The Effect of Municipal Initiatives on State Climate Change Plans

By

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Abstract

Faced with near-unanimous scientific consensus that climate change is being accelerated by human activity and no decisive federal policy on the issue, U.S. states and municipalities are taking the initiative to mitigate the problem despite the lack of economic incentive to do so. Traditional models of state policy adoption indicate that states take cues from either the federal government or other states, neglecting the potentially significant influence of cities. Augmenting diffusion of innovation theory with insights from intergovernmental relations and collaborative government, this paper contends that when formulating climate policies without a federal mandate, states take cues from their cities. A discrete-time event history model is used to investigate these factors, with a dichotomous dependent variable indicating whether or not the state has adopted a climate plan. The results indicate that citizen environmental ideology is a significant factor in the adoption of state climate plans, but the presence of local climate initiatives are not. Although no evidence is found to support the idea of local governments as drivers for state-level policy-making, this research indicates several potential future research avenues.

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Introduction

On Feb. 2, 2007, the Intergovernmental Panel on Climate Change (IPCC) declared that the evidence of a warming trend is "unequivocal," and that human activity has "very likely" been the driving force in that change over the last 50 years (Intergovernmental Panel on Climate Change 2007). All major scientific bodies in the United States whose members' expertise bears directly on the matter have issued similar statements (Oreskes 2004). If left unchecked, anthropogenic climate change has the potential to threaten weather patterns, water availability, ecosystem functions, and human health (Beggs and Bambrick 2005; Haines and Patz 2004; Intergovernmental Panel on Climate Change 2007; Landsea 2005).

Through the negotiation of international treaties such as the Kyoto Protocol, climate change in the United States has emphasized the development of an international solution to climate change. Development of a large-scale solution has been slow to progress, however, and state and municipalities have initiated their own climate mitigation programs that exceed national standards and goals. A growing number of large US-based firms, non-governmental organizations (NGOs), and universities are launching greenhouse gas (GHG) reduction programs (Koontz et al. 2004). As a result, the political setting for US national climate policy is changing, largely driven by collaborative initiatives stemming from lower levels of government (Koontz et al. 2004; Sabatier et al. 2005; Rabe 2004).

Although states play a significant role in the interpretation, application, enforcement, and regulation of environmental policies, the federal government has

largely claimed jurisdiction through a traditional, top-down regulatory approach. With respect to climate change, however, the opposite is holding true and state governments are actively pursuing solutions to lower greenhouse gas emissions in the absence of a federal mandate. In contrast to a model of top down federalism, a majority of the states have passed climate change plans despite the lack of federal oversight. Studies of state policy-making have traditionally attributed state policy adoption to interstate competition (e.g.,Berry and Berry 1990), federal top-down pressure (Karch 2007; Allen et al. 2004), or internal characteristics of the states (Walker 1969) . However, climate change policies allow researchers to examine another possibility: city-to-state, or "bottom-up," diffusion. This area of research has been largely neglected in the literature with the exception of a small number of case studies, the majority of which are in the field of education policy (e.g.,Mintrom 1997).

While there is evidence that US policies in health, welfare, and child care have reflected bottom-up tendencies (Boeckelman 1992), studies of "bottom-up diffusion" have focused on the state-federal relationship. Current studies neglect the increasingly significant role that municipal governments may have in influencing state-level action to combat climate change (Betsill 2001; Engel 2006; Kousky and Schneider 2003; Lindseth 2004; Lutsey and Sperling 2008; Harrison and Sundstrom 2007). The states, therefore, are at the center of a dichotomy between an inactive federal government and highly active municipalities.

Cities have become prominent contributors to the issue of climate change. The International Council for Local Environmental Initiatives (ICLEI) and the US Council of Mayors (COM) actively promote city participation in climate policy. Over 1,000 US cities and counties have signed on to the COM's Climate Protection Agreement (CPA) and ICLEI's Cities for Climate Protection Plan (CCP). Both plans have a similar approach: cities monitor current emissions, enact policies to reach lower target emission standards, and monitor progress. These local efforts are highly significant. In a recent analysis, Lutsey and Sperling (2008) estimated that, even without federal action, the combined effects of state, local and regional programs could lower GHG emissions to 2010 levels by 2020.

Given that traditional approaches to environmental policy involve either a command and control approach from the federal government or the use of market-based mechanisms, an interesting puzzle arises: *why* are states taking action without a federal mandate or incentives? It is economically not rational for a state to participate in a climate protection plan, as the free-rider problem is too large for a sub-national unit to overcome (Kousky and Schneider 2003). While popular support exists for the development of climate change solutions (Brace et al. 2002; Brechin 2003; Nisbet and Myers 2007), popular opinion alone doesn't fully explain states decision-making and why the federal government is allowing them to proceed in areas typically reserved for a top-down regulatory approach.

Drawing upon theories of diffusion, collaborative government, and intergovernmental relations, this study empirically examines which factors prompt

state action on climate change, with a particular focus on the impact of local government activity on state-level decision-making. Following a discussion on existing research on state policy adoption, I present the results of a discrete-time event history model for the years 1990, the year prior to the first city adoption of a climate plan, to 2007. After a discussion of my findings, I describe the impact the results of this study have for understanding the role that local level implementation has on state level policy adoptions, an important role often ignored in the literature.

Background

Climate Change Policy in the United States

Out of concern for the global impacts of climate change, the international community began negotiating a response, culminating in the 1997 Kyoto Protocol. This agreement binds most of the world's industrialized nations to greenhouse gas (GHG) reduction targets. Despite the fact that the Kyoto conference was a major breakthrough in environmental policy, as it set landmark goals and over a hundred countries signed the resulting climate treaty, US involvement in the process was minimal (Byrne et al. 2007). Ultimately the US declined to ratify the treaty and is therefore not bound by any of the treaty's GHG reduction requirements (Betsill 2001; Byrne et al. 2007).

While the debate continues over the appropriate policy solution, GHG emissions continue to rise, contributing to an increase in average global surface temperature, in turn impacting weather patterns, global ecology, and human health. Weather patterns are expected to change significantly in several regions, including an

increase in extreme weather events such as droughts and hurricanes (Landsea 2005). Birds are migrating earlier, and the geographic range of many species has shifted (McCarty 2001). Additionally, the recent global rise in asthma rates could be an early health effect of anthropogenic climate change (Beggs and Bambrick 2005).

In the absence of a comprehensive national policy, it falls to the states to fill the policy vacuum left by the federal government. State and local governments directly face and must deal with the problems caused by climate change, such as rising sea levels and regional air pollution. Although sub-government involvement in climate change policy is not solely in response to federal inaction, the lack of US involvement puts special emphasis on the actions of state and local governments to address the problem (Byrne et al. 2007; Rabe 2004, 2006). US states have taken steps to reduce GHG emissions in varied ways, including cap and trade, mandatory GHG reporting, auto emission standards, and investments in alternative fuels (Pew Center on Global Climate Change 2009; US Environmental Protection Agency). To date, 24 states have active climate legislative commissions and executive branch advisory groups and 36 states have climate action plans or are in the process of adopting plans (Pew Center on Global Climate Change 2009).

From an economic perspective, it is not rational for a sub-national level of government to take on climate change as an issue because reduction of local emissions will not prevent the spread of GHG across political boundaries (Dietz et al. 2003; Ostrom et al. 1999). Viewed solely in terms of economics, climate change appears to be a policy arena well-suited for a traditional top-down regulatory

approach, as with other public environmental goods (Dietz et al. 2003; Ostrom et al. 1999). It is a problem with a non-excludable good that crosses political boundaries (a "commons" problem, e.g. Hardin 1968). In addressing the issue, the largest political units, typically address environmental issues that are trans-boundary in nature.

Despite these issues, climate change is leading to an expansion of the responsibilities at sub-national levels of government. The policies are being developed and implemented from the "bottom-up" as opposed to the traditional "top-down" view of federalism. States have long played a role in implementing and enforcing federal environmental regulations, but in climate policy, they are clearly taking the lead. This represents a divergence from traditional environmental policy, in which each city or state is responsible only for problems within its own boundaries and the federal government oversees all problems that substantially traverse state and local jurisdictions (Scheberle 2004).

