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State-level factors in Metropolitan Climate Activism

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State-level factors in Metropolitan Climate Activism

Cover Page Footnote

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Introduction

Despite the growing scientific, political, and public recognition of global climate change (Ury 2011; IPCC Summary 2013), an increasingly partisan debate in US politics threatens to undermine the movement's momentum evident a decade ago. Public opinion, while generally recognizing the reality of climate change, remains ambivalent on its causes and public policy implications (Dunlap and McCright 2008; Guber 2012; Zajko 2011). The lack of a galvanized public undoubtedly emboldens many national leaders to sidestep consideration of climate change. The recent US disengagement from the Paris Climate Agreement and the response of states, cities, and other actors to this decision (Popovich and Schlossberg 2017) is one more twist in what Rabe (2008: 105) refers to as the "odyssey of climate change policy."

Notwithstanding this apparent pause in the climate change movement, subnational governments play a significant role in addressing climate change at the local level (Betsill 2001). Cities can address local sources of greenhouse gas (GHG) emissions and simultaneously affect the tenor of public debate and policy. According to Bulkeley (2010), cities have a significant carbon footprint, perhaps as much as 75 percent of global GHG emissions, although estimates vary. Lee and Koski (2012) add that cities control a number of factors of modern life that contribute directly to the problem of GHG emissions, including land use, municipal waste, and building codes. At the same time, municipalities are limited in their capacity to "own" and manage sources of GHG emissions for which they have little control, particularly in the absence of state and federal policy.

Cities must also overcome the "rationality" of climate inaction; cities can neither limit the benefits of climate mitigation to their own boundaries nor insulate themselves from the effects of GHG emissions outside those boundaries (Krause 2011). As Engle and Orbach (2008: 120) note: "In such instances, free riding is often the economically superior course of action." Individual cities contribute relatively little to the overall problem of climate change, thus motivating action at this level runs counter to individual rationality in a global commons (Zahran 2010). Encouraging cities to address climate change in the face of limited expectation of success represents an interesting collective action problem.

The evolution of several "city networks" at both the national and global level indicates that these collective behavior problems are not insurmountable. In the United States, the largest city network by far is the United States Conference of

Mayors (USCM) Mayor's Climate Protection Agreement (MCPA). The MCPA evolved in 2005 from the effort of a few mayors. Signatories of the MCPA committed their cities to reducing GHG emissions to 7 percent below their 1990 levels by 2012, the same goal as the Kyoto Treaty when it became effective in 2006. Almost 1000 cities had signed the agreement by 2009 (USCM 2009), representing the majority of mayors in the conference, 5 percent of cities, and 30 percent of the US population (Krause 2010). While the shelf life of the agreement did not extend past 2012, the USCM has nonetheless continued to promote a variety of climate protection policies, research, and official recognition of exemplary city practices.[1]

States have also taken on a significant role in promoting energy and climate policy despite the absence of federal policy leadership (Barbour and Deakin 2012; Zahran et al. 2010; Vasseur 2014). The majority of states are addressing energy issues with the goal of reducing energy use and promoting alternative sources of power (see Carley 2011 for a review). Currently, 34 states have a state Climate Action Plan (CAP) (Center for Climate and Energy Solutions 2017). Kwon et al. (2014) argue that states can play an entrepreneurial role promoting climate activism. Most state CAPs were enacted in the first decade of this century, reflecting greater bi-partisan agreement regarding the need to address climate change. Since then, climate debates have become increasingly fractious; although most states continued to promote a wide portfolio of energy policies (Carley 2011), a few states have backpedaled on such commitments (Deitchman 2017: 50).

Thus, while cities and states are central to the climate debate, the degree to which state-level factors influence municipal climate activism remains uncertain. Krause (2010: 48) argues it is logical to expect that a certain degree of "vertical diffusion" exists between states and cities regarding climate policy. Policy diffusion from cities and states to the federal government has characterized a number of public policies, including state-mandated recycling. Selin and VanDeveer (2007) add that policy diffusion exists across municipal networks, as well as other organized coalitions promoting policy innovation and learning among sub-state actors, including state regional climate initiatives, public-private partnerships, and private sector groups. Thus, we would expect that states leading in climate planning will also have a greater number of cities and a larger percentage of the population associated with MCPA. However, several factors are also likely to influence state-level municipal activism, including civic capacity and coastal proximity (Brody et al. 2009), partisanship (Deitchman 2017; Geri and McNabb 2011), climate stress (Zahran et al. 2008), and state energy leadership (Selin and

VanDeveer 2007). This research examines whether state sociodemographic factors and energy policy are associated with two measures of municipal climate activism treated as a state-level phenomenon.

