

## **REPORT OF THE VIRGINIA CLIMATE SURVEY**

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### **OVERVIEW**

State governments have taken an unexpectedly central role in the formation and implementation of policies to reduce greenhouse gas emissions in response to growing concerns over climate change. More than a decade after the signing of the Kyoto Protocol, the future of international treaties and regimes remains highly uncertain. At the federal level, the 110<sup>th</sup> Congress has given unprecedented attention to this issue, holding nearly 150 hearings on the topic. Nonetheless, no major federal initiatives to reduce carbon dioxide and related emissions have emerged from either the legislative or executive branches, likely deferring any future steps to the 44<sup>th</sup> President and the 111<sup>th</sup> Congress. Even the major 2007 U.S. Supreme Court decision on climate change remains a point of intense dispute between the other federal branches of government.

In the absence of international collaboration or federal policy, a growing number of state governments have used powers available to them under their respective constitutions to develop policies designed to reduce their own releases. These policies have frequently been linked to other state goals, such as diversification of their energy supply or reduction in the release of other environmental contaminants. At present, 27 states mandate increases in their level of electricity that comes from renewable sources through so-called portfolio standards. Twenty-one are formally involved in the development of carbon cap-and-trade programs, including a ten-state partnership of Northeastern states that launched the first auction of carbon allowances in September 2008. Fourteen states have joined California's effort to attempt to impose regulatory provisions on carbon emissions from future vehicle fleets. Indeed, one can find examples of virtually every conceivable policy that has been proposed around the world to reduce greenhouse gas emissions in operation in one or more states, with a pattern toward policy proliferation and regionalization that shows no signs of slowing.

Policy analysts contend that a variety of factors have converged to stimulate state policy development. This includes concerns over possible threats that climate change may pose to particular states, ranging from coastal damage to shifts in agricultural productivity. At the same time, states have pursued a number of these initiatives for other reasons, such as diversification of their energy supply or to begin to develop national (and, in some cases, international) expertise in anticipation of future federal and international policy. In taking various actions, states have tended to note that they cannot unilaterally address this issue through emissions reductions but recognize that they often have emission levels greater than those of other nations. Texas, for example, releases more greenhouse gases per year than the United Kingdom.

Thus far, state policy development has been robust in every region of the nation except the Southeast. There has been some indication that this may be changing, reflected in North Carolina's and Florida's adoption of a mandatory renewable portfolio standard in 2007 and Florida's active exploration of a carbon cap-and-trade mechanism and climate adaptation strategies. Most states in the region, however, have proven far less involved in this arena than their counterparts in the Pacific West, the Southwest, the Northeast, and the Midwest.

### **The Case of Virginia**

Virginia has been no exception to this pattern, although there have been indicators in recent years that it may be moving toward a more active posture on greenhouse gas reduction policies. The Commonwealth has experienced considerable growth in its emissions between 1990 and 2005, an increase of 38 percent that is more than double the national average of 16 percent during this period. Its overall level of emissions in 2005 ranked it 15<sup>th</sup> among the American states and its rate of emissions growth from 1990-2005 placed it eighth, according to 2008 data from the U.S. Environmental Protection Agency. At its current levels, Virginia emissions exceed those of nations such as Egypt, Greece, and Pakistan.

Virginia began to give indication that it was moving toward the more active cluster of states in 2007. In April of that year, Governor Timothy M. Kaine signed into law a voluntary renewable portfolio standard, which established a non-binding goal that the Commonwealth will derive 12 percent of its total electricity from renewable sources by 2022. In September, the Virginia Energy Plan was released, establishing a non-binding goal to reduce greenhouse gas emissions to 2000 levels by 2025, which would constitute a reduction of 30 percent from anticipated levels. Three months later, Governor Kaine issued Executive Order 59, which established a Virginia Governor's Commission on Climate Change, which is scheduled to provide a series of recommendations by the end of 2008 on how to attain the reduction goal. In turn, Governor Kaine has used his role as the incoming chair of the Southern Governors' Association to propose development of a regional strategy on climate change and energy. "There is no doubt that the science shows that climate change is happening," said Gov. Kaine in August 2008, when he proposed a regional approach.

### **The Virginia Survey**

Collectively, these relatively recent steps appear to follow the pattern of many other states around the nation, where early commission reports and non-binding goals were subsequently translated into state policy. It is impossible to know whether or not Virginia will follow this pattern. But a fundamentally important question in any public policy venue involves the views of the citizenry. Do citizens of the Commonwealth believe that global temperatures are warming and that climate change is occurring? Do they support or oppose Virginia engagement in this area of policy, including possible emulation of policies being enacted in other states? How do Virginia public attitudes on these matters compare with national averages?

Thus far, we know relatively little about public opinion on climate change, both in Virginia and in many other states. Most survey research has focused on broad national trends and has not tended to consider different state perspectives or explore receptivity to various policy options. The most reliable body of survey research on a single state emanates from California, which arguably has the most ambitious set of climate policies in the nation. However, California may not be representative

of national or other regional views. Consequently, we designed this study as an initial effort to tap the pulse of the Virginia citizenry on these increasingly salient public policy issues.

This report summarizes data collected in a telephone survey of Virginia residents between September 8 and 24, 2008. The final number of completed surveys was 660 with a resulting margin of error of +-4 percent at the 95 percent confidence level. Percentages throughout the survey have been rounded upward at the .5 mark, thus many totals in the results will not equal 100 percent. We are very grateful to WestWind Foundation, the Emily Hall Tremaine Foundation, the Muhlenberg College Institute of Public Opinion, the Center for Local, State, and Urban Policy at the University of Michigan, and an anonymous donor for essential financial support of this project. Our survey instrument was based in part on prior surveys, including some national surveys and a pilot survey we conducted in Michigan and Pennsylvania in 2007. This allows for some comparison against national trends and findings from other states that have been more actively involved in climate policy development, as noted in the report.