Local Government Initiatives

Politically, cities can serve an important role in the adoption of national policies. Although they cannot directly affect international treaties, city policies can stimulate public debate and discussion, serving "to heighten public awareness about the threat of global climate change and shift public opinion in favor of international regulations" (Betsill 2001). As in the model of a "laboratory of democracy," cities with successful policies can stand as proof that certain types of programs can be used to effectively lower GHG emissions.

Half of the world's population lives in urban areas and a majority of the activities that produce GHG is focused in cities, making local governments the level of government closest to the problem (Betsill 2001). Additionally, city governments have authority over actions that impact GHG emissions, including land-use planning, waste management, transportation and energy usage (Betsill 2001). Buildings (heating, cooling and lighting) and motor vehicles are the two major community sources of GHG; therefore, action plans commonly focus on strategies that will produce reductions in those sectors. Additionally, public education is an important element in most action plans (Pew Center on Global Climate Change 2009).

Cities also set emission targets for municipal facilities and operations. Energy-saving measures not only provide examples for citizens, but can also produce substantial energy cost savings. A committee of municipal department heads or a combination of municipal employees and interested citizens may develop the plans. Experience has shown that successful implementation of the plans requires the commitment of city leaders who can inspire sustained, community-wide effort (Osofsky and Levit 2008).

International Council for Local Environmental Initiatives

This research focuses on one of the primary organizations promoting cities efforts to reduce GHG: The International Council for Local Environmental Initiatives (ICLEI). ICLEI was launched in 1990 as a worldwide association of local governments committed to climate protection. ICLEI works to develop a community

of worldwide local governments with the goal of improving environmental conditions "through cumulative local actions" (ICLEI 2008). Today, ICLEI is comprised of members from over 1000 local governments from around the world.

One of the cornerstone projects of ICLEI is its Cities for Climate Protection (CCP) campaign. This program was initiated in 1992 with the goal of encouraging local governments to implement climate change policies. To join the campaign, a city must commit to undertake five milestones: conduct a baseline emissions analysis, adopt an emissions reduction target, complete a local action plan to reach that target, then implement the plan and monitor and verify results (ICLEI 2008). To date, 1126 municipalities around the world have joined the campaign, including 569 from the United States. Additionally, ICLEI reports a 10% annual increase in the rate of city participation (ICLEI 2008).

The US cities that have signed the ICLEI-CCP greatly vary in population and location. Populations range from Point Arena, CA, a small town with 460 people, to New York City, with a population of over 8 million. Nearly a third of the signed cities have populations of less than 10,000 people, but 10 of the country's largest cities have also signed. Appendix A lists all of the US cities that have signed onto the CCP.

Other organizations

In addition to ICLEI, several national non-profits are active in assisting local leaders on environmental issues. These groups include the US Council of Mayors, Climate Solutions, Natural Resources Defense Council (NRDC), Sierra Club, Kyoto

USA, the Climate Crisis Coalition, and The Virtual March. The approach for each group varies, but all encourage the formation of partnerships between business, environmentalists, interest groups and government. Many focus on the formation of regional agreements between states. The focus of Kyoto USA is solely on the local level, encouraging U.S. cities and their residents to reduce their GHG emissions.

The US Council of Mayors, aided by Climate Solutions and the Sierra Club, has launched a nationwide challenge to mayors to strive to make GHG reductions that meet or exceed Kyoto targets. More than 900 cities have signed on to this challenge, ranging in size from North Pole, Alaska, to Los Angeles, California. The organization is one of many organizations that have established a partnership with the ICLEI-CCP program to set a worldwide goal of a 60% reduction in emissions from 1990 levels by 2050 (Selin and VanDeveer 2007).

The Sierra Club has aided the rapid growth in issue awareness through their national "Cool Cities Campaign." The goal of the campaign is to have every mayor sign and implement the US Council of Mayors Climate Protection Agreement (MCPA). As part of this campaign, the Sierra Club encourages its members to organize and push their city leaders to sign the MCPA, promoting a bottom-up effect. The Club's website highlights cities that have GHG reduction "success stories" and provides links to a "Cool City" contact in every city that has endorsed the agreement.

Theoretical Framework

Diffusion of innovative policies

Early pioneers outlined basic principles of diffusion of innovative policies across state lines. Walker (1969) originated the study of innovations among states. He concluded that certain states were more likely to adopt policies first, based on internal characteristics. Gray (1973) disagreed with this and argued that innovativeness "is not a pervasive factor; rather it is issue-and-time specific at best." She postulated that the pattern of adoption will vary, and depending upon the issue at hand and the time frame, a state could be either a "leader" or a "laggard."

Recent scholarship has expanded on these ideas. Berry and Berry (1990) argued that it is incorrect to view diffusion based solely on internal (e.g., Walker) or external (e.g., Gray) characteristics. They also expanded on methodological approaches, using an event history analysis to examine the diffusion of state lottery adoptions over time. They show event history analysis (a form of pooled cross sectional time series analysis) to be a useful tool in explaining the adoption of state policies. Mintrom (1997) expanded on Berry and Berry (1990) by incorporating the idea of a policy entrepreneur. Controlling for both internal and external characteristics, he found that an active policy entrepreneur, someone advocating for change, significantly increased the probability of consideration and adoption of school choice legislation.

Studies of diffusion have widely varied on policy topic, including same sex marriage bans (Haider-Markel 2001), abortion (Mooney and Lee 1995), HMO reform

(Balla 2001), and anti-smoking policies (Shipan and Volden 2008). In the environmental arena, empirical applications include net metering (Stoutenborough and Beverlin 2008), clean air regulations (Potoski 2001), and Superfund (Daley and Garand 2005). Although the applications of diffusion of innovation theory are broad, the same principles apply: a combination of external factors (such as pressures from neighboring states) and internal factors (including state wealth, education level, population density) will influence the decision of a state to imitate the policies of their neighbors (Walker 1969; Berry and Berry 1999; Berry et al. 2004). This study examines two possible avenues of external pressure: bottom-up (pressure from cities on the states) and regional (pressure from neighboring states).

Bottom-Up Diffusion

Ushered in during the Reagan years, many policymakers believed that the federal government became too large and powerful, intruding into affairs better handled by states and municipalities. Based on this premise, they argued for a reduction in federal aid, the conversion of matching grants to block grants, greater flexibility for states in implementing federally funded programs, and a reduction of federal mandates. This method of governing is referred to as "devolution," the "devolving" of federal responsibilities to lower levels of government.

Critics of devolution argue that leaving environmental policies to the states will lead to a "race to the bottom" effect, in which some states will relax their environmental standards to avoid losing business to other states that are more "business friendly." The race to the bottom occurs because each state can export the

cost of its more lenient clean air standards (more pollution in the air) to states beyond its borders, while the economic growth attracted by the lower standards occurs exclusively within each state's borders. It is in the best interest of the federal government to maintain control over environmental policy not only to avoid potential environmental degradation, but also to avoid potential interstate conflict caused by the exportation of pollution across state lines (Engel 1997). Under this rationale, federal regulation is justified because the national government would set the standard, which no state could lower, thus eliminating the race to the bottom.

While there is evidence that the level of governance is significant to the implementation of successful environmental policy, there is no consensus in the literature on whether decentralization leads to a race to the bottom (Fredriksson and Millimet 2002; Levinson 1997; List and Gerking 2000). Millimet (2003) asserted that devolution led to better environmental regulation than what would have occurred under a policy of centralization. Comparing data from before Regan's policy shift and the actual levels that occurred after the policy shift, Millimet (2003) found evidence for the opposite effect—a "race to the top"—in pollution control efforts during the Reagan administration.

In an examination of state clean air standards, Potoski (2001) found similar race to the top effects. Despite economic pressure, many states have adopted standards that exceed EPA requirements. A multi-variate analysis showed that these states have stronger pro-environmental political climates, indicating that the

environmental policies were set in response to citizen demands, rather than in deference to economic pressure.

While intergovernmental management studies often focus on federal-state relations, there are other avenues to explore. In the only study to date of policy diffusion from the local to state level, Shipan and Volden (2006) posit that with cooperation and idea exchange, state-level lawmakers may view cities as laboratories of democracy in a manner similar to the way in which the federal government utilize the states. State leaders may allow the cities to try different forms of regulation while they watch and learn. Cities with successful policies stand as proof that regulations can be used to effectively lower GHG emissions. These findings, combined with intergovernmental cooperation models, lead me to my primary hypothesis:

> *Hypothesis 1: Bottom-up diffusion: States with higher city participation in CCP will be more likely to adopt a statewide climate action plan.*

Using city participation in ICLEI CCP as a representative of local initiatives, I predict that states with higher levels of participation in CCP will be more likely to adopt a statewide climate action plan, as city initiatives encourage the development of statewide climate policies.