Climate Protection and City Networks

Several major "city networks" (Lee and van de Meene 2012: 200) have evolved to address climate change. The municipal climate protection movement, however, is of relatively recent origin, corresponding to the growth of global climate change as an environmental problem. One of the first networks to evolve was the International Council for Local Environmental Initiatives (ICLEI) Cities for Climate Protection (CCP). This network has grown to over 1000 cities throughout the world (Bulkeley 2010). Betsill (2001) notes that the CCP project formed in 1990, establishing the Urban CO_2 Reduction Project or UCRP in the US, Canada, and Europe the following year. In 1993, this campaign morphed into the CCP campaign. The CCP campaign requires cities to issue an executive decree binding the city to the CCP campaign goal. By 2001, 79 US cities were part of the CCP. As Zahran et al. (2008) note, the campaign moves cities from emission analysis to action plans with specific timetables for targeting CO_2 emissions to 20 percent below 1990 levels, which is significantly more proactive than the Kyoto Treaty. Bulkeley (2010) indicates that a second wave of networks formed in the 2000s. These newer networks are more likely to have evolved within national contexts, the US Conference of Mayors being one of the first to do so in 2005.[2]

Much of the research on climate city networks examines differences between signatory and nonsignatory cities as well as the "rationality" of joining a city network. For example, Zahran et al. (2008) examine the ecological factors for why cities participate in climate change activities despite the free rider problem, focusing on climate risk, such as proximity to the east or west coast, local climate stressors, and civic capacity to adapt locally. Such commitments are more likely when regional planning and coordinating entities reduce the cost of participation to localities and increase the selective incentives for doing so. Overcoming such costs has often entailed framing climate actions in terms of the additional "co-benefits" that are realized (Kwon et al. 2014), such as economic growth or future fiscal payoffs. Betsill (2001) also emphasizes the importance of "local hooks" when framing climate protection, to "think locally, act locally" (p. 404), particularly as this relates to such local issues as air quality, quality of life, and development. Furthermore, while cities have "localized the policy of controlling GHG emissions"

(p. 398), many cities nonetheless frame the issue as a global problem. Where cities do not traditionally prioritize environmental protection, such hooks may not be available to address climate mitigation or adaptation. Brody et al. (2009) underscore the significance of local excludable benefits, but also the importance of climate risks or anthropogenic climate stressors, and local capacity to address GHG emissions for predicting municipal climate action.

The question raised by this research and others is why some cities engage in climate activism, or conversely, why some do not. As Hamin et al. (2014) note, local governments that lack access to peer cities, regional networks, or progressive state policies are likely to face greater obstacles in implementing such plans at the local level. Research on coastal communities in Massachusetts experiencing sea level increases suggests that these “capacity constraints” (p. 113) make planning challenging even when climate change is evident. As Wood et al. (2014) argue, local leaders face a variety of community attitudes regarding climate change from active support to apathy and hostility. Where municipal leaders cannot count on a supportive community environment, signing the MCPA, or more recent USCM pledges, could be politically problematic. Their research points out that while “viral governance” has encouraged states and municipalities to engage in climate planning, the reality on the ground is much more complex. Many communities are reframing climate problems as “something else” (p. 548) and thus bypassing potentially adverse community reactions.

An important issue to address, particularly if cities become the primary agents of climate policy, is whether municipal climate actions have a significant impact in reducing GHG emissions. Wang (2012) asserts that there is a tendency for cities to focus on “win-win” measures that emphasize the co-benefits of climate action, particularly those related to mitigation rather than adaptation. This may be particularly true for the MCPA compared to the ICLEI-CCP network, which is more predictive of those climate actions not typically taken by cities to mitigate GHG emissions. On the other hand, Wood et al (2014) and Krause (2011) found significantly higher mean number of mitigation actions for MCPA signatory cities compared to their nonsignatory counterparts. Similarly, Lee and Koski (2012) found that MCPA cities had a higher number of green building projects, specifically those that are Leadership in Energy and Environmental Design (LEEDS) certified. However, as Wang (2012) notes, the MCPA’s lack of enforcement mechanisms or consequences for not meeting emission goals makes it difficult to distinguish symbolic or politically expedient statements from more substantial commitments.

