that 4 out of 10 Americans cited their personal observations of stable temperatures as the key reason for not believing that the planet is warming. As with those who believe in global warming, personal experience appears to be an important driver of disbelief regarding this phenomenon. Additionally, 19% of individuals who do not believe in global warming cited a belief that any warming reflects natural fluctuations and not a long term trend.

TABLE ELEVEN
"What is the primary factor that makes you believe
that temperatures on earth are not increasing?"

Factor	Percent Responding
Personal Observations	42%
Natural Patterns Explain Change	19%
Not Enough Scientific Evidence	11%
Evidence that Disproves Global Warming	8%
No Particular Reason	5%
Media has Misled	3%
Other Reason	12%

The 2008 Miller Center survey further examined the factors that shaped public attitudes toward climate change through a series of statements with which respondents could agree or disagree. These statements were drawn from media accounts that portrayed different controversies that have arisen in American and international deliberations over climate change. Each of these presented a declarative statement about some aspect of global warming and was introduced to further discern public sentiment, with findings presented in Table Twelve. The findings suggest disagreement was greatest with the statement, "the Earth's atmosphere is too large for man's activity to change the climate" (69%). There was also majority disagreement with statements including "scientists are overstating evidence about global warming for

their own interests" (58%), and "there is not enough scientific evidence to support claims that the Earth is getting warmer" (58 %). In contrast, respondents were more evenly divided in reaction to the statement that "the media is overstating the evidence about global warming," reflected in the fact that thirty one percent strongly disagreed with the statement, whereas twenty four percent strongly agreed with the stated position.

TABLE TWELVE

"For each statement please indicate if you strongly agree, somewhat agree, somewhat disagree or strongly disagree."

	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree	Not Sure
There is not enough scientific evidence to support claims that the Earth is getting warmer.	20%	18%	19%	39%	4%
Scientists are overstating evidence about global warming for their own interests.	19%	19%	20%	38%	5%
The Earth's atmosphere is too large for man's activity to change the climate.	10%	13%	22%	47%	8%
Any recent warming on Earth is the result of natural trends and not the activities of man.	21%	19%	22%	31%	8%
The media is overstating the evidence about global warming.	24%	22%	20%	31%	4%

While a majority of Americans disagreed with all of the statements presented in Table Twelve, there is a very significant difference between those who believe in global warming and those who don't. More specifically, among residents of the United States who do not believe that the Earth is warming there are high levels of "strong agreement" with the various statements presented to them, as seen in Table Twelve. Conversely, very few Americans who believe in global warming offered strong agreement with any of the statements regarding climate issues

TABLE THIRTEEN

Strong Agreement with the Statements by Individual Belief in Global Warming

	Believe in Global Warming	Do Not Believe in Global Warming
There is not enough evidence to support claims that the earth is getting warmer.	11%	61%
Scientists are overstating evidence about global warming for their own interest.	12%	47%
The Earth's atmosphere is too large for man's activity to change the climate.	4%	33%
Any recent warming on Earth is the result of natural trends and not the activity of man.	11%	58%
The media is overstating the evidence about global warming.	13%	64%

SECTION FOUR: PUBLIC VIEWS ON GOVERNMENT ACTION

With the American public's growing acceptance of the reality of global warming and its threats to the nation, greater attention has been given to the role of government in addressing the problem. As demonstrated earlier in this paper, almost 3 out of 4 Americans now believe in global warming. Among these individuals there is strong support for immediate government action to address increasing global temperatures. The survey indicates that 70% of Americans who believe in global warming feel that the problem requires an immediate government response. Although there is generally high support for government action across key demographic groups such as gender, race, age, and educational attainment, there are significant differences in support for government intervention across party affiliations. As can be seen in Table Fourteen, there is a 34% gap between Democrats and Republicans in terms of their preference for immediate government action to address global warming, with the position of independents almost perfectly situated between individuals associated with the two major parties. Once again it is important to emphasize that these strong partisan differences are found among individuals who acknowledge the existence of global warming. When combined with the results in Table Two that demonstrate a strong partisan divide in terms of belief in climate change, the prominent role of partisanship in this policy area is clearly observable.