There is a possibility that state/local relationships may be antagonistic, rather than supportive. In the post-1970's era of federal decentralization, cities have become more dependent than ever on states for funding for key projects, leading to hostile relationships between the largest cities and their states (Weir 1996; Weir et al. 2005).

This “fiscal centralization” is leading to tension between the largest cities, who feel they should have more say in state affairs, and the states. This could potentially lead to a “standoff” situation, in which a state will purposefully avoid adoption of policies similar to their cities. Regarding climate change plans, however, this does not seem to be the case, as cities with noted antagonistic state relationships are in states that have adopted climate plans (Chicago, for example).

Regional Effects

It is, however, possible that factors other than pressure from cities are influencing the development of state climate policies. Diffusion of innovative policy literature points to two additional possible explanations of state policy adoption: pressures from neighboring states, and pressure from internal determinants (Walker 1969; Berry and Berry 1999; Berry et al. 2004). Regional diffusion occurs when states face similar problems as their neighbors and are therefore benefit from similar solutions. Under this model, states with neighbors who have adopted a climate change plan will be more likely to adopt a similar statewide plan. This occurs for three primary reasons: a) states are in competition with one another b) states learn about policies from their neighbors, and c) state leaders face political pressure from their constituents to adopt policies that have been implemented in other states. States tend to face similar problems as their neighbors and are therefore likely to benefit from similar solutions.

Regarding climate change, the regional diffusion model holds true. Large-scale physical effects of climate change, including “bad” air and increased flooding

are shared regionally. The smog in New York City can be correlated with increased asthma rates in Connecticut as well as New York, and thus both states have reason to adopt similar policies for cleaner air. Likewise, weather changes causing flooding in the Midwest affects all states in the region, leading to similar policy solutions. I expect, therefore, to find clustering patterns of climate plan adoption, indicating that states are addressing these problems in a manner similar to their neighbors.

> *Hypothesis 2: Regional diffusion: States with neighbors who have adopted a climate change plan will be more likely to adopt a similar statewide plan.*

Internal Determinants

Internal determinants must be considered along with regional diffusion effects when attempting to describe state policy adoption (Berry and Berry 1990). While it is unrealistic to assume a state will be ignorant of the policies of their neighbors, it is equally as unlikely that state leaders would willfully ignore the conditions of their own state (Berry and Berry 1990). If a state does not have the resources to implement a policy, it is much less likely to pass such a bill, regardless of the policies of its neighbors. Therefore, a complete model of state policy diffusion must consider both internal factors and neighbor effects on diffusion.

I will test the effect of four internal state characteristics suggested by the literature as potential explanations for the adoption of a state climate policy: citizen ideology, united legislature, problem severity, and socioeconomic status.

I expect that a state with a government more liberal leaning constituency (as defined by a scale developed by Berry et. al 1998) will support environmental regulation, as opposed to free-market solutions to environmental problems (Ringquist 1993; Berry et al. 1998). In a related measure, a government united under a Democratic legislature and governor should support a statewide command and control approach to climate change. This is because the Democratic Party, in general, is more likely to view government response and intervention as a viable solution to an environmental problem.

> *Hypothesis 3: Political ideology: States with more liberal citizenship will be more likely to adopt a statewide climate plan.*

> *Hypothesis 4: Legislative control: States with Democratic control of the government will be more likely to adopt a statewide climate plan.*

Pro-health interests were shown in Shipan and Volden (2006) to be a significant predictor of state adoption of anti-tobacco policies. They explain that strong interest group presence utilizes and focuses local examples to build a case for a statewide policy that would not have the opportunity to come together absent a motivated group or policy entrepreneur.

> *Hypothesis 5: Organized interests: States facing stronger pressure from organized interests will be more likely to adopt a statewide climate plan.*

States that are more strongly impacted by climate change should feel stronger pressure to adopt measures to reduce GHG emissions than states that are less affected.

Coastal states, for example, face a higher risk of being affected by rising sea levels caused by climate change and should therefore be more likely to take initiatives to address the problem directly (Lutsey and Sperling 2008; Zahran et al. 2008b; Zahran et al. 2008a).

> *Hypothesis 6: Problem severity: States with urgent climate-related problems will be more likely to adopt a climate policy.*

Adopting any new program is costly; only states with abundant financial resources can afford the luxury of being a participant in an experimental policy (Lutsey and Sperling 2008). Even with excessive funding, the commitment to strictly implement and enforce the policy is necessary for a policy to succeed.

> *Hypothesis 7: Socioeconomic status: States with greater financial resources will be more likely to adopt a statewide climate policy.*

Methods

Analytical Model

To test the effects of municipal policies on state climate plan adoption, data were collected for each state for the years 1990-2007 and analyzed using a discrete-time event history analysis. This approach is used to study the modeling of time to event data; in this context, policy adoption is considered a “failure” or an "event.” This model tests for the effects of both internal and external determinants of policy change and has been used in many empirical studies on state-level policy diffusion (e.g., Berry and Berry 1990, Mooney and Lee 1995, Mintrom 1997).

The dependent variable of interest is the adoption of a state climate plan. To construct the variable for analysis, I collected data from the Environmental Protection Agency and the Pew Center on Global Climate Change. Many states have completed or are in the process of revising or developing a comprehensive climate action plan that details the actions that the state can take to reduce their GHG emissions. The dependent variable is coded as a 0 if a state does not have a plan that year. Once a state has passed a climate plan, the dependent variable is coded 1. The state is dropped out of the model once it adopts a plan and is no longer "at risk" of adoption. The resulting dataset was analyzed using a maximum likelihood logit model. Variance inflation factors were calculated as a test for collinearity. Table 1 shows, by year, the states that have adopted a climate plan.

Table 1. State Climate Plan Adoption by Year

State	Year adopted	State	Year adopted
Alabama	1997	Montana	1999
Arizona	2006	North Carolina	2000
California	2006	New Hampshire	2001
Colorado	1998	New Jersey	1999
Connecticut	2005	New Mexico	2002
Delaware	2000	New York	2003
Florida	2006	Nevada	2007
Hawaii	1998	Oregon	2004
Iowa	1996	Rhode Island	2002
Illinois	1994	South Carolina	2007
Kentucky	1998	Tennessee	1999
Maine	2000	Utah	2000
Massachusetts	2004	Vermont	1998
Maryland	2004	Washington	1996
Minnesota	2003	Wisconsin	1998
Missouri	2002		

Independent Variables

The independent variables in this model are described below and listed in tables 2 and 3.

Bottom-Up and Regional Diffusion

As shown in Shipan and Volden (2006) states can take policy cues from their cities. The key variable of interest in this study is a measure of the percentage of state population covered by the ICLEI-CCP agreement. I calculated the proportion of each state's population that was covered by a climate plan using a database of city membership in the ICLEI-CCP agreement with city-level population data. For each year, I summed the population of those cities covered by the CCP agreement and divided this value by the state's total population. This is the method Shipan and Volden (2006) used to calculate their variable of interest. Using a proportion of state population covered by policy restriction is preferable to a raw count of the number of cities in a state with restrictions, as the size of cities in the CCP program varies from small towns with under 1000 citizens to large cities such as New York and Chicago. By making the measure a proportion of total state population, I can account for variance in city size and with a percentage I can compare across states[1].

Aside from local-to-state diffusion, I control for effect of neighboring states. To assess this effect, I include a measure of the proportion of states with climate plans by EPA region. Admittedly, this is a blunt measure of regional diffusion, but it is a

[1] I did run a model with raw counts, but did not find it to have a significant effect on state adoption.

reasonable proxy for neighbor effects. EPA regional offices are in constant contact with state offices over a variety of environmental issues. Despite the fact that climate plans are not federally mandated, EPA regions offer a forum for the exchange of ideas on all environmental problems including clean air and water, which are strongly linked to the issue of climate change. Moreover, Stoutenborough and Beverlin (2008) showed EPA region to be an influential factor in the adoption of state net metering policies, an policy area closely related to the issue of climate change.