In summary, many US cities are engaged in climate activism despite having to overcome significant disincentives for doing so. Factors identified with increasing municipal climate activism of particular note are local climate risks, civic capacity, local organizational capacity, political partisanship, commitment to a climate agreement, and membership in a peer network promoting climate activism. Mayors facing uncertain local political support may nonetheless address climate change if state energy plans and political climate provide a rationale for action. The following section outlines the evolution of states' response to climate change.

The Role of States in Promoting Climate Action

Geri and McNabb (2011) note that at least since the budget cuts of the 1980s under the Reagan Administration, energy policy has increasingly become the province of states. As with other matters left to the states, policy innovation has led to ". . . either a profusion of experimentation, or a hodgepodge of inconsistent and conflicting standards, depending on one's perspective" (2011: 101). Despite this, as Carley (2011: 291) notes, states are pursuing a wide variety of energy policy goals focusing on three broad outcomes—diversification, decentralization, and decarbonization. Fischlein et al. (2014) suggest that energy policy is largely the purview of states, both in terms of setting broad policy objectives, the implementation of these policies, and the regulation of public utilities. Given the relative absence of federal climate policy specifically targeting carbon emissions, states have become "laboratories for climate change policy" (p. 171). State Energy Offices exist in every state but play very different roles, some acting with relative autonomy and others whose function is subsumed under other departments (Deitchman 2017: 8-10). While some states are clearly early adopters of climate policy (Posner 2010: 78) and leading by example, such as California (see Kwon et al. 2012; Barbour and Deakin 2012), other states are back pedaling regarding energy efficiency and renewable energy standards (Deitchman 2017: 50; Center for Climate and Energy Solutions 2017). Despite such variance in approach, states are making significant headway in reducing GHG emissions (Drummon 2010), promoting renewable energy (Vasseur 2014; Carley 2012), financing energy projects (Deitchman 2017), and other outcomes that promote energy development (Carley 2016). As Geri and McNabb (2011: 79) note though, the availability of encompassing federal subsidies enabled states to make such broad energy and climate commitments, particularly during the economic recovery.

Rabe (2004; 2008; 2011) argues that states are the primary locus of climate change governance, but not only because of federal reticence to engage consistently across presidential administrations. States have come to define the issue in terms of their own political and/or economic self-interests, addressing a variety of energy issues, including energy development and efficiency, responding to climate related events, positioning themselves as climate leaders, and managing municipal waste. Much of the groundwork for climate change policy developed in the 1990s prior to the Kyoto debate. By the late 1990s, partisan pushback was occurring not only in Washington, D.C., but also in state houses, some of whom rallied against treaty ratification as well as climate action in the absence of federal leadership. While some states inhibited efforts to address climate change, all states nonetheless continued to promote energy policies of one kind or another, albeit with differing motivations. The framing of energy issues, including climate change, differs from state to state, sometimes explicitly addressing the reduction of GHG emissions or through such "stealth" policies as energy efficiency, vehicle use reduction, and renewable energy portfolio standards (RPS). The rise of the MCPA occurred between 2005-2007, during what Rabe (2011) refers to as the period "state domination" of climate policy (1997-2007). The election of President Obama and the Supreme Court ruling in *Massachusetts vs. EPA* in 2007 providing the EPA the statutory authority to regulate carbon dioxide as an air pollutant began a new period of "contested federalism," involving renewed efforts by the federal government to define the climate agenda.

Geri and McNabb (2011: 104) argue that energy policy in the first decade of this century was a comparatively bi-partisan endeavor. Debates around climate change policy, at least at the Federal level, have since taken on the more partisan character associated with environmental policy. As Rabe (2011) notes above, some of this partisanship has migrated to the states. The MCPA emerged at a time where there was national recognition of the significance of climate change, the value of increasing energy efficiency and renewable energy, and decreasing reliance on foreign sources of power. As Deitchman (2017: 65) asserts, state-level climate policy innovation occurred when the majority of state houses were under Democratic control. The changing tide of political control of state governments to the Republican Party may be consequential for the continued retreat from the carbon economy. Deitchman asserts that the ". . . generalization and conventional wisdom that Democrats support more stringent action on greenhouse gas emissions mitigation than their Republican Party counterparts is accurate and verifiable"

(2017: 49-50). However, many states pursue energy policies that are beneficial to GHG reductions, such as renewable energy and stricter building codes, without specific reference to climate change (Selin and VanDeveer 2007; Wood et al. 2014).