TABLE FOURTEEN

" Do you or do you not think global warming requires immediate government action?"

	Yes	No	Not Sure
Overall	**70%**	**20%**	**10%**
Republican	49%	44%	7%
Democrat	83%	12%	6%
Independent	67%	20%	13%
Male	68%	24%	8%
Female	71%	18%	12%
White	67%	24%	9%
Not White	75%	13%	12%
College Educated	70%	22%	8%
Non-College	70%	18%	12%
18-44	75%	18%	8%
45-64	70%	20%	10%
65 and Older	64%	24%	12%

The survey findings provided some additional insight into the American public's perceptions of the relative responsibility of governments within the federal system of government in the United States. In this survey Americans were asked to identify the level of responsibility that the federal, state and local governments have in dealing with global warming. The results show that the public places the largest responsibility for dealing with climate change in the hands of the federal government, but also place substantial responsibility at both the state and local levels of government. Only 17% of Americans indicated that state governments had no responsibility for dealing with global warming, while just 22% stated that local governments.

TABLE FIFTEEN
Public Perceptions of the
Roles of Government in Addressing Global Warming

	A Great Deal of Responsibility	Some Responsibility	No Responsibility	Not Sure
Federal Government	48%	33%	15%	5%
State Government	34%	46%	17%	4%
Local Government	26%	47%	22%	5%

During the past eight years state governments have taken the lead in many areas of climate and energy policy. From the development of renewable energy requirements to the adoption of energy efficiency, state governments have directly engaged the underlying causes of climate change. However, there has been substantial debate surrounding these efforts. These debates have often centered on the economic impact of unilateral state efforts to reduce greenhouse emissions, and the relationship between states and the federal government in this policy area. Critics of state efforts to reduce greenhouse gases have regularly contended that states put themselves at competitive disadvantages by placing strict standards on emissions. Conversely, proponents of state efforts to increase energy efficiency and alternative energy production have made the case that state governments can enhance their economies through policies that support reduction of greenhouse gas emissions.

The Miller Center surveys asked individuals for their level of agreement with a series of statements regarding the impact of state level initiatives to address global warming. The results indicate that most Americans want their states to act on addressing global warming even if these actions come without similar efforts on the part of neighboring states or the federal government. Over 6 out of 10 Americans believe their state should adopt anti-global warming policies even when neighboring states fail to take such actions. Meanwhile, 7 out of 10 adults in the United States feel their state is responsible for dealing with climate change even if the federal government abdicates its role in this matter.

TABLE SIXTEEN
Public Perception of State Level Efforts to Address Climate Change

	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree	Not Sure
My state should not adopt anti-global warming policies unless its neighboring states also adopt similar policies	19%	15%	22%	40%	5%
If the federal government fails to address the issue of global warming it is my state's	41%	29%	9%	17%	5%

responsibility to address the problem.					
State governments will boost their economies by requiring greater use of renewable energy.	47%	30%	6%	8%	9%
My state's economy will be damaged if it requires greater use of renewable energy while neighboring states don't have such requirements.	13%	24%	20%	31%	13%

Americans also overwhelmingly (87%) believe that state governments will boost their economies by requiring greater use of renewable energy. However, they are more divided on the impact of such efforts when they are done without similar efforts in adjacent states. While a slight majority (51%) of Americans disagrees that their state's economy would be damaged by requiring greater use of renewables when neighboring states did not adopt such requirements, 37% believe the economy of their home state would be hurt by unilateral adoption of renewable energy requirements. The state level surveys indicate significant differences across states when it comes to perceptions of the economic impact of renewable energy requirements.