At the same time we were interviewing Virginia residents, we were also conducting a national survey that asked identical sets of questions. This involves nearly 2,000 interviews, with particularly large concentrations in California, Mississippi, and Pennsylvania. These states were selected to maximize diversity according to their degree of climate policy development to date and carbon dioxide emissions trends between 1990 and 2005. We do not attempt to undertake comparative analysis between Virginia and these states in this analysis but will present all of our survey findings at the National Conference on Climate Governance that will be hosted at the Miller Center on December 11-12, 2008.

## **SECTION ONE: PERCEPTIONS OF THE ISSUE**

In recent years, a number of national surveys have indicated that significant percentages of the American citizenry perceive average temperatures as increasing. Solid majorities of surveyed Americans have attributed this phenomenon at least in part to human activity and view it as a serious problem. Our 2008 Virginia findings generally follow the pattern that has emerged nationally, with some exceptions noted below.

### **Increasing Global Temperatures**

One important measure of public attitudes toward climate change is whether or not citizens believe average global temperatures have been increasing in recent decades. National surveys have shown a consistent increase in the past decade in the percentage of Americans who support this position. In our Virginia survey, three of four respondents expressed their view that there is “solid evidence” that average temperatures on Earth have been increasing over the past four decades, as noted in Table One. In contrast, 13 percent said that such solid evidence was lacking whereas 12 percent were not sure.

**TABLE ONE**

**“From what you’ve read and heard, is there solid evidence that the average temperature on Earth has been getting warmer over the past four decades?”**

	<b>Virginia</b>	<b>United States*</b>
<b>Yes</b>	<b>75%</b>	<b>71%</b>
<b>No</b>	<b>13%</b>	<b>21%</b>
<b>Not Sure</b>	<b>12%</b>	<b>8%</b>

\*Results from 2008 Pew Research Center Poll

Looking more closely at how Virginians 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 very small differences in terms of age, race, educational attainment and gender in terms of 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, as evident in Table Two. The findings indicate that Virginia Democrats were 31 percent more likely than their Republican counterparts to indicate that there is solid evidence that the Earth is getting warmer, with independent residents of the Old Dominion 18 percent more likely than the Commonwealth’s Republicans to hold that belief.

**TABLE TWO**

**Belief in Global Warming by Select Demographic Categories**

	<b>Yes</b>	<b>No</b>	<b>Not Sure</b>
<b>Overall</b>	<b>73%</b>	<b>13%</b>	<b>12%</b>
<b>Republican</b>	<b>57%</b>	<b>24%</b>	<b>19%</b>
<b>Democrat</b>	<b>88%</b>	<b>3%</b>	<b>9%</b>
<b>Independent</b>	<b>75%</b>	<b>13%</b>	<b>15%</b>
<b>Male</b>	<b>71%</b>	<b>16%</b>	<b>13%</b>
<b>Female</b>	<b>78%</b>	<b>10%</b>	<b>11%</b>
<b>White</b>	<b>73%</b>	<b>14%</b>	<b>12%</b>
<b>Non-Nonwhite</b>	<b>81%</b>	<b>9%</b>	<b>10%</b>
<b>College Educated</b>	<b>71%</b>	<b>15%</b>	<b>14%</b>
<b>Non-College</b>	<b>80%</b>	<b>11%</b>	<b>10%</b>
<b>18-44</b>	<b>73%</b>	<b>11%</b>	<b>16%</b>
<b>45-64</b>	<b>77%</b>	<b>14%</b>	<b>9%</b>
<b>65 and Older</b>	<b>76%</b>	<b>14%</b>	<b>11%</b>
<b>Northern VA</b>	<b>78%</b>	<b>13%</b>	<b>10%</b>
<b>Tidewater</b>	<b>75%</b>	<b>15%</b>	<b>10%</b>
<b>Richmond/Charlottesville</b>	<b>68%</b>	<b>13%</b>	<b>19%</b>

Among those citizens who felt that strong evidence of warming did exist, a clear majority (55 percent) felt “very confident” of this fact and most of the remaining respondents were “fairly confident,” as seen in Table Three.

**TABLE THREE**

**“Are you very confident, fairly confident, not too confident or not confident at all that the average temperature on Earth is increasing?” (N=495)**

<b>Very Confident</b>	<b>55%</b>
<b>Fairly Confident</b>	<b>38%</b>
<b>Not Too Confident</b>	<b>4%</b>
<b>Not Confident at All</b>	<b>1%</b>
<b>Not Sure</b>	<b>1%</b>

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 (39 percent) attributed temperature rise to human activity, whereas 20 percent pointed to natural patterns and one third thought a combination of human and natural factors were responsible, as noted in Table Four.

**TABLE FOUR**

**“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?” (N=495)**

<b>Human Activity</b>	<b>39%</b>
<b>Natural Patterns</b>	<b>20%</b>
<b>A Combination</b>	<b>33%</b>
<b>Not Sure</b>	<b>8%</b>

### **Issue 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 Virginia see global warming as a serious problem. Nearly nine out of 10 respondents who believe in global warming identified the issue as either a very serious (61 percent) or somewhat serious (28 percent) problem, with only four percent indicating that it is “not a problem,” as shown in Table Five. This level of response on issue severity is higher than in some national and state surveys.