States thus play a central role in defining the energy and climate policy agenda by promoting a wide portfolio of policy instruments but with significant variation across states (Fischlein et al. 2014). It is logical to expect that states with demonstrated leadership in promoting the reduction of GHG emissions would also have a higher prevalence of municipal climate activism. We examine the impact of state-level energy and climate policy, as well as other factors identified in the literature (Krause 2010; Zahran et al. 2008; Wang 2012; Brody et al. 2009; Kwon et al. 2014), on municipal climate activism, but focus solely on US states as the unit of analysis.

Methodology

A large degree of variation in policy, economic and industrial activity, culture, and other factors characterizes the US political system. Thus, while individual US states exist within one singular society, there is incredible diversity within states, making a state-based comparison highly appealing. Many comparable studies have assessed phenomena—including policy and environmental conditions—via a state level analysis (Clement & Schultz 2011, Dietz et al. 2015, Tung et al. 2014, Valdmanis 2015, Vasseur 2014). As with previous research, the current study utilizes data gathered from a variety of sources, all measured at the state level for a few methodological reasons. First, there is no consistent municipal-level data for environmental organizations, political representation or ideology, and other social factors for making appropriate comparisons. Second, many of the signatory municipalities exist within larger Metropolitan Statistical Areas (MSA) thus complicating the analysis. Aggregating data at the state level simplifies these problems. Data sources reflect either specific years or a range of years corresponding to the efforts of the USCM MCPA campaign.

Our analysis uses two dependent variables: (1) the percentage of a state's residents who reside in cities covered by the MCPA as of 2010, and (2) the ratio of signatory cities (N=1060) to the number of a state's cities with populations of 25,000 or more using Census data for 2005, the approximate start of the MCPA. Because the number of signatory cities exceeds the number of cities with populations of 25,000 or more for some states, City Ratio can exceed one. As expected, the number of signatory cities correlates strongly (r=.807) with the number of a state's cities with populations of 25,000 or more.

The grouping of the independent variables derives primarily from existing research on municipal climate activism to include social, political, and economic factors. Social factors are civic capacity, population size, population density, and income inequality. Civic capacity is measured by combining z-scores for percentage of state residents with a Bachelor's degree and average household income (Cronbach's alpha=.90). State population and population density are likely to be associated with greater state economic and other resources to address climate change. The state's Gini Index is included in the analysis as a measure of income inequality. To the extent that income inequality reduces state overall quality of life (Valdamis 2015: 989), we can expect that it will also undermine public support for climate action.

Political factors included are state partisanship and the number of environmental organizations. As Medoff (1997) notes, state representatives' voting record and the average percent voting for a Presidential candidate can provide an indicator of state partisanship. The League of Conservation Voters National Environmental Scorecard for both the US Senate and House of Representatives afforded the first measure aggregated for 2006 to 2010. Average percentage voting Democrat for the 2004, 2008, and 2012 US presidential elections provided a second measure of Partisanship. The National Center for Charitable Statistics records (2014) specified the number of environmental non-profit organizations filing form 990 in a state for the year 2010. The number of environmental non-profit organizations, rather than the number of these organizations per capita, arguably provides a better indicator of a state's social capital potential for environmental action (Brody et al. 2009). We would expect that states with stronger environmental records, higher percentages of Democratic voters (Wang 2012: 604), and a greater number of environmental organizations would be more likely to have higher levels of municipal climate activism.

The only economic factor examined is the proportion of a state's total employment that is involved in extraction, manufacturing, transportation, or production industries. As Zahran et al. (2008) note, while social and civic capacity enhance the potential for climate activism, greater investment in the carbon-based economy represents a barrier. Additionally, coastal states experience, or will likely experience, greater risk associated with climate change (with both rising sea levels and the proximity to other climatological phenomena like hurricanes) increasing the likelihood of municipal climate action. We expect that states with higher levels of carbon employment will have lower levels of municipal climate activism, while proximity to the Atlantic or Pacific Oceans will increase it.