Recent studies of diffusion show the importance of accounting for time dependence when using discrete-time event history analysis (Box-Steffensmeier and Jones 1997; Buckley and Westerland 2004). To account for time, I include an independent variable that counts the years from 1990 until policy adoption.

Internal Determinants

Diffusion of innovation theory indicates that state policy outcomes may be affected by conditions internal to the state, and therefore they must be accounted for in a model of state policy adoption. I specifically focus on several categories of internal characteristics: organized interests, problem severity, socioeconomic status, and political characteristics.

Organized Interests

Pressure from organized interests on state government has long been thought to influence state policymaking. In this study, I account for environmental group pressure with a per capita measure of Sierra Club membership. In general,

environmental groups lobby for and support strict environmental standards. The Sierra Club, in particular, has been a consistent supporter of strict regulation of GHGs. Its current top six policy goals are all related to the mitigation of climate change (Sierra Club 2009). Additionally, it has developed a Climate Recovery Agenda--a set of initiatives "that will help cut carbon emissions 80% by 2050, reduce our dependence on foreign oil, create a clean energy economy and protect our natural heritage, communities and country from the consequences of global warming" (Sierra Club 2009).

It is important to account for pressure in opposition to climate plan adoption. An ideal measure would be a per capita membership count of an organization opposed to climate regulation. In the absence of this data, I use a proxy for business interest pressure on legislators to oppose climate plans: the amount of tax dollars generated by the sale of gasoline within a state. Using information from the Department of Energy, I multiplied the per capita average yearly sales of gasoline (measured in thousands of gallons sold per day per person) by the yearly gasoline tax for each state[2]. Revenues generated from fuel taxes are typically used by a state to support transportation expenditures, such as highway maintenance (Goldman and Wachs 2003). States that generate more revenue from gas taxes should be less likely to implement plans that would encourage the limitation of gas use. Additionally, the energy interests, representing gasoline manufacturers, should be against legislation

[2] I ran models with this variable coded as both tax revenue generated and as a raw number of the gallons of gas sold per capita. Neither measure was significant. I therefore only use tax revenue generated in the final model.

that would lower their sales. For all of these reasons, I expect states that sell more gasoline per capita to face stronger opposition to climate plan adoption.

Problem Severity

Scientific research indicates that the effects of climate change will be felt the hardest in coastal states. As global temperature rises, these states will suffer from increased damage from flooding generated by rising sea levels and severe storms (Intergovernmental Panel on Climate Change 2007). Consequently, it follows that states on the coast, faced with the potential consequences of climate change, will be more invested in finding solutions to the problem such as developing climate plans. I account for this in my model through a dichotomous variable coded 0 for inland states and a 1 for states with ocean shoreline.

To account for problem severity through an economic indicator, I also include the millions of dollars of weather-related damage done to property and crops each year, normalized by crop total acres of productive cropland. States that incur more weather-related damage may be more likely to adopt a climate plan to reduce costs of repairing and replacing damaged areas.

Socioeconomic Status

I also include in this model a measure of per capita gross state product (GSP). A new policy requires a significant amount of resources to implement and enforce. Climate policies have the potential to be resource intensive, as they include costs for monitoring GHG emissions as well as costs incurred by the policies developed to

reduce GHGs. As a result, I predict that states with less financial resources will be less likely to adopt a climate plan.

Political Characteristics

In this model, I include three measures reflecting state government structure. First, a variable is included to measure of unified Democratic control of state government. This is coded as a dichotomous variable with a value of 1 for states in which Democrats control both houses of the legislature and the governorship. A government united under Democratic control should be more likely to adopt a state climate plan, as Democrats are more likely to accept government intervention as a viable solution to environmental problems.

Second, I include a score of legislative professionalism. As developed by Squire (1992), professionalism is a combined value related to a state legislature's salary, staff resources, and time in session. Mirroring the findings of Shipan and Volden (2006), I expect states with a higher level of professionalism to be more likely to adopt innovative policies such as a state climate plan.

Finally, I include a dichotomous variable indicating the presence or absence of a state ballot initiative. Laws passed by legislatures in states with initiatives more closely reflect the state voter's median views (Lupia and Matsusaka 2004). Furthermore, states with initiatives are generally more responsive to public views, allowing citizens to "constrain the behavior of elected officials" (Gerber 1996). Gerber (1998) described cases in which the threat of an initiative vote led to a legislative response. Regarding climate change, a highly contested policy area, I

expect this to be the case. States with initiatives will be more likely to adopt a climate change plan before the idea is placed on an initiative ballot and legislators lose control of framing the issue.

A measure of citizen ideology was originally included, as a measure of citizen ideology created by Berry et al. (1998). I expect the ideology of state citizenry to influence its policies. If a state policy direction is an expression of citizen preferences, a state with a highly liberal citizenship will be more likely to adopt a climate plan. However, this variable is omitted from the final analysis, as a collinearity problem develops when it is in the same model as Sierra Club membership (VIF=6.42). A correlation exists between states with high Sierra Club membership and those with high liberal ideology scores (pairwise correlation score=0.7289, p=0.001). In this study, Sierra Club membership is utilized both to measure environmental support and act an indicator of overall citizen liberalness.

Table 2. Descriptive Statistics of Independent Variables

Variable	Mean	St. Dev.	Min.	Max.
Bottom-up Diffusion				
Percent of state population covered by CCP	1.967	5.688	0	47.150
Regional Diffusion				
Percent of states in EPA region with climate plans	15.368	19.815	0	83.333
Problem Severity				
Shoreline	0.436	0.496	0	1
Weather related damage	0.275	2.205	0	38.679
Organized Interests				
Sierra Club membership	1.709	1.094	0.264	7.973
Gasoline tax revenue per capita	0.251	0.069	0.052	0.450
Political Factors				
Unified Democrat	0.207	0.405	0	1
Legislative professionalism	0.202	0.139	0.034	0.659
Initiative	0.507	0.500	0	1
State Resources				
State GSP per capita	29.087	6.876	15.225	49.981
State Controls				
Percent Bachelors degrees	22.680	5.064	7.500	37.600
Population density	167.081	226.572	0.965	1082.702
Maturation Control				
Temporal counter	7.209	4.873	0	17

Table 3. Descriptions of Independent Variables

Variable	Description
Bottom-Up Diffusion	
CCP	Proportion of state population living in cities that have signed ICLEI CCP. Constructed by author based on USEPA website, US Census and data provided by ICLEI (Anna Frankel).
Regional Diffusion	
EPA	Percentage of states in EPA region that have adopted climate change plans.
Problem Severity	
Shoreline	Dichotomous variable indicating the presence or absence of ocean shoreline.
Damage	Total amount of storm-related damages to property and crops, in millions of dollars, divided by state crop production capacity. From NOAA National Weather Service and USDA Census of Agriculture.
Organized Interests	
Sierra Club	Membership in Sierra Club as a percentage of state population. Provided to author by Dorothy Daley.
Gas tax	Total gasoline sales per capita (thousands of gallons sold per day) multiplied by state's gas tax. Constructed with data from Department of Energy and The Tax Foundation.
Political Factors	
Citizen ideology	Ideology score for state citizenship. From Berry et al.; available on ICPSR website.
Unified Democrat	Dichotomous variable indicating Democratic party control of all state political institutions (governorship, both houses of legislature). Constructed by author based on *Book of the States*, various years.
Legislative professionalism	Measure of professionalism of state legislature. From Squire (1997). Same value used for all years.
Initiative	Dichotomous variable showing presence or absence of a state ballot initiative process.
State Resources	
GSP	State per capita income (millions of dollars). From US Dept. of Commerce Bureau of Economic Analysis.
State Controls	
Bachelors	Percentage of the population 25 years and over with bachelor's degree or higher. From US Dept. of Commerce Bureau of Economic Analysis and US Census.
Population density	State population per square mile. From US Census.
Maturation Controls	
Temporal counter	Variable that counts the years until policy adoption

Results and Discussion

Over five hundred US cities, representing millions of citizens, are participating in the ICLEI CCP program. These cities have committed themselves to lowering greenhouse gas emissions and have implemented successful strategies. Due to the success and popularity of the city plans, it stands to reason that the states would adopt similar measures, using the cities as a "laboratories of democracy" in a relationship similar to that between the states and federal government. The results of this analysis, however, indicate that citizen pressure is significant, but it does not act through the cities, but through the actions of organized interests. These results indicate that state climate plan adoption is not related to local government action, but is significantly related to Sierra Club membership within the state. The analytical results of the model are presented in table 4 and are further discussed below.