**TABLE FIVE**

**“In your view is global warming a very serious problem, somewhat serious, not too serious, or not a problem?” (N=495)**

<b>Very Serious</b>	<b>61%</b>
<b>Somewhat Serious</b>	<b>28%</b>
<b>Not Too Serious</b>	<b>6%</b>
<b>Not a Problem</b>	<b>4%</b>
<b>Not Sure</b>	<b>1%</b>

Not only do strong majorities of Virginia residents view climate change as a problem but they also believe that immediate governmental action is necessary. We found that more than seven out of 10 respondents (72 percent) who believe the Earth is warming also believe that immediate action was

needed, without specifying the type of policy or level of government, as demonstrated in Table Six. In contrast, only 19 percent felt that immediate governmental action was not necessary, while nine percent were not certain about this issue. We explore different levels of support for various governmental policy options later in the report, but this finding suggests a fairly broad base of support for some form of near-term governmental response.

**TABLE SIX**

**“Do you or do you not think global warming requires immediate government action?” (N=495)**

<b>Requires Immediate</b>	<b>72%</b>
<b>No, it does not</b>	<b>19%</b>
<b>Don’t Know/Not</b>	<b>9%</b>

## **SECTION TWO: FACTORS THAT SHAPE BELIEFS ABOUT GLOBAL WARMING**

As the previous section has demonstrated, most Virginia residents believe that the Earth is warming and that human activities have contributed to these changes. National polls also show that the number of Americans who acknowledged global warming has grown significantly over recent years. What is not clearly known are the reasons that individuals in Virginia and elsewhere believe that the Earth is warming. Thus this project attempts to measure the impact that a number of factors may have played in influencing Virginians’ views of the existence of global warming.

First, we asked Virginians 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 indicate that Virginians’ belief in global warming is most effected by their personal experiences as well as melting polar ice and glaciers. In particular, one out of four individuals surveyed said that their personal experience with hotter temperatures in Virginia has served as the main reason why they believe the Earth is warming, with about one in five (21 percent) claiming melting polar and glacier ice is primarily responsible for their acknowledgement of global temperature increases. A full list of the factors that have convinced Virginians that global warming is happening can be found in Table Seven below.

**TABLE SEVEN**

**“What is the primary factor that has caused you to believe that temperatures on earth are increasing?” (OPEN ENDED QUESTION: N =495)**

<b>FACTOR</b>	<b>PERCENT RESPONDING</b>
<b>Warmer Local Temperatures/Personal Experience</b>	<b>25%</b>
<b>Melting Glaciers and Polar Ice</b>	<b>21%</b>
<b>Media Coverage/Literature on the Issue</b>	<b>14%</b>
<b>Changing Weather Patterns/Strong Storms</b>	<b>13%</b>
<b>Scientific Research</b>	<b>7%</b>
<b>Pollution/Human Activity</b>	<b>7%</b>
<b>No Specific Reason/Not Sure</b>	<b>6%</b>
<b>Other/Misc.</b>	<b>5%</b>
<b>Declining Species</b>	<b>2%</b>

<b>Gore Documentary</b>	<b>1%</b>
<b>Natural Patterns</b>	<b>1%</b>

In addition to the open ended question regarding the primary causes of individual belief in a warming planet, eight factors were tested to determine their relative contribution to one’s belief in the existence of global warming. These factors were chosen because of their prominent role in the scientific theories of climate change, as reflected in a number of major reports released by the International Panel on Climate Change (IPCC), and their key role in ongoing media coverage and public discourse over the issue. These factors are clearly not exhaustive of all possible reasons that may influence an individual’s views on the existence of global warming but they provide an initial test of alternative factors that may shape beliefs on this matter. In Table Eight, the eight factors included in the survey are listed.

**TABLE EIGHT**

<b>Declining glaciers and polar ice throughout the globe</b>
<b>Warmer temperatures in your area during recent years</b>
<b>Computer models that indicate the earth is getting warmer</b>
<b>The strength of Hurricanes hitting the United States</b>
<b>Al Gore’s documentary “An Inconvenient Truth”</b>
<b>Milder winters in your area</b>
<b>Declining numbers of polar bears and penguins</b>
<b>Severe droughts in areas across the United States</b>

The results of the survey indicate substantial variation in the impact that each factor plays in determining individual views on global warming and this is presented in Table Nine. Declining glaciers and polar ice throughout the globe emerges as the factor that has most heavily influenced Virginia citizens on this issue. Nearly nine in 10 respondents stated that this phenomenon had either a very large (63 percent) or somewhat large (25 percent) effect on their views that the Earth is getting warmer. None of the other factors had a comparable impact and yet more than three out of four respondents cited severe droughts in areas across the United States (80 percent), milder winters in their area (78 percent), and the strength of hurricanes hitting the United States (76 percent) as having either very large or somewhat large influence on their views. Seventy-four percent of respondents also noted the role of warmer temperatures in their area during recent years.

**TABLE NINE**

**“For each factor mentioned indicate if it has had a very large, somewhat large, not too large or no effect on your view that the earth is getting warmer.” (N= 495)**

	<b>Very Large</b>	<b>Somewhat Large</b>	<b>Not too Large</b>	<b>No Effect</b>	<b>Not Sure</b>
<b>Declining glaciers and polar ice throughout the globe.</b>	<b>63%</b> <b>3%)</b>	<b>25%</b> <b>(25%)</b>	<b>4%</b> <b>(4%)</b>	<b>5%</b> <b>(5%)</b>	<b>4%</b> <b>(4%)</b>
<b>Warmer temperatures in your area during recent years.</b>	<b>39%</b> <b>(39%)</b>	<b>35%</b> <b>(35%)</b>	<b>14%</b> <b>(14%)</b>	<b>10%</b> <b>(10%)</b>	<b>3%</b> <b>(3%)</b>
<b>Computer models that indicate the earth is getting warmer.</b>	<b>30%</b> <b>30%</b>	<b>35%</b> <b>35%</b>	<b>13%</b> <b>13%</b>	<b>12%</b> <b>12%</b>	<b>10%</b> <b>10%</b>