Three dichotomous measures from the Center for Climate and Energy Solutions are the basis of state energy and climate policy: (1) a State Climate Action Plan (CAP), (2) a mandatory Renewable Energy Portfolio Standard (RPS), and (3) an Energy Efficiency Resource Standard (EERS). The presence or absence of these policies are noted for 2008 or prior, approximately the middle of the MCPA campaign. Scores are summed together to create State Leader ranging between 0 and 3 (Cronbach's alpha=.789). While the resulting measure clearly assesses more than just state climate policy, a more expansive measure differentiates policy leadership.[3] As Carley (2011) indicates, RPS and EERS policies adoption rates vary across states and may be more indicative of energy policy innovations than climate policy alone. Fourteen states have enacted all three policies, an equal number have enacted none, and eleven each respectively have adopted one or two (see Appendix A for more details of these variables). Adoption of these policies should be positively associated with sub-state climate activism.[4] Addressing this question directly, Krause (2010) demonstrates that state CAP and GHG emission targets, along with political ideology, and percent of state employment in manufacturing, are unrelated to the MCPA signatory status of cities with populations of 25,000 or more. Excluding cities with populations less than 25,000, however, may have underestimated these effects. As Kwon et al. (2014) and Osofsky (2012) argue, state CAPs or other environmental and energy policies can affect municipal climate activism in a myriad of ways.

Table 1: Study Variables

State Characteristic	Minimum	Maximum	Mean	S.D.
Dependent Variables				
Percentage of State Population Covered by MCPA	1.7	55.2	24.1	13.2
City Ratio	.14	5.0	1.0	.93
Independent Variables[1]				
Population Size	576,626	38,041,430	6,268,126	7,000,878
Civic Capacity (Z score)	-1.76	2.03	0	.95
Gini Index	.40	.50	.45	.02
League of Conservation Voters Scorecard for all Congress	8.5	95.9	55.5	26.4
Average Percentage voting Democrat (2004-2012)	28.3	65.7	48.2	9.3
Population Density (persons per square mile)	1.2	1195	195.1	261.0
Number of Environmental Organizations filing Form 990	25	1375	209.75	220.1
Proportion of workers employed in carbon based industries	.13	.24	.18	.03
State Leadership	0	3	1.5	1.2

[1]Excludes Coastal/Non-Coastal as this is a dichotomous nominal variable.

Results

Table 2 Rank Order of States by Percentage for Covered State Population

Rank	State	Covered Population	Rank	State	Covered Population
1	NY	55.17	26	MI	24.11
2	AZ	48.38	27	ND	23.27
3	AK	46.89	28	HI	21.90
4	CA	44.17	29	ID	21.59
5	NV	43.62	30	MO	20.85
6	NM	42.10	31	PA	20.75
7	NE	39.86	32	VA	18.16
8	IL	38.90	33	CO	17.55
9	OR	35.88	34	ME	17.26
10	MA	34.27	35	KS	17.14
11	NJ	34.24	36	DE	15.35
12	WA	34.22	37	MD	15.10
13	MN	33.58	38	AR	14.50
14	RI	33.21	39	LA	14.09
15	FL	32.03	40	GA	12.09
16	CT	31.38	41	SC	10.24
17	NC	31.00	42	MS	10.12
18	IA	29.87	43	AL	8.87
19	NH	27.74	44	UT	7.94
20	IN	27.59	45	VT	7.67
21	TX	27.54	46	TN	4.63
22	WI	26.53	47	OK	3.83
23	OH	24.67	48	SD	2.83
24	MT	24.42	49	WV	2.33
25	KY	24.41	50	WY	1.71

Table 2 reports the percentage of the state population covered by the MCPA agreement. The range falls between 1.7 percent for Wyoming to 55.2 percent for New York, the only state where the majority of the population is covered. New York City's participation in the MCPA clearly helped New York state rise to the top place. As noted earlier, some 1,060 cities have signed on to the agreement, representing 30 percent of the US population. As the table suggests, significant percentage differences exist between states. Regional differences (not reported in the table) are also evident with Western states having the highest average of 30.0 percent, followed by the Northeast (29.1 percent), Midwest (25.8 percent), and the South (15.3 percent).

Table 3 Rank Order of States by City Ratio

Rank	State	City Rate	Rank	State	City Rate
1	ME	5.00	26	WI	0.77
2	HI	4.00	27	MA	0.76
3	NJ	3.44	28	KS	0.75
4	VT	2.00	29	KY	0.7
5	MD	1.86	30	MI	0.69
6	NH	1.80	31	IL	0.69
7	NC	1.67	32	AZ	0.65
8	AK	1.67	33	VA	0.63
9	IA	1.65	34	SC	0.57
10	NY	1.42	35	RI	0.57
11	MN	1.36	36	OH	0.57
12	PA	1.25	37	CA	0.56
13	SD	1.00	38	NE	0.50
14	NM	1.00	39	ND	0.50
15	DE	1.00	40	IN	0.50
16	CT	1.00	41	GA	0.50
17	FL	0.99	42	AR	0.38
18	OR	0.94	43	WY	0.33
19	WA	0.92	44	LA	0.33
20	MO	0.88	45	TX	0.33
21	CO	0.85	46	TN	0.32
22	NV	0.83	47	AL	0.32
23	MT	0.83	48	MS	0.28
24	WV	0.80	49	UT	0.16
25	ID	0.78	50	OK	0.14