As can be seen in Table Seventeen, a plurality of Mississippians agreed that their state's adoption of renewable energy requirements would damage the Mississippi economy if neighboring states did not take similar actions. Conversely, most Californians do not believe that such actions would harm their state's economic well-being.

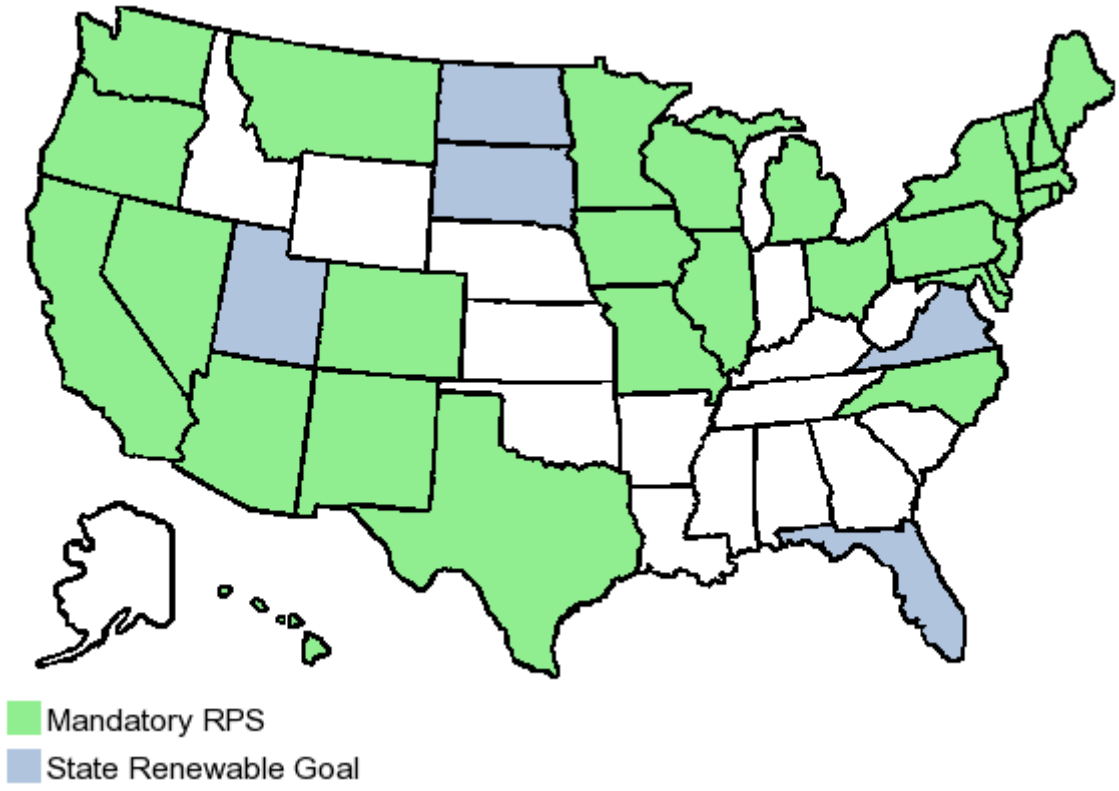
TABLE SEVENTEEN

Level of Agreement with the statement, "My state's economy will be damaged if it requires greater use of renewable energy while neighboring states don't have such requirements"

	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree	Not Sure
National	13%	24%	20%	31%	13%
Pennsylvania	20%	24%	21%	24%	11%
Virginia	14%	23%	25%	24%	13%
Mississippi	22%	27%	19%	18%	15%
California	16%	14%	18%	34%	17%

The contrast between public opinion in these two states is particularly interesting given the dramatically different policies that have been adopted in California and Mississippi. During the last quarter century California has established itself as a national leader in terms of the establishment of regulations to promote alternative energy use, while Mississippi is one of only 15 states that currently has no mandatory renewable energy requirement or no state goal for the use of renewables (Pew Center, 2008). In addition, Mississippi is the only state in the nation in which no neighboring state has either a mandatory or voluntary renewable energy standard (See Figure 1). Thus it may not be surprising that its residents are significantly more likely than the rest of the nation to believe that action on the part of their state without similar action in Louisiana, Alabama, Tennessee and Arkansas, may place Mississippi at a competitive disadvantage.