<b>The strength of Hurricanes hitting the United States</b>	<b>46%</b> (46%)	<b>30%</b> (30%)	<b>12%</b> (12%)	<b>9%</b> (9%)	<b>4%</b> (4%)
<b>Al Gore’s documentary “An Inconvenient Truth”</b>	<b>20%</b> (20%)	<b>21%</b> (21%)	<b>6%</b> (6%)	<b>25%</b> (25%)	<b>27%</b> (27%)
<b>Milder Winters in your area</b>	<b>40%</b> (40%)	<b>38%</b> (38%)	<b>8%</b> (8%)	<b>11%</b> (11%)	<b>3%</b> (3%)
<b>Declining numbers of polar bears and penguins.</b>	<b>35%</b> (35%)	<b>29%</b> (29%)	<b>9%</b> (9%)	<b>13%</b> (13%)	<b>14%</b> (14%)
<b>Severe droughts in areas across the United States.</b>	<b>45%</b> (45%)	<b>35%</b> (35%)	<b>9%</b> (9%)	<b>8%</b> (8%)	<b>2%</b> (2%)

Respondents were somewhat less persuaded by computer models that indicate the Earth is getting warmer (65 percent) and declining numbers of polar bears or penguins (64 percent). However, the only factor that fell substantially below the others in influence was former Vice President Al Gore’s Award-winning documentary “An Inconvenient Truth.” In this instance, the response was much more divided, with one of four respondents indicating that the film had no effect, whereas 20 percent suggested that it had a very large effect, 21 percent noted that it had a somewhat large effect and 27 percent were not sure.

While most Virginians indicated that they believed the planet is heating up, 13 percent indicated that they do not believe global warming is occurring. These individuals were asked to identify the primary reason that makes them believe temperatures on Earth are not increasing. Among the most prominent factors identified were personal observations of temperatures that had not changed, natural patterns that explain any short term fluctuations, and the lack of scientific evidence to support global warming claims. Breakdowns of the various responses to this question are found in Table 10.

**TABLE 10**  
**“What is the primary factor that makes you believe that temperatures on Earth are not increasing?” (OPEN ENDED COMMENTS, N = 86)**

<b>Natural Patterns Explain any Fluctuation</b>	<b>24%</b>
<b>Personal Experiences and Observation</b>	<b>24%</b>
<b>Lack of Scientific Evidence</b>	<b>22%</b>
<b>No Particular Reason/Not Sure</b>	<b>12%</b>
<b>Evidence that Disproves Global Warming</b>	<b>8%</b>
<b>Media is Misleading the Public</b>	<b>5%</b>
<b>Other</b>	<b>5%</b>

We 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 refine public sentiment, with findings presented in Table 11. We found that disagreement was greatest with such statements as “the Earth’s atmosphere is too large for man’s activity to change the climate” (65 percent) and “scientists are overstating evidence about global warming for their own interests” (62 percent). Response was

a bit more evenly divided concerning other statements, although majorities disagreed with such arguments as “there is not enough scientific evidence to support claims that the Earth is getting warmer” (60 percent) or “any recent warming on Earth is the result of natural trends and not the activities of man” (55 percent). 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 29 percent strongly disagreed whereas 24 percent strongly agreed.

**TABLE 11**

**“For each statement please indicate if you strongly agree, somewhat agree, somewhat disagree or strongly disagree.”**

	<b>Strongly Agree</b>	<b>Somewhat Agree</b>	<b>Somewhat Disagree</b>	<b>Strongly Disagree</b>	<b>Not Sure</b>
<b>There is not enough scientific evidence to support claims that the Earth is getting warmer.</b>	14%	24%	23%	37%	3%
<b>Scientists are overstating evidence about global warming for their own interests.</b>	15%	18%	24%	38%	5%
<b>The Earth’s atmosphere is too large for man’s activity to change the climate.</b>	11%	14%	28%	37%	9%
<b>Any recent warming on Earth is the result of natural trends and not the activities of man.</b>	18%	22%	26%	29%	6%
<b>The media is overstating the evidence about global warming.</b>	24%	19%	23%	29%	5%

While a majority of Virginians disagreed with all of the statements presented in Table 11, there is a very significant difference between those who believe in global warming and those who don’t. More specifically, among Virginians 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 12. Conversely, very few Virginians who believe in global warming offered strong agreement with any of the statements regarding climate issues

**TABLE 12**

**Strong Agreement with the Statements by Individual Belief in Global Warming**

	<b>Believe in Global Warming</b>	<b>Do Not Believe in Global Warming</b>
<b>There is not enough evidence to support claims that the earth is getting warmer.</b>	7%	49%
<b>Scientists are overstating evidence about global warming for their own interest.</b>	7%	50%

<b>The Earth’s atmosphere is too large for man’s activity to change the climate.</b>	<b>8%</b>	<b>28%</b>
<b>Any recent warming on Earth is the result of natural trends and not the activity of</b>	<b>11%</b>	<b>45%</b>
<b>The media is overstating the evidence about global warming.</b>	<b>14%</b>	<b>65%</b>

### **SECTION THREE: GOVERNMENTAL RESPONSIBILITY**

Climate change has generally been portrayed as a global issue for which an international regime would most likely emerge as a policy response. This was certainly evident in the creation of the Kyoto Protocol that attempted to establish such an international mechanism. But more than a decade after its creation, Kyoto lies in tatters, due to non-engagement by the United States and emerging nations as well as implementation problems among ratifying parties. In response, individual nations and more localized units have begun to take unilateral steps. As noted earlier, this has entailed a substantial state government response in many parts of the United States whereas the federal government has been much less active thus far. Given the statements of both presidential candidates about taking a more active federal role on climate change in the event that they are elected and the recent emergence of high-level deliberation over possible climate policy development in Virginia, we wanted to gauge public sentiment concerning the responsibility of respective levels of American government on this issue.