Table 3 reports the ratio of signatory cities to the number of cities with a population of 25,000 or more (City Ratio). As noted earlier, City Ratio indicates the degree of diffusion across cities within the state and thus adjusts (in part) for variation in the number of municipalities and state population. The City Ratio varies between a low .14 for Oklahoma, to a high of 5.0 for Maine. As with covered state population, City Ratio varies between regions (not reported in table) with the highest being the Northeast (1.9) followed by the West (1.0), the Midwest (.82), and the South (.62). The Pearson correlation of .299 ($p \leq .05$) indicates that both indicators are measuring similar but also unique dimensions of state climate activism. Outlier and normality analysis of the data indicated that Covered State Population approximates normality. For City Ratio, three outlier states (Maine, Hawaii, and New Jersey) exceeded three standard deviations prompting deletion from the analysis, resulting in an approximately normal but slightly positively skewed distribution.

Table 4 Pearson Correlation Matrix for Independent Variables

Variable	Pop Den.	State Pop.	Gini Index	LCV Score	Avg. Demo.	Envir. Orgs	Carbon Employ	State Leader	Coastal Prox.
Civic Capacity	.553**	.112	-.112	.544*	.575*	.074	-.692*	.513*	.382
Pop. Density	---	.169	.371**	.496*	.539*	-.030	-.507*	.366*	.463*
State Pop		---	.517*	.065	.224	.660*	-.168	.227	.269
Gini Index			---	.075	.173	.156	-.127	-.028	.293*
LCV Score				---	.881*	.271	-555*	.628*	.229
Avg. Democrat					---	.212	-.621*	.725*	.373**
Envir. Orgs						---	-110	.146	.113
Carbon Employ							---	-.521*	-.344*
State Leader								---	.144

*($p \leq .05$)

Table 4 reports the correlation matrix for all the independent variables. Results indicate a predictable pattern of intercorrelations between social, environmental, and political factors. Carbon Employment correlates as expected with Civic

Capacity, population density, LCV score, and average percent Democrat with Pearson correlations ranging between -507 to -.692. Overall, results suggest moderate to strong positive intercorrelations between State Leader and Civic Capacity (.513), LCV score (.628), average percent Democrat (.725), and negatively with Carbon Employment (-.521). The correlation between LCV score and average percent Democrat (.881) suggests the possibility of collinearity. To overcome this problem for the following regression analysis, the z-score transformations for both variables were averaged together as a combined measure of political and environmental partisanship (Cronbach's Alpha=.937). Higher Partisanship scores represent states with higher percentage of Democratic voters and higher LCV score.

Table 5 Stepwise Linear Regression Results Predicting Covered State Population

Variable	*B*	Standard error	Beta
(Constant)	.241	.011	
Partisanship	.132	.014	.811*
r^2 Adjusted r^2 F-ratio	.657 .650 92.047*		
*(p≤.05)			

Table 5 reports the forward stepwise regression results for covered state population. Forward stepwise regression enters predictor variables into the equation one at a time in order of their correlation with the dependent variable. The process stops when additional variables no longer contribute significantly to the explained variance (Mertler and Vannatta 2005: 170). Stepwise regression is the preferred analysis strategy given the limited number of cases (N=50) and the number of independent variables. The results indicate that only Partisanship is significantly associated with covered state population, accounting for 65 percent of the variance between states. Thus, other factors do not contribute to a significant improvement in the variance after accounting for the influence of Partisanship. The results are surprising given the amount of variance explained, and by the general lack of significant association for other variables.

Table 6 Stepwise Linear Regression Results Predicting City Ratio			
Variable	*B*	Standard error	Beta
(Constant)	.543	.094	
State Leader	.197	.050	.509*
r^2 Adjusted r^2 F-ratio	.259 .243 15.728*		
r*(p≤.05)			

Table 6 repeats the forward stepwise regression for City Ratio. City Ratio accounts for the degree of diffusion of the MCPA among cities by examining the ratio of the number of signatory cities (some of whom have a population less than 25,000) relative to cities with a population of 25,000 or more. This measure of municipal climate activism provides a partial adjustment for state population. The inclusion of state population in the regression equation is an additional control. The results indicate that only State Leader emerges as significant, with an adjusted r^2 of .243. As with Covered State Population, other study factors did not contribute significantly to understanding variability in municipal climate activism after accounting for the influence of State Leader. Despite the lower than expected amount of explained variance, the results support the assertion that more proactive state energy policy is associated with climate activism at the municipal level.