FIGURE 1
State Adoption of Renewable Portfolio Standards
and Renewable Energy Goals



Source: Pew Center on Global Climate Change

SECTION FIVE: RESPONSE TO POLICY ALTERNATIVES

While a majority of Americans are in agreement that global warming is occurring, is a serious problem, and warrants responses from multiple levels of government, there is less agreement among them on some of the prominent policy alternatives that are being proposed to address global warming. The numerous societal sources of carbon dioxide, methane and other greenhouse gases open innumerable options for policy designed to reduce emissions. They run the gamut from market-based approaches to command-and-control regulation, as well as many possibilities for promoting technological innovation through subsidies and incentives. In turn, these policies cut across virtually every sector of economic activity, including the generation of electricity, transportation, manufacturing, and agriculture, among many others. This section reviews the divergent responses to some prominent policy alternatives, a number of which have been enacted in multiple states, and will likely be under consideration in the One Hundred and Eleventh Congress.

We asked respondents to consider twelve possible policy options, making specific reference to the question of whether they supported state government adoption. We found that five were either strongly or somewhat supported by more than 70 percent of respondents, ten received such support from more than

50 percent of respondents, and two were opposed by a strong majority of respondents. Table Sixteen ranks these policy options according to the highest level of respondents who indicated strong support for state adoption of them.

TABLE EIGHTEEN
Policy Options by Level of Strong Support among Americans

Policy Option	Percent Strongly Supporting
1. Creation of Renewable Portfolio Standard	59%
2. Increase Fuel Efficiency Standards for Automobiles	52%
3. Increased Support for Clean Coal Technology	51%
4. Energy Efficiency Requirements for Residential and Commercial Buildings	50%
5. Tax Reductions for Hybrid Vehicle Purchase	45%
6. Require Vehicles to Reduce Green House Gas Emissions	35%
7. Increased Use of Nuclear Power	34%
8. Increased Support for Ethanol Development	32%
9. Establishment of Cap and Trade	25%
10. Increased Fossil Fuel Taxes	18%
11. Increased Gasoline Taxes	10%

Renewable Energy Mandates

As can be seen in Table Eighteen, just under 6 out of 10 United States residents offered strong support for state government regulations that require a set portion of electricity to come from renewable energy sources, with over 8 out of 10 Americans offering at least some degree of support for this option. While generally popular, partisanship appears to have a significant impact on individual preferences regarding renewable energy standards. The Miller Center results once again indicates a strong partisanship affect in a matter related to climate change. Republicans are significantly more likely than Democrats or independents to offer strong opposition to state laws which require set portions of electricity to come from alternative energy sources such as wind, solar or hydroelectric power.

TABLE NINETEEN
Public Support for State Renewable Energy Requirements

	Strongly Support	Somewhat Support	Somewhat Oppose	Strongly Oppose	Not Sure
National	59%	23%	6%	8%	4%
Republican	52%	22%	5%	20%	2%
Democrat	68%	20%	5%	3%	4%
Independent	58%	24%	8%	6%	4%

At the state level support for renewable energy standards is quite strong, although there are some moderate differences in terms of intensity of support for this policy option. While just under 2 out of 3 Californians strongly support state requirements for the use of alternative energy sources for the

production of electricity, less than half (49%) of Mississippi residents maintain similar positions on this matter. Strong support for renewable standards is similar in Pennsylvania and Virginia, with 53% and 55% of residents in those states highly supportive of these policy tools. These moderately varied levels of support are positively correlated with state efforts to increase alternative energy use.