Our findings suggest widespread perception that federal, state, and local governments have either a great deal or some responsibility for taking actions to reduce global warming, as seen in Table 13. Exactly one half of respondents said that the federal government has a great deal of responsibility on this issue, with 36 percent assigning it some responsibility and only 10 percent saying it has no responsibility. When combined, 86 percent of respondents believe that the federal government is responsible on this issue. At the same time, 85 percent of respondents also believe that state governments have some degree of responsibility and 77 percent have a similar view of local governments, although both of these levels have somewhat lower percentages of respondents who believe that they hold a great deal of responsibility.

**TABLE 13**  
**“For each level of government that I mention please tell me if it has a great deal of responsibility, some responsibility or no responsibility for taking actions to reduce global warming.”**

	<b>A Great Deal of Responsibility</b>	<b>Some Responsibility</b>	<b>No Responsibility</b>	<b>Not Sure</b>
<b>The Federal Government</b>	<b>50%</b>	<b>36%</b>	<b>10%</b>	<b>4%</b>
<b>State Governments</b>	<b>36%</b>	<b>49%</b>	<b>11%</b>	<b>4%</b>
<b>Local Governments</b>	<b>29%</b>	<b>48%</b>	<b>19%</b>	<b>4%</b>

The continuing expansion of the state role, both around the nation and possibly in Virginia led us to further probe citizens’ views of how they perceive state government involvement. Some of these questions addressed intergovernmental issues, considering possible connections with action or lack

thereof in Washington, D.C., or in neighboring states. As evident in Table 14, we found sizable majorities of respondents who disagreed with the statement that “my state should not adopt anti-global warming policies unless its neighboring states also adopt similar policies” and who agreed with the statement that “if the federal government fails to address the issue of global warming it is my state’s responsibility to address the problem.”

**TABLE 14**  
**Level of Agreement with Statements on Virginia’s Possible Role in Combating Global Warming**

	<b>Strongly Agree</b>	<b>Somewhat Agree</b>	<b>Somewhat Disagree</b>	<b>Strongly Disagree</b>	<b>Not Sure</b>
<b>My state should not adopt anti-global warming policies unless its neighboring states also adopt similar policies.</b>	<b>(16%)</b>	<b>(15%)</b>	<b>(24%)</b>	<b>(38%)</b>	<b>(6%)</b>
<b>If the federal government fails to address the issue of global warming it is my state’s responsibility to address the problem.</b>	<b>(38%)</b>	<b>(31%)</b>	<b>(13%)</b>	<b>(14%)</b>	<b>(4%)</b>

In turning more directly to the question of possible state policy development, one inevitable question concerns potential economic impact of various initiatives. Given the growing role of state governments in using renewable energy promotion as a tool to combat global warming, we asked specific questions on the anticipated economic impact of such steps, as presented in Table 15. We found that three out of four respondents either agreed (strongly or somewhat) with the statement that “state governments will boost their economies by requiring greater use of renewable energy” whereas only 15 percent disagreed (strongly or somewhat) and 10 percent were undecided. In turn, more respondents disagreed with the statement that “my state’s economy will be damaged if it requires greater use of renewable energy while neighboring states don’t have such requirements,” although the margin of difference was narrower on this question.

**TABLE 15**  
**Level of Agreement with Statements on the Economic Impact of Virginia’s Possible Role in Combating Global Warming**

	<b>Strongly Agree</b>	<b>Somewhat Agree</b>	<b>Somewhat Disagree</b>	<b>Strongly Disagree</b>	<b>Not Sure</b>
<b>State governments will boost their economies by requiring greater use of renewable energy.</b>	<b>41%</b>	<b>34%</b>	<b>11%</b>	<b>4%</b>	<b>10%</b>
<b>My state’s economy will be damaged if it requires</b>	<b>14%</b>	<b>23%</b>	<b>25%</b>	<b>24%</b>	<b>13%</b>

<b>greater use of renewable energy while neighboring states don't have such requirements.</b>					
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#### **SECTION FOUR: RESPONSE TO POLICY ALTERNATIVES**

While a majority of Virginia residents 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 already been enacted in multiple states, could be added to the agenda in Virginia, and will likely be under consideration in the 111<sup>th</sup> Congress.

We asked respondents to consider 12 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, 10 received such support from more than 50 percent of respondents, and two were opposed by a strong majority of respondents. Table 16 ranks these policy options according to the highest level of respondents who indicated strong support for state adoption of them.

**TABLE 16**  
**Policy Options by Level of Strong Support among Virginians**

<b>Policy Option</b>	<b>Percent Strongly Supporting</b>
<b>1. Creation of Renewable Portfolio Standard</b>	<b>55%</b>
<b>2. Increased Support for Clean Coal Technology</b>	<b>51%</b>
<b>3. Increase Fuel Efficiency Standards for Automobiles</b>	<b>49%</b>
<b>3. Energy Efficiency Requirements for Residential and Commercial Buildings</b>	<b>49%</b>
<b>5. Tax Reductions for Hybrid Vehicle Purchase</b>	<b>47%</b>
<b>6-. Increased Use of Nuclear Power</b>	<b>30%</b>
<b>6. Require Vehicles to Reduce Green House Gas Emissions</b>	<b>30%</b>
<b>8. Increased Support for Ethanol Development</b>	<b>27%</b>
<b>9. Restrictions on Suburban Development</b>	<b>23%</b>
<b>10. Establishment of Cap and Trade</b>	<b>16%</b>
<b>11. Increased Fossil Fuel Taxes</b>	<b>13%</b>
<b>12. Increased Gasoline Taxes</b>	<b>10%</b>

Turning attention towards public opposition to the varied policy options, we once again find that tax options stand out among the alternatives. Over half (55 percent) of Commonwealth residents expressed strong opposition to increasing gas taxes as a means of reducing greenhouse gas emissions, with more than one in three (37 percent) Virginians strongly opposed to increasing fossil fuel taxes in order to combat global warming. No other policy option drew more than 18 percent strong opposition, with only a handful of state residents strongly opposed to renewable portfolio standards, increased energy efficient standards, or development of clean coal technologies.

