DIFFERENTIATING CITY-LEVEL POLICY ANALYTIC CAPACITY FOR CLIMATE AND ENERGY ISSUES

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Abstract

What is the relative extent and type of policy analytic capacity of actors involved in city-level climate and energy issues? This paper pursues this question through an analysis of a questionnaire administered in 2011 to actors involved in climate and energy issues in Colorado, U.S.A. The results indicate that policy analytic capacity, that is, the ability to generate and process information, is about the same among individuals involved in city-level activities compared to those involved in national and international levels, with the exception of modeling and applied research. However, organizational-level capacity, i.e., organizational priority and resources devoted to climate change and energy issues, is less for those organizations involved at the city-level. Multivariate results suggest a differentiation of roles and abilities: actors involved at the international and national levels are more associated with capacity in technical areas (e.g., economic analysis, risk analysis) and actors involved at the city-level are more associated with outreach and engagement (e.g., collaborating with those you agree and disagree with and facilitation). The associations should not be interpreted as a strict dichotomy of roles but rather as a reflection of tendency to use certain tools and techniques to fit problems and needs at any particular level of government.

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INTRODUCTION

The threat of climate change presents a quintessential collective action problem marked by goal conflict, problem and solution uncertainty, and a need for multiple actors to cooperate to achieve jointly shared outcomes. Overcoming these threats requires not just the right institutional arrangements to foster trust and cooperation but also policy action across all levels of government backed by the policy analytic capacity (PAC) to inform such actions. Policy analytical capacity relates to information acquisition and utilization in the policy process (Howlett, 2009; pg 162). To study PAC at any level of government is to assume that, even with cooperation and trust among actors facing an ongoing societal dilemma, learning and sustainable decision making will falter without the ability of individuals and organizations to acquire and utilize relevant information. This paper examines the tools, techniques, and information sources used by policy actors operating at the city-level compared to those operating at the international, national, and state levels.

In the U.S., efforts to address climate change began at the international level with the U.S. government providing initial leadership, but these efforts stalled. Thereafter, attention on climate change shifted to state and local levels (Rutland & Ayett, 2008). Studies of local action on climate change have focused primarily on examining the actions of city leaders (Rutland & Ayett, 2008) and the networks of climate change

advocates and opponents (Selin & vanDeever, 2007). However, research on policy actors engaged in climate and energy policies has not directly explored the PAC among actors. What is the level of PAC in city-level climate and energy issues and to what extent is it different than the PAC at state, national, and international levels?

The case study focuses upon those policy actors involved in climate and energy issues in Colorado, United States. Colorado possesses a balance of traditional energy resources and a recent rise in its renewable energy sector. The threats to the state from climate change include shorter and warmer winters, a thinner snowpack, earlier melting of the snowpack with increased spring runoff, increased periods of drought, increases in the number of wildfires, and substantial losses of alpine forests due to pine beetle infestations. Like many areas of the world and the United States, Colorado launched an initiative to address climate change, which resulted in the creation of the Colorado Climate Action Plan in November 2007 calling for a 20% reduction of state greenhouse gas emissions by 2020 (Ritter, 2007). While the specifics of Colorado are different than other states, the forecasted adverse impacts of climate change as well as a tepid response makes Colorado typical among states.

This paper proceeds with an examination of climate policies throughout various levels of government and a theoretical description of the tools and techniques used by policy actors and the conceptual framework of PAC. We then describe the case study of Colorado climate and energy issues and the methods of data collection. The results indicate that, involvement in city-level climate/energy activities is best thought of as not involving just local government officials but actors from a range of organizational affiliations. Second, actors involved at the city-level have training and levels of

education that are on par with actors at the state, national, and international levels in some areas while having lower levels of training in other areas. Third, the organizational capacity and priority of organizations involved at the city–level is lower than organizations involved at the higher levels. Finally, actors and organizations involved at the city-level are more likely to use different tools and techniques and information sources than the higher levels.