Table 4. Determinants of State Climate Plan Adoption

Variable	Coefficient	Std Error
Bottom-Up Diffusion		
Percent of state population covered by CCP	0.038	0.024
Regional Diffusion		
Percent of states in EPA region with climate plans	-0.012	0.014
Problem Severity		
Shoreline state	-0.108	0.539
Weather related damage	-1.543	1.462
Organized Interests		
Sierra Club membership	0.371*	0.167
Gasoline tax revenue per capita	-0.005	0.049
Political Factors		
Unified Democrat	0.144	0.564
Legislative professionalism	-1.303	1.641
Initiative	-0.465	0.452
State Resources		
State GSP per capita	-0.005	0.049
State Controls		
Percent Bachelors degrees	0.042	0.059
Population density	0.001	0.001
Maturation		
Temporal counter	0.218*	0.073
Constant	-6.515*	1.573
N=716		
Prob χ^2 = 0.000		
R^2 = 0.159		

Note: * indicates significance at the 0.05 level.

Regional and Bottom-Up Diffusion

In this analysis, regional pressure does not factor into a state's decision to adopt a climate change plan. This indicates a lack of competition between states to sign plans. However, since this analysis does not focus on a specific type of action, only the fact that a promise for action was made, this may not be the case if specific types

of climate-related actions are examined. The dichotomous variable indicating presence or absence of a climate plan may not accurately reflect tendencies for specific policies. Perhaps running multiple models for specific types of climate change policies, such as whether states are setting performance standards for vehicles (by law, states may follow federal emissions standards or the more stringent standards set by California) may show regional effects to be significant in pushing certain types of policies over others. For example, regional diffusion was shown to be a significant factor in the adoption of net-metering policies, which are a proposed solution to combating climate change (Stoutenbouough and Beverlin 2008). The PEW Center on Global Climate Change lists over 20 policy types that can be used as possible comparisons across states.

The idea of policies diffusing in a bottom-up pattern is a potential avenue that has been overlooked by the literature. However, as this study shows, the importance that diffusion pressure has on policy adoption may be dependent upon the policy being debated. Shipan and Volden (2006) found evidence for bottom-up diffusion in the adoption of state anti-smoking laws, a highly contested issue with an easily definable problem. The laws being passed had penalties for failure to comply. In contrast, the climate change plans studied in this research are non-binding agreements to address the technically complex issue of climate change. Additionally, in Shipan and Volden's study, the state laws fell into categories that were similar to the local

laws they emulated. For example, they examined smoking bans in restaurants, smoking bans in public buildings, and restrictions on the size of cigarette packages that may be sold. These categories of action were easily comparable across states and between the state and local levels. Regarding climate change plans, each state varies greatly in the way in which they choose to act, or even if further action will be taken. The presence of a climate change plan may not mean the same thing in every state, so this study may not be comparing the same units across all states. One possible way to address this is to emulate Shipan and Volden and create several models to examine multiple policies that fall into easily identifiable categories that can be compared across all states and localities.

Political and Demographic Factors

Perhaps for a similar reason, in this model the adoption of a state climate change plan was not affected by state political (unified Democratic government, legislative professionalism, presence of a ballot initiative) and demographic (state GSP, education levels, and population density) factors. The plans are a promise that something will be done, not a binding agreement on what will be done, and there is no cost to signing the agreement, as well as no penalty for failure to act. State resources do not have an impact if the state is not actually taking action, as it does not cost anything to sign an agreement. Democrat and Republican controlled states were equally likely to adopt a plan, indicating that Democratic control of a state does not

affect the likelihood of a plan being adopted. An examination of different types of actions being taken among states may show different results, as would a study of those states that are actively pushing for specific climate change actions. Furthermore, the presence of a ballot initiative had no effect on the likelihood of adoption. Theoretically, these factors should be important if the policies were highly contested, as legislators in states with initiatives would rush to adopt policies that are politically beneficial to them, rather than losing control of the issue and allowing a ballot vote.

Problem Severity

Neither measure of problem severity is a significant predictor of state action. This result is counter-intuitive at first, as it seems logical to expect that states with a more pressing issue would be more likely to seek a solution to the problem. However, while there is a scientific consensus that climate change is anthropogenic, this fact is still being debated in the political arena. Furthermore, the impact of changes in climate on weather patterns is still being debated. Given these unknowns, states may be reluctant to act on climate change legislation, regardless of the costs to property and crops. It may be more politically feasible to spend resources on other, proven, solutions such as improving shoreline defenses against flooding and early warning systems, than on the potential of climate change prevention.

Organized Interests

The amount of tax dollars generated by the sale of gasoline was not a significant predictor, indicating there is not fiscal pressure from against the adoption of climate change plans in a state.

Of all of the independent variables in this study, only Sierra Club membership was significant. This result is consistent with explanations given above for the other variables when considering the dependent variable: whether a state has passed a climate change plan. These plans are non-binding agreements, and a state can pass a plan without penalty for not meeting their set targets. Legislators in states with stronger environmental support, measured here by higher percentage of population as members of Sierra Club, face more pressure to sign climate change agreements, thus appeasing voters at very low costs to their own political agendas.

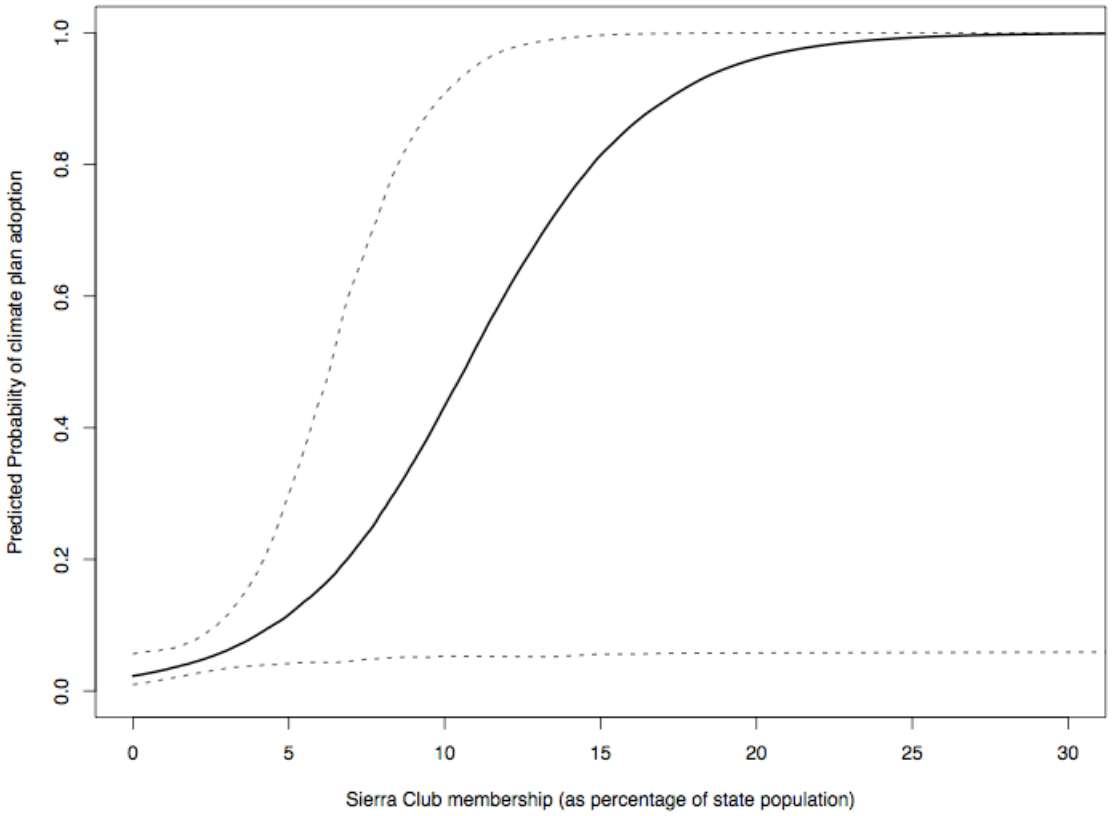
Table 5 reports the predicted probabilities of state climate change plan adoption at various values of Sierra Club membership. When all variables are held at their means, a state has a less than five percent chance of adopting a climate plan. When the percentage state Sierra Club membership increases by one standard deviation (an increase of 1.4 percent of the state population), this increases to six percent. When Sierra Club membership is at its maximum value (7.9 percent of state population), the likelihood of a state adopting a climate plan increases to nearly thirty percent. The relationship between Sierra Club membership and state action can further be seen in figure 1, which shows the predicted probability of state adoption over a range of values for CCP participation.