**TABLE 17**  
**Policy Options by Level of Strong Opposition Among Virginians**

<b>Policy Option</b>	<b>Percent Strongly</b>
<b>1. Increased Gasoline Taxes</b>	<b>55%</b>
<b>2. Increased Fossil Fuel Taxes</b>	<b>37%</b>
<b>3. Increased Support for Ethanol Development</b>	<b>18%</b>
<b>4. Restrictions on Suburban Development</b>	<b>17%</b>
<b>5. Establishment of Cap and Trade</b>	<b>15%</b>
<b>6. Increased Use of Nuclear Power</b>	<b>14%</b>
<b>6. Require Vehicles to Reduce Green House Gas</b>	<b>14%</b>
<b>8. Tax Reductions for Hybrid Vehicle Purchase</b>	<b>11%</b>
<b>9. Increase Fuel Efficiency Standards for Automobiles</b>	<b>10%</b>
<b>10. Energy Efficiency Requirements for Residential and</b>	<b>7%</b>
<b>11. Creation of Renewable Portfolio Standard</b>	<b>6%</b>
<b>12. Increased Support for Clean Coal Technology</b>	<b>5%</b>

### **Renewable Energy Mandates**

Renewable electricity mandates, also known as portfolio standards, are now in place in 27 states. They reflect a consistent pattern of proliferation and diffusion since the first such policy was enacted in Iowa in 1991. Many of these policies set increasingly ambitious targets for renewable electricity; the Pennsylvania program calls for an increase in the share of electricity provided by renewable sources from one percent in 2007 to 18 percent by 2018 whereas North Carolina will require attainment of a 12.5 percent level by 2021. Such policies tend to define the term renewable energy quite broadly, thereby allowing some degree of competition among various sources in attempting to meet these targets.

As noted earlier, Virginia is one of two states with a voluntary version of this policy. We found that three in five Virginians did not know whether or not their state had a mandatory form of this policy in place, although 32 percent said no and seven percent said yes. But despite this uncertainty over its existence, Virginians overwhelmingly thought that this was a good idea. Fifty-five percent of respondents strongly supported the idea that state governments “should require a set portion of all electricity to come from renewable energy sources such as wind, solar or hydroelectric power.” Twenty-seven percent expressed some support, leaving only 13 percent with some opposition and six percent undecided, as indicated in Table 18.

**TABLE 18**  
**Levels of Support for Adoption of a Renewable Portfolio Standard**

<b>Strongly Support</b>	<b>55%</b>
<b>Somewhat Support</b>	<b>27%</b>
<b>Somewhat Oppose</b>	<b>7%</b>
<b>Strongly Oppose</b>	<b>6%</b>
<b>Not Sure</b>	<b>6%</b>

Looking more closely at the attitudes of Virginians towards renewable portfolio standards (RPS) we find that there are very limited differences in terms of standard demographic classifications. As can be seen in Table 19 there are similar support levels across gender, age, race and educational attainment categories. Only in the area of partisan affiliation do we see a statistically significant difference in support for RPS, with Republicans less likely than both Democrats and independents to offer strong support for this policy tool (62-to-44 percent). This variation may be related to a general Republican hesitancy to embrace governmental mandates of any type.

**TABLE 19**  
**Levels of Support for Adoption of a Renewable Portfolio Standard By Selected Demographics**

	<b>Strongly Support</b>	<b>Somewhat Support</b>	<b>Somewhat Oppose</b>	<b>Strongly Oppose</b>	<b>Not Sure</b>
<b>Overall</b>	<b>55%</b>	<b>27%</b>	<b>7%</b>	<b>6%</b>	<b>6%</b>
<b>Republican</b>	<b>44%</b>	<b>30%</b>	<b>12%</b>	<b>10%</b>	<b>5%</b>
<b>Democrat</b>	<b>62%</b>	<b>25%</b>	<b>3%</b>	<b>5%</b>	<b>6%</b>
<b>Independent</b>	<b>55%</b>	<b>28%</b>	<b>6%</b>	<b>5%</b>	<b>7%</b>
<b>Male</b>	<b>55%</b>	<b>26%</b>	<b>8%</b>	<b>7%</b>	<b>3%</b>
<b>Female</b>	<b>54%</b>	<b>28%</b>	<b>6%</b>	<b>4%</b>	<b>8%</b>
<b>White</b>	<b>55%</b>	<b>27%</b>	<b>7%</b>	<b>7%</b>	<b>4%</b>
<b>Non-nonwhite</b>	<b>55%</b>	<b>29%</b>	<b>4%</b>	<b>3%</b>	<b>9%</b>
<b>College Educated</b>	<b>52%</b>	<b>29%</b>	<b>7%</b>	<b>8%</b>	<b>5%</b>
<b>Non-College</b>	<b>57%</b>	<b>26%</b>	<b>6%</b>	<b>3%</b>	<b>7%</b>
<b>18-44</b>	<b>54%</b>	<b>31%</b>	<b>6%</b>	<b>4%</b>	<b>5%</b>
<b>45-64</b>	<b>59%</b>	<b>24%</b>	<b>6%</b>	<b>6%</b>	<b>4%</b>
<b>65 and Older</b>	<b>48%</b>	<b>27%</b>	<b>7%</b>	<b>9%</b>	<b>10%</b>

### **Alternative Methods to Reduce Carbon Emissions in Electricity**

Alongside mandating increased use of renewables, other states have experimented with additional 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. Virginia 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,

which includes efforts to sequester carbon below ground level. Even with the technical limitations, clean coal is well positioned in terms of public support because of a wide gap between those who have intense positive views of the alternative (51 percent strong support) and those with extremely negative views (5 percent strong opposition).