TABLE TWENTY
Public Support for State Renewable Energy Requirements in Relation to State Renewable Energy Requirements

	Existing Renewable Energy Requirements	Strong Support For Renewable Energy requirements
California	Aggressive Statewide Requirement for Renewable Energy Use	64%
Pennsylvania	Moderate Statewide Requirement for Renewable Energy Use	53%
Virginia	Voluntary Statewide Standard for Renewable Energy Use	55%
Mississippi	No Statewide Requirement for Renewable Energy Use	49%

Alternative Methods to Reduce Carbon Emissions in Electricity

Alongside mandating increased use of renewables, other states have experimented with other ways to reduce carbon emissions in their generation of electricity. These may range from policies that promote a particular electricity-generating technology, whether or not it is currently in operation, to efforts to reduce overall demand for electricity through heightened energy efficiency. Survey respondents viewed three specific options of this type favorably.

In particular, they endorsed the idea of state government support for clean coal technology at nearly the same level as their support for renewable portfolio standards. Such technology does not yet exist, although a number of states have begun research and development initiatives in this area. While controversy has raged in the policy debates regarding clean coal there seems to be far less divisiveness towards this proposal within the broader American public. The surveys found that nearly 8 out of 10 Americans support increased state government support for clean coal technology. While the highest levels of support for clean coal were found in coal-rich Pennsylvania, about half of the residents of states such as Virginia, Mississippi and California indicate strong support for this policy option. The public support for clean coal technology does not seem to be affected by the partisan division that has been found for most policies aimed at fighting climate change. As can be seen in Table Twenty One, the levels of support for clean coal are almost identical among Democrats, Republicans and independents. This strong support for clean coal technology may be behind the recent efforts of environmental groups to change public opinion on this matter through an aggressive national advertising campaign in late 2008.

TABLE TWENTY ONE
Public Support for Increased Government Support of Clean Coal Technology

	Strongly Support	Somewhat Support	Somewhat Oppose	Strongly Oppose	Not Sure
National	**51%**	**28%**	**5%**	**7%**	**9%**
Pennsylvania	58%	26%	5%	5%	6%
Virginia	51%	31%	6%	5%	8%
Mississippi	46%	32%	7%	5%	9%
California	51%	26%	4%	7%	12%
Republican	48%	28%	5%	9%	10%
Democrat	53%	26%	4%	7%	10%
Independent	50%	32%	4%	8%	7%

While not as popular as clean coal, the survey found strong support for state efforts to increase nuclear power as a means of reducing greenhouse gas emissions. Almost 6 in 10 Americans want states to support increased use of nuclear power in order to reduce the emissions of gases that cause global warming, with about 1 in 3 strongly supporting such efforts. This support for nuclear power as part of the fight against climate change is also strong across the states, with nearly identical levels of support in states as diverse as California and Mississippi. The major demographic divides in support for nuclear power as a means of addressing global warming are found across gender and age divides. Support for nuclear power is highest among men and senior citizens, with women significantly more unsure than men regarding efforts to increase nuclear power use.

TABLE TWENTY TWO
Public Support for Increased Use of Nuclear Power to Reduce Greenhouse Gas Emissions

	Strongly Support	Somewhat Support	Somewhat Oppose	Strongly Oppose	Not Sure
National	**34%**	**25%**	**12%**	**17%**	**12%**
Pennsylvania	38%	21%	14%	14%	13%
Virginia	30%	29%	15%	14%	12%
Mississippi	31%	29%	13%	12%	16%
California	36%	24%	8%	17%	16%
Male	46%	25%	8%	17%	5%
Female	25%	25%	15%	17%	18%
18-44	31%	24%	15%	18%	12%
45-64	31%	29%	12%	17%	12%
65 and Older	47%	20%	7%	15%	12%

Transportation

As one of the major sources of greenhouse gases, transportation will play an important role in any effort to address global warming. The survey results indicate strong support for state government policies that "require auto makers to increase the fuel efficiency of their vehicles even if it increases the cost of the vehicle." This policy option received nearly as high a level of support as renewable portfolio standards, with forty nine percent expressing strong support, twenty eight percent expressing some support, and only twenty percent expressing some degree of opposition. In turn, we found very similar levels of support for state governments to give tax reductions to individuals who purchase hybrid fuel vehicles.