Table 5. Predicted Probabilities of State Adoption of a Climate Action Plan

Model Characteristics	Predicted Probability of Policy Adoption
All variables at mean (Sierra = 1.752)	0.041
Percent Sierra Club membership at minimum value (0.263)	0.025
Percent Sierra Club membership at maximum value (7.972)	0.270
A one standard deviation increase in Percent Sierra Club (2.896)	0.060
Two standard deviation increase in Percent Sierra Club (4.041)	0.086
A one standard deviation loss in Percent Sierra Club (0.607)	0.028
Sierra Club membership at zero	0.023
Ten percent Sierra Club membership	0.427
Fifteen percent Sierra Club membership	0.808
Twenty percent Sierra Club membership	0.960

Note: All variables in model are held at their mean value unless otherwise noted.

Figure 1. Predicted Probabilities of State Climate Plan Adoption



Note: All other variables held at their mean value. Dotted lines indicate 95% confidence intervals.

Alternative models

Given the lack of significant results, I explored alternative model specifications: a cross-sectional analysis for the year 2007, and a combination of both models through a pooled cross-sectional time series analysis. The results of both models are found in the appendix. The cross-sectional analysis supports the results of this study, indicating Sierra Club membership as a significant predictor of state action. The pooled cross-sectional time series analysis, however, yields conflicting results, not noting Sierra Club membership as significant predictor, but indicating that percent CCP signatory cities and the absence of a ballot initiative are the factors that influence a state's policy adoption.

The conflicting results from these analyses may be due to the nature of climate change policy and how it is modeled. In the discrete-time event history and the cross-sectional analyses, policy adoption is modeled as a static process, once a state adopts a policy, it is "locked in" to its decision and do not change. The pooled cross-sectional time series analysis, however, models adoption as a dynamic process. New cities are signing the CCP agreement at a rapid rate. States are continually amending their policies, allowing the possibility, if the analysis were extended into future years, for a state to revert from a 1 back to a 0 as policymakers reconsider available options. Running the data as a pooled cross-sectional time series analysis accounts for the possibility of a state reverting, as a state is not dropped out of the model once it

adopts a plan. This allows for the fact that policy plans are not absolute and a state may change its mind over time.

Running an analysis this way for the years 1990-2007 produces results contrary to the event history analysis and cross sectional analysis. In this model, CCP participation is a significant variable. These results lend support to the idea that, regarding climate change policies, bottom-up diffusion is occurring. In this model, as theorized, states are taking cues from local governments, placing the states in the middle of an inactive federal government and highly active local governments. Given this model, an understanding of the conditions under which states follow the lead of their cities is dependent upon how the policy is considered. If it is treated as a static object that remains unchanged across all time periods, the analysis indicates that citizen pressure is the most significant predictor of state action. If, however, the policy is treated as a dynamic object that changes over time, the model allows for the idea that states are taking cues from their cities.

Conclusion

Given the potential importance of local drivers on state policy adoption, the results of this study were surprising. Bottom-up diffusion was not a key factor in the adoption of state climate plans, but Sierra Club membership was. This result, in combination with the fact that none of the state political or demographic factors were found to be significant, indicates that states are passing climate change plans in deference to the wishes of their citizens. This is perhaps because of the nature of the climate change plans. They are non-binding agreements and do not have a penalty for

non-attainment of set goals, making it relatively easy to pass a symbolic climate plan to appease citizen pressure.

Several avenues of future research are suggested by the results presented here. I would like to examine which states are more likely to be actively pushing specific solutions, rather than signing a broad plan. Examining several specific policies types across all states, such as net metering programs, or vehicle emissions standards, can do this. A second possibility to compare policies across states is the construction of a scale that measures the aggressiveness with which a state is pursuing climate change policies. One way to construct this scale would be ranking each state based on how many of the 16 "State Best Practices" outlined by the EPA (US Environmental Protection Agency 2006).

Although not included in this study, a study of individual personal characteristics of individual governors may yield interesting results. Clearly, some mayors have been more active than others in pursuing citywide initiatives to address climate change. The mayor of Chicago, for example, example, in order to encourage greener, more energy-efficient buildings, successfully advocated for the city's creation of an expedited building permit process, leading to more than 2 million square feet of "green building" (City of Chicago 2009). The presence of an "eco-friendly" governor acting as a policy entrepreneur may lead a state to be more likely to aggressively pursue climate change action.

Finally, while the results of the discrete-time event history analysis did not show bottom-up diffusion to be a significant predictor, the results of the pooled cross-

sectional time series analysis indicates a need for more research into the nature of the problem. The nature of the policy being considered, whether policy adoption is viewed as a static or dynamic process, should be given more consideration.

Climate change is among the most serious problems facing the world today. Most scientists agree that should the problem remain unchecked, the consequences will be wide-reaching and dire. Despite an international call for action on the issue, the United States has not announced a policy agenda to address the issue. In this policy vacuum, it has fallen to the states to take up the problem and create solutions. Although climate change is an active area of policy research, current studies neglect the increasingly significant role that municipal governments may have in influencing state-level action. The possibility of bottom-up diffusion has been largely ignored, except for a small number of case studies that on the state-national relationship. Although it was not discovered to be a driver in this study, future studies should look to bottom-up diffusion as a possible explanation for state policy adoption.

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Appendix A: List of CCP Signatory Cities

City Name[3]	Year Signed
Prior to 2000	
Berkeley, CA	1991
Santa Monica, CA	1991
Muncie, IN	1991
Newark, NJ	1991
Olympia, WA	1991
Miami-Dade County, FL	1991
Portland, OR	1991
Denver, CO	1992
Minneapolis, MN	1992
Saint Paul, MN	1992
Austin, TX	1993
Chicago, IL	1993
Chula Vista, CA	1994
Boulder, CO	1995
Burien, WA	1996
Atlanta, GA	1996
Overland Park, KS	1996
San Francisco, CA	1997
Aspen, CO	1997
Burlington, VT	1997
Cambridge, MA	1999
New York, NY	1999
Seattle, WA	1999
2000	
Boston, MA	2000
San Diego, CA	2000
Fort Collins, CO	2000
2001	
Santa Cruz, CA	2001
Irvine, CA	2001
Decatur, GA	2001
Washtenaw County, MI	2001
Duluth, MN	2001
Chapel Hill, NC	2001
Ann Arbor, MI	2001
Carrboro, NC	2001
2002	

[3] Counties listed in this table were not used in final analysis to avoid problems with double-counting cities.

Santa Rosa, CA	2002
Arlington County, VA	2002
Brattleboro, VT	2002
Madison, WI	2002
2003	
Sonoma City, CA	2003
Sonoma County, CA	2003
Rohnert Park, CA	2003
San Anselmo, CA	2003
Windsor, CA	2003
Annapolis, MD	2003
College Park, MD	2003
Durham, NC	2003
Healdsburg, CA	2003
Orange County, NC	2003
2004	
Marin County, CA	2004
2005	
Carbondale, CO	2005
San Rafael, CA	2005
Carol Stream, IL	2005
Fort Wayne, IN	2005
Medford, MA	2005
Denton, TX	2005
San Miguel County, CO	2005
2006	
Gunnison County, CO	2006
Saint Louis, MO	2006
Asheville, NC	2006
Salt Lake City, UT	2006
Houston, TX	2006
Belmar, NJ	2006
Roseville, MN	2006
Arcata, CA	2006
Cloverdale, CA	2006
Santa Clara County, CA	2006
Sacramento, CA	2006
Palo Alto, CA	2006
Gainesville, FL	2006
New Orleans, LA	2006
Belmont, MA	2006
Reading, MA	2006
Worcester, MA	2006
Chevy Chase, MD	2006
Portland, ME	2006