**TABLE 20**  
**Levels of Support for Increased State Government Support for Clean Coal Technology**

<b>Strongly Support</b>	<b>51%</b>
<b>Somewhat Support</b>	<b>31%</b>
<b>Somewhat Oppose</b>	<b>5%</b>
<b>Strongly Oppose</b>	<b>5%</b>
<b>Not Sure</b>	<b>8%</b>

Virginia residents also provided strong support for the proposition that state government require an increase in energy efficiency for residential and commercial buildings and appliances, as indicated in Table 16. The Commonwealth already does have a number of energy efficiency programs in place and the 2007 Virginia Energy Plan discusses additional options in considerable detail. Hence, respondents may draw from some direct experience in making this assessment.

In turn, respondents endorse the increased use of nuclear power as a way to reduce greenhouse gas emissions. Virginia has long-standing experience with nuclear energy, although like the remaining states it has been several decades since the Commonwealth commissioned a new reactor. Respondents support for expanded nuclear activity was lower than the other policy options noted in this section but 30 percent of residents strongly supported expanded use while 29 percent expressed some support and 28 registered some degree of opposition, with 12 percent uncertain, as reflected in Table 21.

**TABLE 21**  
**Levels of Support for Increased Use of Nuclear Power**

<b>Strongly Support</b>	<b>30%</b>
<b>Somewhat Support</b>	<b>29%</b>
<b>Somewhat Oppose</b>	<b>15%</b>
<b>Strongly Oppose</b>	<b>12%</b>
<b>Not Sure</b>	<b>6%</b>

## **Transportation**

The transportation sector presents a particularly important challenge for any Virginia effort to reduce greenhouse gas emissions in coming years as this sector has generated more than 40 percent of the Commonwealth's total emissions in recent years, according to data from the U.S. Environmental Protection Agency. On the one hand, there may be constraints on what states can pursue in this area, given the historic federal role in setting average fuel economy standards for vehicles. Indeed, federal legislation enacted in 2007 called for the first increase in these standards in many years.

At the same time, many states have advanced a number of methods to attempt to reduce the carbon imprint from transportation activities. Among the most prominent is a California-led effort to set carbon emission standards from future vehicular fleets. This builds on legislation enacted in Sacramento in 2002, for which 14 states have formally offered endorsement if the federal government authorizes this state-level experimentation as it has frequently in prior decades through a formal waiver. The legal status of this matter is unclear, though both Senators McCain and Obama have expressed willingness to grant the waiver to California and any other state that embraces the California proposal.

We found that Commonwealth residents strongly support the idea that state government should “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 49 percent expressing strong support, 28 percent expressing some support, and only 20 percent expressing some degree of opposition. In turn, we found very similar levels of support for state governments to give tax incentives to individuals who purchase hybrid fuel vehicles.

**TABLE 22**  
**Levels of Support for Various Transportation Policies**

	<b>Increased Fuel Efficiency</b>	<b>Tax incentives for Hybrid Vehicle Purchase</b>
<b>Strongly Support</b>	<b>49%</b>	<b>47%</b>
<b>Somewhat Support</b>	<b>28%</b>	<b>31%</b>
<b>Somewhat Oppose</b>	<b>10%</b>	<b>8%</b>
<b>Strongly Oppose</b>	<b>10%</b>	<b>11%</b>
<b>Not Sure</b>	<b>4%</b>	<b>3%</b>

In addition, a majority of survey respondents also supported state government efforts to restrict development in suburban areas in order to reduce the use of energy for transportation. While policy analysts have increasingly focused on the relationship between land use and global warming, there has been limited state or local government effort to create legislation that regulates land use to explicitly reduce greenhouse gas emissions. One notable exception is California’s recent adoption of SB375 which attempts to direct development toward more concentrated areas in order to decrease greenhouse gas emissions. This policy is tied to California’s overall statutory goals for reducing greenhouse gases that were passed in 2006.

When looking at support for limiting suburban development in order to reduce greenhouse gas emissions we found moderate regional differences within Virginia. In particular, residents of Northern Virginia were more likely than their counterparts in the Tidewater and Richmond/Charlottesville regions to strongly support government restrictions on suburban development. While there are many factors that may explain this variation, the high levels of suburban growth and the substantial traffic congestion in the metropolitan Washington D.C. region may significantly contribute to the higher levels of support for growth restrictions.

**TABLE 23**  
**Support for Government Restrictions on Suburban Development by**  
**Area of Residency**

	<b>Northern Virginia</b>	<b>Tidewater Region</b>	<b>Richmond/Charlottesville</b>
<b>Strongly Support</b>	<b>29%</b>	<b>18%</b>	<b>22%</b>
<b>Somewhat Support</b>	<b>31%</b>	<b>37%</b>	<b>28%</b>
<b>Somewhat Oppose</b>	<b>19%</b>	<b>18%</b>	<b>19%</b>
<b>Strongly Oppose</b>	<b>12%</b>	<b>16%</b>	<b>18%</b>
<b>Not Sure</b>	<b>10%</b>	<b>11%</b>	<b>14%</b>

A majority of Virginia residents support the development of ethanol as an alternative to fossil fuels in transportation. However, support for ethanol development did not attain the same level of support as the other transportation proposals included in the study. In addition, the support for ethanol was well below results in earlier national and state surveys. This may reflect negative scholarly and media accounts of the possibly limited reduction in greenhouse gas emissions achieved through conversion of corn into transportation fuel, as well as increased agricultural commodity prices.