Table 7 Stepwise Linear Regression Results Predicting State Leadership			
Variable	*B*	Standard error	Beta
(Constant)	1.500	.116	
Partisanship	1.060	.145	.727*
r^2 Adjusted r^2 F-ratio	.529 .519 53.850*		
*(p≤.05)			

As noted earlier, several sociodemographic and geographic factors are associated with energy policy leadership, including coastal location and region (Deitchman 2017: 58), civic capacity, and political partisanship (Brody et al. 2009). Given the strong association between State Leader and City Ratio, study factors were regressed on State Leader. Table 7 presents these results. Only Partisanship remained as a significant factor, accounting for approximately half of the variance between states (adjusted r^2=.519). These results indicate that partisanship is strongly associated with state climate and energy leadership. In other words, states with a stronger environmental voting record and a larger percentage of the population voting Democratic also have a higher State Leadership score.

These findings confirm existent research regarding the role of state ideology influencing adoption of specific energy and climate policies (Lyon and Yin, 2010; Vasseur 2014; Deitchman 2017). As Geri and McNabb (2011) argue, state energy policy is more likely now than in the recent past to reflect partisan differences. Policy instruments measuring state policy context (CAP, RPS, and EERS) are also strongly associated with state partisanship (Pearson correlations .603 to .673). These findings correspond with Bromley-Tujilo et al.'s (2016) research demonstrating higher probabilities of policy adoption, particularly CAP and RPS, among liberal Democratic legislatures. These results provide at least limited support for seeing municipal climate activism as situated in the larger state political and policy milieu.

As Rabe (2011) noted earlier, state innovation in energy policy, particularly the development of state CAPs, occurred at a time when the Democratic Party controlled the majority of state houses. Rollbacks or efforts to weaken these policies is occurring in some states (Hess et al 2016), raising concerns over the future of state-led efforts to promote GHG reductions. As Antonio and Brulle (2011) argue, while both parties have promoted neoliberal approaches to energy and environmental policy, differences between the two parties has clearly widened with time. On the other hand, Hess et al. (2016) demonstrate that Republican dominated state legislatures do pass "green laws" when they are consistent with conservative ideological frames; i.e., promote regulatory relief, smaller government, and voluntary actions. Furthermore, state natural resources, such as renewable energy potential, impact likelihood of adoption (Bromley-Tujilo et al. 2016), with wind power in Texas being a notable example (Carley 2011; Fischlein et al. 2014). As Vasseur (2010) cautions, we should resist viewing the determinants of state energy and environmental policy adoption in binary terms. While these results underscore the importance of partisanship both for understanding state energy policy and sub-state municipal climate activism, significant variation remains unexplained.

Conclusion

As Bulkeley (2010) notes, national governments around the world have provided only limited and largely inconsistent support for climate change policy and action. Globalization and the transboundary nature of climate change have opened a new chapter in environmental governance and an accompanying political economy focused on the control of carbon. At this point, however, carbon control is a largely voluntary enterprise (Engel 2006); thus, its implications for an emerging political economy remain unclear. For now, how cities and states interpret the climate dilemma and implement policies related to the reduction of GHG emissions is central to the future of climate debate.

To date, little research has examined the interconnection between US states and municipal climate activism, each being viewed as responding to differing exigencies when addressing the problem of global climate change (Krause 2010:47). The declining role of the national government (at least for now) necessitates further exploration of how state-level factors impinge on efforts of cities to mitigate and adapt to climate change. This research has confirmed the association of certain state-level sociodemographic factors with municipal climate activism, particularly energy policy leadership, percentage of Democratic voters, and state environmental voting record.

This research highlights the significance of partisanship and energy policy at the state level for understanding municipal climate activism. These results are significant for a number of reasons. States, cities, and non-state actors are likely the primary locus of policy implementation in the US, at least in the near term. Abbott and Kasprzyk (2012) note that the emerging "disarticulated federalism" of climate change policy produces both significant innovation and future uncertainty. There is much promise, as former NYC Mayor Bloomberg (2017) recently suggested, in realizing the Paris Agreement with policies and actions already on the ground. Whether states, cities, and other sub-state actors can effectively reduce GHG emissions in the absence of federal leadership remains an open question. It is clear that more politically motivated states and cities will continue to act in ways consistent with a retreat from the carbon era, albeit with differing motivations and issue framing.