TABLE TWENTY THREE
Levels of Various Automobile Related Policies

	Increased Fuel Efficiency	Tax incentives for Hybrid Vehicle Purchase
Strongly Support	52%	45%
Somewhat Support	25%	26%
Somewhat Oppose	8%	10%
Strongly Oppose	11%	14%
Not Sure	4%	5%

One of the more controversial options in the public debate over energy policy in the United States is ethanol. While originally receiving significant levels of positive public attention, ethanol has become a much more divisive issue in recent years. When asked if state governments should increase support for the development of ethanol, over half of Americans (58%) indicated that they support such efforts. However, about one third of Americans stated opposition to increased state level support for ethanol development, with one out of five strongly opposed to this policy approach. Support levels for ethanol development are moderately affected by the educational attainment of Americans with college educated individuals more likely to oppose government support for ethanol than their counterparts without college degrees.

TABLE TWENTY FOUR
Public Support for Increased Government Support of Ethanol

	Strongly Support	Somewhat Support	Somewhat Oppose	Strongly Oppose	Not Sure
Overall	32%	26%	12%	20%	11%
College Educated	28%	24%	13%	24%	11%
Non-College	35%	27%	11%	16%	11%

Finally, Americans clearly rejected one policy tool that many economists and policy analysts have endorsed as the most efficient way to reduce greenhouse gas emissions, namely the increased taxation of gasoline and other fossil fuels. Both the federal and state government already tax these fuels, but usually at low levels. Analysts contend that taxation would increase demand through heightened price, producing revenue that could be reimbursed or applied to renewable energy or energy efficiency programs.

A striking element of public opposition to reducing gasoline consumption through tax mechanisms was the consistency of negative opinion across important demographic cleavages. As can be seen in Table Twenty Five, a majority of Americans in each political, gender, race, educational attainment and age category strongly opposed using higher gas taxes to fight climate change. Such overwhelming disfavor helps explain the near total lack of consideration that policy makers and candidates (including President Elect Barack Obama) give to this option, despite the recommendations of policy analyst and economists

Cap-and-Trade

It appears increasingly likely that the 111th Congress will devote particular attention to the option of attempting to reduce greenhouse gas emissions through a market-based system known as cap-and-trade. This involves creation of a market whereby emission permits are allocated and can be traded among targeted sources. In theory, this leads to a more cost-effective approach than mandated the same standard or technology for every sources and has been the animating principal behind efforts to develop such systems in the Northeast, Pacific West, and Midwest.

If the general public can readily understand the relative complexity of a cap and trade mechanism. The study did ask Americans whether or not "state governments should allow businesses to buy and sell permits to release greenhouse gases if it results in an overall decrease in emissions." By about a 2 to 1 margin, Americans are more supportive of this proposal than opposed to it, but as Table Thirty Four suggests, about 1 in 5 respondents was uncertain about this option.

TABLE TWENTY FIVE
Levels of Support for a Cap-and-Trade Program to Reduce Emissions

Strongly Support	25%
Somewhat Support	30%
Somewhat Oppose	9%
Strongly Oppose	18%
Not Sure	18%

Although the cap-and-trade option remains unclear to a substantial number of Americans, it seems that this issue does not suffer from a partisan divide in the way other options do. While policy options that include mandates and requirements are viewed quite differently by Democrats and Republicans, the level of strong support for cap-and trade is similar among Republicans and Democrats. Only among the very popular clean coal technology option and the despised gasoline tax is the partisan divide as narrow as it is for cap-and-trade. As the concept becomes more common among Americans during the upcoming policy debates it will be interesting to see if this relative lack of partisanship prevails.