One notable facet of support for ethanol development is the difference among Virginians in terms of their educational attainment. While 51 percent of residents of the Commonwealth with college degrees expressed support for increased ethanol development, 67 percent of Virginians without college degrees maintained the same position, as noted in Table Twenty Four.

**TABLE 24**  
**Support for Ethanol Development by Educational Attainment**

	<b>College Educated</b>	<b>Non-College Educated</b>
<b>Strongly Support</b>	<b>23%</b>	<b>30%</b>
<b>Somewhat Support</b>	<b>28%</b>	<b>37%</b>
<b>Somewhat Oppose</b>	<b>13%</b>	<b>11%</b>
<b>Strongly Oppose</b>	<b>26%</b>	<b>10%</b>
<b>Not Sure</b>	<b>9%</b>	<b>11%</b>

Finally, Virginia residents 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. Virginia and other states already tax these energy sources, but usually at low levels. Analysts contend that taxation would reduce energy demand through heightened price, producing revenue that could be reimbursed to citizens or applied to renewable energy or energy efficiency programs. We did not test possible linkages between elevated energy taxes and possible reallocation of these revenues. But Virginia respondents rejected proposed increases in gasoline taxes and fossil fuel taxes more generally as a way to combat climate change.

## Cap-and-Trade

It appears increasingly likely that the 111<sup>th</sup> 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 mandating the same standard or technology for every source and has been the animating principal behind efforts to develop such systems in the Northeast, Pacific West, and Midwest. One highly-visible Congressional proposal of this sort has been the Climate Security Act, for which Virginia’s John Warner is a U.S. Senate co-sponsor and a leading advocate for this approach. In turn, the Commonwealth reserves the option of joining with northeastern neighbors, as in the Regional Greenhouse Gas Initiative, or possible partners such as Florida, should it select this option.

One enduring question about cap-and-trade is whether or not the citizenry understands this approach, given its complexity and relatively limited use in environmental protection to date. We asked residents 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.” More respondents were supportive of this proposal than were opposed but, as Table 25 suggests, opinion is fairly evenly divided across categories and more than one in five respondents was uncertain. We did not have the opportunity to frame this question in different ways, gauging possible differences in reaction depending on the wording, but clearly public understanding and support remains somewhat unclear on this initiative. This finding in Virginia is similar to what has been found nationally and in select other states.

**TABLE 25**  
**Levels of Support for a Cap-and-Trade Program to Reduce Emissions**

<b>Strongly Support</b>	<b>16%</b>
<b>Somewhat Support</b>	<b>34%</b>
<b>Somewhat Oppose</b>	<b>13%</b>
<b>Strongly Oppose</b>	<b>15%</b>
<b>Not Sure</b>	<b>22%</b>

Although the cap-and-trade option remains unclear to a substantial number of Virginians, it seems that this issue does not suffer from a partisan divide in the way that other options do. While policy alternatives that include mandates and regulatory requirements are often viewed quite differently by Democrats and Republicans, there is no statistically significant gap between party loyalists when it comes to cap-and-trade, as seen in Table 26. As the policy debate regarding cap-and-trade evolves, the absence of a partisan split on this alternative, along with the opportunity to move undecided Virginians, positions this option for eventual adoption.

**TABLE 26**  
**Levels of Strong Support for a Cap-and-Trade Program to Reduce Emissions**  
**By Party Affiliation**

	<b>Democrats</b>	<b>Republicans</b>	<b>Difference</b>
<b>Clean Coal Technology</b>	<b>55%</b>	<b>47%</b>	<b>8%</b>
<b>Increase Fuel Efficiency for Automobiles</b>	<b>51%</b>	<b>40%</b>	<b>11%</b>
<b>Hybrid Fuel Vehicles Tax Reductions</b>	<b>54%</b>	<b>36%</b>	<b>18%</b>
<b>Fossil Fuel Tax Increase</b>	<b>15%</b>	<b>7%</b>	<b>8%</b>
<b>Increased Support for Nuclear Power</b>	<b>23%</b>	<b>39%</b>	<b>16%</b>
<b>Establish Cap and Trade</b>	<b>15%</b>	<b>17%</b>	<b>2%</b>
<b>Renewable Portfolio Standards</b>	<b>62%</b>	<b>44%</b>	<b>18%</b>
<b>Restrict Suburban Development</b>	<b>24%</b>	<b>19%</b>	<b>5%</b>
<b>Energy Efficiency Requirements</b>	<b>54%</b>	<b>40%</b>	<b>14%</b>
<b>Increase Gasoline Taxes</b>	<b>11%</b>	<b>6%</b>	<b>5%</b>
<b>Require Vehicles to Reduce Green House Gas</b>	<b>34%</b>	<b>17%</b>	<b>17%</b>
<b>Increased Support for Ethanol Development</b>	<b>30%</b>	<b>22%</b>	<b>8%</b>

#### **SECTION FIVE: LOOKING AHEAD**

This report is intended to provide the first examination of the views of Virginia residents on a wide range of issues related to global warming. It builds on earlier national surveys and experimental work done in a small subset of states, offering the first profile of Virginia public opinion on the existence of climate change and policy options currently being implemented in some other states. In many respects, our Virginia findings are consistent with what is known nationally. However, this report draws upon only the Virginia sample of a survey that was conducted nationally in September 2008. At the National Conference on Climate Governance at the Miller Center on December 11-12, 2008, we will review the entire national survey, as well as compare the Virginia response with that from other states.