While cities and some states have made significant strides reducing carbon emissions, more coordination across levels of government, including regional planning associations (Barbour and Deakin (2012), is required. As Betsill (2001) notes, climate change policy is inherently intergovernmental. Thus understanding the city-state relationship is imperative but only part of the larger context of multilevel climate governance. While state partisanship serves both to enable and constrain local climate action, such differences may decline as states transition from climate mitigation to adaptation (Wang 2012). Given the near abdication of federal government and the varying context of state energy leadership, municipalities are clearly the most significant force for climate action. As Bulkeley (2010: 231) argues, understanding municipal climate activism ". . . requires a more nuanced concept of the city as a site within which climate governance is taking place." The latter point recognizes the need to examine the unique exigencies facing municipalities as they address climate change as well as the larger intergovernmental milieu. Osofsky's (2012) research on Minnesota's GreenStep Cities Program[5] underscores the potential of enabling state energy legislation for encouraging voluntary municipal climate action among suburban cities who vary significantly in core needs, institutional and financial capacity, and partisanship. A multiscaled approach (McKendy 2015), one that includes statewide and regional networks, can overcome impediments posed by the national debate on climate policy.

Footnotes

1. The United States Conference of Mayors Climate Protection Agreement began with a series of discussions at the "Sundance Summit" in July of 2004, in Salt Lake City, and approved at the June 2005 meeting of the mayors. In March 2007, the Climate Protection Center (CPC) was officially launched (USCM 2007). The USCM also began recognizing outstanding cities through its Climate Protection Awards. These annual awards recognize the best practices of cities for their work in promoting climate protection. CPC provides resources such as reports on best practices (USCM 2011, 2014, 2014), press releases, the current list of participating cities, and the MCPA form. Following President Trump's June 2017 withdrawal from the Paris Agreement in June 2017, several cities, states, universities and colleges, and businesses signed an open letter to the President entitled "We are Still In" (Alverz 2017; Popvich and Schlossberg 2017)). The USCM passed a nonbinding resolution at its annual meeting exhorting President Trump to remain in the Paris Climate Accord, along with additional resolutions promoting renewable energy, addressing rising sea levels, energy efficiency, and the like (USCM 2017).

2. For additional background on the evolution of subnational city networks, see Reckien et al. (2015), Osofsky (2012), Betsill and Bulkely (2006), and Bulkeley (2010).

3. Assessing which states are leaders depends on how factors are weighted. Deitchman's (2017) typology assigns states into "leader" and "laggard" status based on seven dichotomous energy measures, including energy efficiency standards, renewable energy portfolio standard, and adoption of a Climate Action Plan (p. 57). In addition, innovations in state financing of energy program is another defining feature of energy leadership. Leader states tend to be heavily concentrated in Democratic, Western, and Northeastern states. Fuel type is also relevant to ranking, as leaders are more likely to be states not reliant on coal as the predominant fuel source.

4. Few studies examine the impact of statewide energy policy on sub-state actors. Abbott and Kasprzyk (2012) demonstrate a strong association between climate policy scores at the state-level and climate action planning for higher educational institutions who are signatories of the American College and Universities Presidents' Climate Commitment (ACUPCC).

5. https://greenstep.pca.state.mn.us/.

Appendix A. Variable and Data Sources

State Characteristic	Source and Year
Percentage of state population covered by agreement	US Mayors Conference 2006-2012
Ratio of signatory cities to cities with a population of 25,000 or more	Census Bureau County City Data Book https://www.census.gov/library/publications/2010/compendia/databooks/ccdb07.html
Population size and density (estimate)	Census Bureau 2012
Civic Capacity: Percentage with Bachelor's degree, and Average State Income	ACS 2009
Gini Index	Census Bureau 2010
League of Conservation Voters scorecard for US Congress	League of Conservation Voters 2006-2010
Percentage change in Presidential voting for Democratic President (2004 to 2012)	Federal Election Commission 2004, 2008, 2012
Environmental Organizations (501(c)(3) organizations from Tax Form 990)	National Center for Charitable Statistics (2014)
Carbon Employment: percentage of workers employed in extractive, manufacturing, transportation, or production occupations	Bureau of Labor Statistics 2010
State Leader	Center for Climate and Energy Solutions (C2ES)

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