TABLE TWENTY SIX
Strong Support for Policy Options to Address
Global Warming by Partisan Affiliation

	Democrats	Republicans	Difference
Clean Coal Technology	53%	48%	5%
Increase Fuel Efficiency for Automobiles	60%	49%	11%
Hybrid Fuel Vehicles Tax Reductions	49%	38%	11%
Fossil Fuel Tax Increase	23%	12%	11%
Increased Support for Nuclear Power	29%	45%	16%
Establish Cap and Trade	27%	22%	5%
Renewable Portfolio Standards	68%	52%	16%
Restrict Suburban Development	28%	17%	11%
Energy Efficiency Requirements	63%	405	24%
Increase Gasoline Taxes	10%	9%	1%
Require Vehicles to Reduce Green House Gas	42%	27%	15%
Increased Support for Ethanol Development	37%	26%	11%

CONCLUSION

The results of the Miller Center Survey provide the basis for some fairly clear conclusions regarding Americans and climate change. By and large Americans believe that global warming is real and that it is a serious problem facing the nation. These beliefs are drawn from a combination of personal observations of changes in the physical environment around them and images of altered global environments (e.g. melting polar ice). Most Americans believe that immediate government action is needed to deal with climate change and that governments at all levels of the federal system have responsibility to deal with the matter. United States citizens generally embrace regulatory means by which alternative energy sources can be developed and energy efficiency achieved, although a substantial partisan divide challenges consensus on these matters. Americans are more unified in terms of tax increases to reduce consumption, although this unified position is in strong opposition to this alternative. It appears that belief and concern aside, Americans are hesitant to dig into their pockets to address global warming in a meaningful way.

With this study of opinion on global warming occurring just before the Wall Street freefall and severe economic downturn in the fall of 2008, the minimal level of willingness to pay for climate mitigation may have actually decreased to levels lower than previously thought. It is against this backdrop that the Obama Administration, the next Congress, state governments and municipalities will attempt to move the nation forward in tackling this elusive policy problem. While any imposition of direct costs on the American public will likely be met with strong opposition by the public, there appear to be a number of areas in which the public will likely offer significant support. The Miller Center surveys indicate that state efforts to develop alternative energy sources are seen as a means to boost state economies. If states and the federal government can package alternative energy programs as engines for economic development and the revenue generation for such efforts is not seen as either punitive or excessive, significant progress on climate policy may be achieved. The early signs that the Obama administration may make green

technology a cornerstone of its “New New Deal” may be well suited to a public that wants action on energy and climate change but does not want to pay a large price tag.

METHODOLOGY FOR THE MILLER CENTER SURVEYS: The findings from the Miller Center surveys were drawn from a telephone survey of Americans during September, 2008. The survey results are based on a random sample of adults age 18 and older who reside in the United States. Interviewing and sampling was conducted by the Muhlenberg College Institute of Public Opinion. In addition to a national sample of 603 Americans, samples of at least 300 residents were conducted in 4 states: California, Pennsylvania, Virginia and Mississippi. The final number of completed surveys in the national sample was 603 with a resulting margin of error of +/- 4% at the 95% confidence interval. The margin of error for the state samples was +/- 6% at the 95% confidence interval. However the margin of errors for sub groups (i.e. women, Republicans, senior citizens) is larger due to smaller sample sizes. Percentages throughout the survey have been rounded upward at the .5 mark, thus many totals in the results will not equal 100%. The survey questionnaire was designed by Dr. Barry Rabe of the Ford School of Public Policy at the University of Michigan and Dr. Christopher Borick of the Muhlenberg College Institute of Public Opinion, in some instances linked directly with prior national survey questions to allow for comparison across various audiences.