Northfield, MN	2006
Hamilton, NJ	2006
Maplewood, NJ	2006
Albuquerque, NM	2006
Oneonta, NY	2006
Saratoga Springs, NY	2006
Eugene, OR	2006
San Leandro, CA	2006
Santa Barbara, CA	2006
Pittsfield, MA	2006
King County, WA	2006
Spokane, WA	2006
Tacoma, WA	2006
Alameda, CA	2006
Emeryville, CA	2006
Boise, ID	2006
Charleston, SC	2006
Dallas, TX	2006
Milwaukee, WI	2006
Sarasota County, FL	2006
Anchorage, AK	2006
Alameda County, CA	2006
Albany, CA	2006
Willits, CA	2006
Des Moines, IA	2006
Kansas City, MO	2006
Providence, RI	2006
Chattanooga, TN	2006
Harrisonburg, VA	2006
Oak Harbor, WA	2006
Babylon, NY	2006
Plano, TX	2006
Montpelier, VT	2006
Fort Bragg, CA	2006
Point Arena, CA	2006
Whatcom County, WA	2006
Kirkland, WA	2006
Winchester, MA	2006
Newburyport, MA	2006
Roanoke, VA	2006
Devens, MA	2006
Columbia, SC	2006
Jackson, WY	2006
Pioneer Valley Planning Commission, MA	2006
Ipswich, MA	2006
Central Massachusetts Regional Planning Commission (RPC)	2006
Atherton, CA	2006
Tumwater, WA	2006
American Canyon, CA	2006

2007	
Las Vegas, NV	2007
Ithaca, NY	2007
Belfast, ME	2007
Raleigh, NC	2007
Greenburgh, NY	2007
Golden, CO	2007
Portola Valley, CA	2007
Saint Helena, CA	2007
Bozeman, MT	2007
Larchmont, NY	2007
San Ramon, CA	2007
Buncombe County, NC	2007
Rolling Hills Estates, CA	2007
Fitchburg, WI	2007
Antioch, CA	2007
Novato, CA	2007
Petaluma, CA	2007
San Jose, CA	2007
Fairfax, CA	2007
Davis, CA	2007
Oakland, CA	2007
Stamford, CT	2007
Weston, CT	2007
Orange County, FL	2007
Tampa, FL	2007
Amherst, MA	2007
Natick, MA	2007
Springfield, MA	2007
Mount Rainier, MD	2007
Takoma Park, MD	2007
Missoula, MT	2007
Keene, NH	2007
Nashua, NH	2007
Huntington, NY	2007
Westchester County, NY	2007
Ashland, OR	2007
West Chester, PA	2007
Pittsburg, CA	2007
Pleasanton, CA	2007
Richmond, CA	2007
Torrance, CA	2007
Walnut Creek, CA	2007
Santa Clara, CA	2007
Miami, FL	2007
Clearwater, FL	2007
Hayward, CA	2007
Martinez, CA	2007
Mill Valley, CA	2007

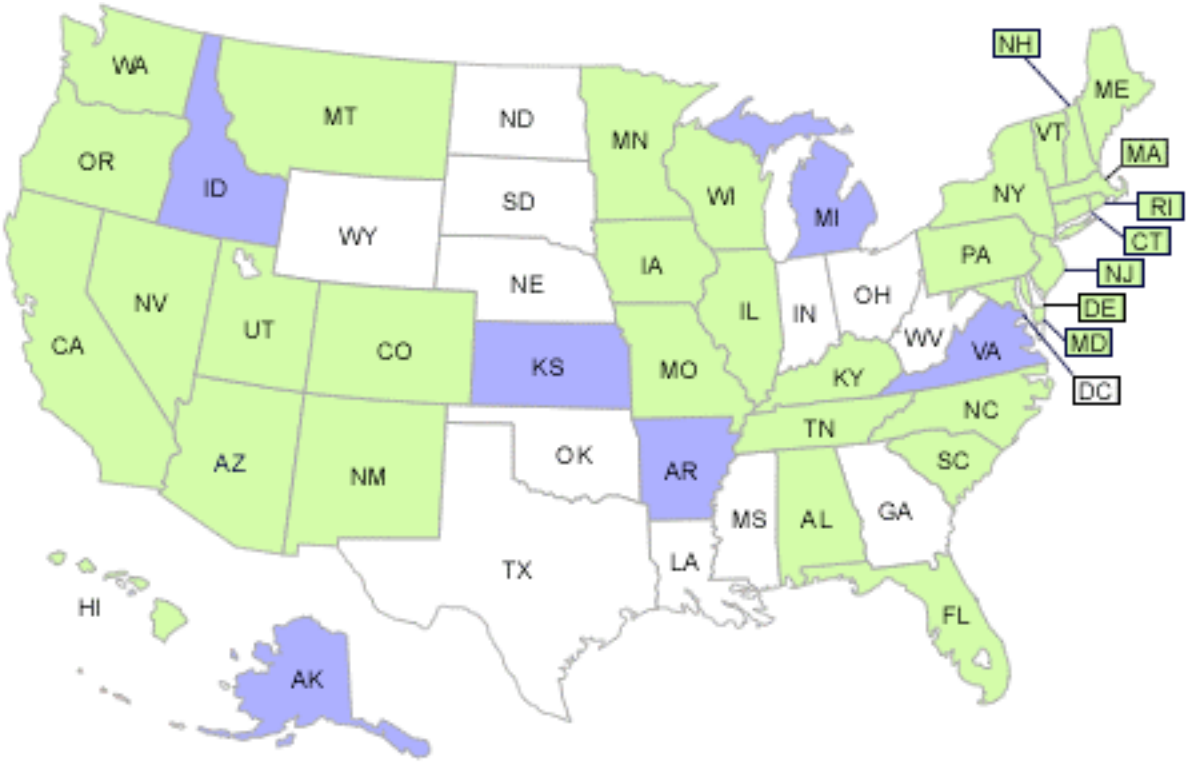
Key West, FL	2007
Sarasota, FL	2007
Newton, MA	2007
Shutesbury, MA	2007
Baltimore, MD	2007
Prince George's County, MD	2007
Montgomery County, MD	2007
Virginia, MN	2007
Fayetteville, AR	2007
Winston-Salem, NC	2007
Santa Fe, NM	2007
Bellingham, WA	2007
Chico, CA	2007
Fremont, CA	2007
Cincinnati, OH	2007
Cleveland, OH	2007
Pittsburgh, PA	2007
Everett, WA	2007
Northampton, MA	2007
Phoenix, AZ	2007
Leon County, FL	2007
Portsmouth, NH	2007
Windham, CT	2007
Tompkins County, NY	2007
Juneau, AK	2007
Belvedere, CA	2007
Benicia, CA	2007
Contra Costa County, CA	2007
Danville, CA	2007
Dublin, CA	2007
El Cerrito, CA	2007
Lafayette, CA	2007
Larkspur, CA	2007
Menlo Park, CA	2007
Morgan Hill, CA	2007
Redondo Beach, CA	2007
Ross, CA	2007
Orlando, FL	2007
Lawrence, KS	2007
Lexington, MA	2007
Hyattsville, MD	2007
Traverse City, MI	2007
Columbia, MO	2007
Charlotte, NC	2007
Charlottesville, VA	2007
Mercer Island, WA	2007
Arlington, TX	2007
Piedmont, CA	2007
Blacksburg, VA	2007
Nevada City, CA	2007

Hermosa Beach, CA	2007
Oberlin, OH	2007
Teton County, WY	2007
Mendocino County, CA	2007
Edmonds, WA	2007
Homer, AK	2007
Knoxville, TN	2007
New Castle County, DE	2007
Bedford, NY	2007
White Bear Lake, MN	2007
Ada County, ID	2007
Lake Oswego, OR	2007
Manitou Springs, CO	2007
Nassau County, NY	2007
Red Hook, NY	2007
Signal Mountain, TN	2007
East Lansing, MI	2007
Clarkstown, NY	2007
Tukwila, WA	2007
Kingston, MA	2007
North Castle, NY	2007
Haverford, PA	2007
Arvada, CO	2007
Ayer, MA	2007
Waterville, ME	2007
Kodiak, AK	2007
La Plata County, CO	2007
Bellevue, WA	2007
Millbrae, CA	2007
Lynnwood, WA	2007
Lake Forest Park, WA	2007
Snohomish County, WA	2007
Decorah, IA	2007
Norfolk, VA	2007
Sacramento County, CA	2007
Moraga, CA	2007
Shoreline, WA	2007
West Palm Beach, FL	2007
Pinole, CA	2007
Dover, NH	2007
Pierce County, WA	2007
Moscow, ID	2007
Lower Makefield, PA	2007
Meadowlands Commission, NJ	2007
Norman, OK	2007
Brighton, NY	2007
Park City, UT	2007
Marathon, FL	2007
West Sacramento, CA	2007
Manhattan Beach, CA	2007

North Miami, FL	2007
Athens, OH	2007
Dubuque, IA	2007
Yonkers, NY	2007
Riverside, CA	2007
Cedar Falls, IA	2007
Northbrook, IL	2007
Hillsboro, OR	2007
Port Townsend, WA	2007
Sumter, SC	2007
Jefferson County, WA	2007
Gaithersburg, MD	2007
Rockville, MD	2007
Clallam County, WA	2007
Roanoke County, VA	2007
Waltham, MA	2007
Alliance, OH	2007
Albemarle County, VA	2007
Hailey, ID	2007
Radnor, PA	2007
West Windsor, NJ	2007
Nether Providence, PA	2007
Livermore, CA	2007
Ferndale, WA	2007
Elmhurst, IL	2007
Edina, MN	2007
San Carlos, CA	2007
Washougal, WA	2007
Galloway, NJ	2007
Issaquah, WA	2007
Johnson County, IA	2007
Riverhead, NY	2007
Lincoln, MA	2007
Queen Anne's County, MD	2007
Southwest Region Planning Commission (RPC)	2007
Warrenton, VA	2007
Calistoga, CA	2007
Clinton County, MI	2007
Rochester, NH	2007
Albany, NY	2007
Newark, CA	2007
Falmouth, ME	2007
Windsor, CT	2007
Vancouver, WA	2007
Humboldt County, CA	2007
Hillsborough, CA	2007

Appendix B: Maps

State Climate Action Change Plans



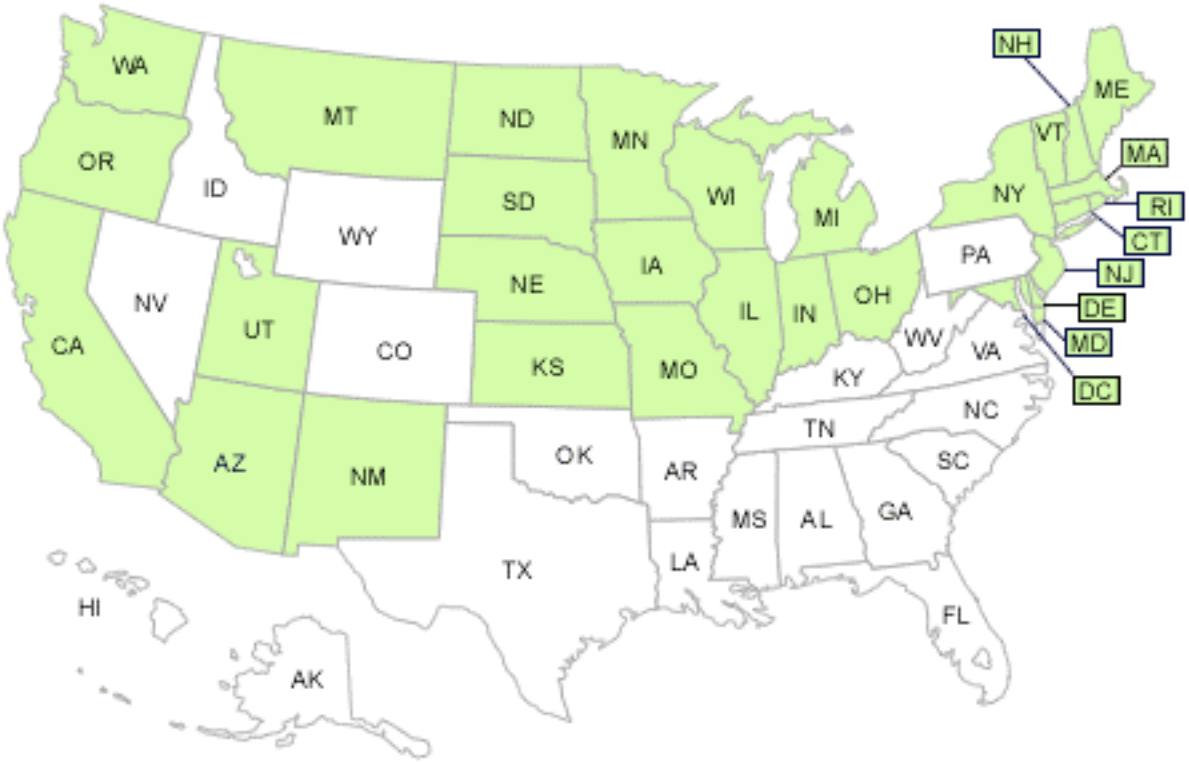
Completed Plan- 32: AL, AZ, CA, CO, CT, DE, FL, HI, IA, IL, KY, ME, MD, MA, MN, MO, MT, NH, NJ, NM, NV, NY, NC, OR, PA, RI, SC, TN, UT, VT, WA, WI

Plan In Development- 6: AK, AR, ID, KS, MI, VA

No Policy in Place- 13: GA, IN, LA, MS, NE, ND, OH, OK, SD, TX, WV, WY

Information current as of August 2008. Figure from USEPA webpage
http://www.epa.gov/climatechange/wycd/stateandlocalgov/state_planning.html#four

State Regional Climate Initiatives



In a regional agreement- 30: AZ, CA, CT, DE, DC, IL, IA, IN, KS, ME, MD, MA, MI, MN, MO, MT, NE, NH, NJ, NM, NY, ND, OH, OR, RI, SD, UT, VT, WA, WI

No agreement in place- 21: AL, AK, AR, CO, FL, GA, HI, ID, KY, LA, MS, NV, NC, OK, PA, SC, TN, TX, VA, WV, WY

Information current as of August 2008. Figure from USEPA webpage
http://www.epa.gov/climatechange/wycd/stateandlocalgov/state_planning.html#two

Appendix C: Other Models

Table C1. Determinants of State Climate Plan Adoption

(Longitudinal time series logistic regression)

Variable	Coefficient	Std Error
Bottom-Up Diffusion		
Percent of state population covered by CCP	0.270*	0.118
Regional Diffusion		
Percent of states in EPA region with climate plans	-0.032	0.050
Problem Severity		
Shoreline state	-0.769	2.705
Weather related damage	-0.001	0.001
Organized Interests		
Sierra Club membership	0.673	0.780
Gasoline tax revenue per capita	14.150	15.049
Political Factors		
Unified Democrat	0.445	1.485
Legislative professionalism	-1.874	8.636
Initiative	-5.835*	2.430
State Resources		
State GSP per capita	0.099	0.290
State Controls		
Percent Bachelors degrees	0.278	0.241
Population density	-0.001	0.006
Maturation		
1995	-0.435	3.924
1996	5.503	3.650
1997	7.213	3.782
1998	12.176*	3.866
1999	14.999*	4.002
2000	18.304*	4.133
2001	18.894*	4.100
2002	21.276*	4.189
2003	22.901*	4.366
2004	25.895*	4.271
2005	26.918*	4.416
2006	29.996*	4.725
2007	30.145*	4.668
Constant	-37.337*	8.398
N=700		
Wald χ^2 = 181.74		
Prob χ^2 = 0.000		

Note: * indicates statistical significance at the 0.05 level.

Table C2. Determinants of State Climate Plan Adoption

(Cross-sectional analysis for year 2007)

Variable	Coefficient	Std Error
Bottom-Up Diffusion		
Percent of state population covered by CCP	0.097	0.060
Regional Diffusion		
Percent of states in EPA region with climate plans	0.046	0.031
Problem Severity		
Shoreline state	-0.043	1.044
Weather related damage	-0.000	0.001
Organized Interests		
Sierra Club membership	1.840*	0.888
Gasoline tax revenue per capita	2.491	6.400
Political Factors		
Unified Democrat	0.579	1.271
Legislative professionalism	-5.915	6.206
Initiative	-0.746	0.937
State Resources		
State GSP per capita	-0.085	0.105
State Controls		
Percent Bachelors degrees	-0.134	0.149
Population density	0.011	0.006
Constant	0.697	5.882
N=50		
R^2 =0.406		
Prob χ^2 = 0.008		

Note: * indicates significance at the 0.05 level.