CLIMATE POLICY THROUGHOUT MULTIPLE LEVELS OF GOVERNMENT

Since the beginning of the industrial age, the burning of fossil fuels has released large amounts of greenhouse gases (GHG) into our atmosphere (UNFCCC, 2006). The accumulation of these gases has resulted in a trapping of heat within the Earth's atmosphere and a gradual warming of the planet. According to the Intergovernmental Panel on Climate Change (IPCC), the leading international scientific institution on climate change research, "warming of the climate system is unequivocal…" and "many natural systems are being affected by regional climate changes, particularly temperature increases" (UNFCCC, 2006). Despite these findings and their acceptance by the majority of the scientific community, the need for public policies to address climate change remains a contentious issue (Oreskes & Conway, 2010; Layzer, 2006). Advocates and opponents of climate change policy disagree over the degree that climate change can be attributed to human actions and the need for government intervention through climate and energy policies.

These debates can be found throughout all levels of government, from the international to the local level. Beginning in the early 1990s, the international community

of governments began to consider policy options for addressing climate change at the international level. In 1997, the international community adopted the Kyoto Protocol, an international agreement to address climate change. Eight years later in February of 2005, the Protocol took effect for the 141 countries that had ratified it. While originally a signatory to the protocol, the U.S. Senate choose not to ratify the treaty and, subsequently, that the U.S. would not be participating in the Kyoto Protocol (Layzer, 2006). While the U.S. had showed initial leadership in addressing climate change at the international level, the country has become increasingly hesitant to address climate change by mitigating its GHG emissions through actions including regulatory or fiscal policies (MCkinstry, 2003).

While stagnation on climate change issues is occurring at the federal level, the state and city levels are increasingly active on climate change (Rutland & Ayett, 2008). More than 30 states have created a climate action plan to address climate change (EPA, 2011). Climate action plans typically outline climate policy goals and identify a set of recommendations that a state can employ to address climate change. Climate policies at the city level often develop independently from state level actions (Rutland & Ayett, 2008). Hundreds of U.S. cities are members of Local Governments for Sustainability (ICLEI), an international association of local governments that have made a commitment to sustainability. To address climate change, ICLEI formed the Cities for Climate Protection Program to assist cities in addressing climate change (Rutland & Ayett, 2008). Similarly, over 1000 mayors have signed on to the U.S. Mayors Climate Protection Agreement to advance the goals of the Kyoto Protocol through local government leadership and action (The United States Conference of Mayors. 2009).

Despite the lack of leadership from the federal government, addressing climate change at the local level is often viewed as a significant opportunity to mitigate the impacts of climate change. Half of the planet's population lives in urban areas, with a significant portion of the human activities attributed to climate change occurring within cities (Organization for Economic Co-Operation and Development, 1995). Ramaswami et al, (2008) note that climate change policies at the city-scale have an opportunity to engage vast segments of the planet's population and to mitigate impacts in large spatial areas across the planet. Betsill (2001) argues that actions at the city level are crucial and that countries could not meet their commitments within national and international climate agreements without the help of city governments. Dietz, Ostrom, and Stern (2003) acknowledge that while climate change is large in scale and involves nonlocal influences, the knowledge base is strongest at small-scale ecologies and institutions. Lutsey & Sperling (2008) suggest that decentralized action on climate change at the city level has several benefits including greater experimentation on climate policies, an ability to tailor actions to fit the preferences of constituents, an ability to test the political responses to innovative policies, and gaining the benefit of local expertise and experience in implementing and administering programs.

At the same time, addressing climate change at the city level often faces several barriers and challenges (e.g., see Rutland & Ayett 2008). One barrier is the difficulty in reconciling the interest of various local stakeholders with business interests often articulating staunch opposition to environmental programs and policies. The development of local environmental actions is also challenged by the limited resources of local governments, a limited or insufficient jurisdiction to address issues, and conflicts

with other higher-priority programs and policies at the local level. Similarly, Betsill (2001) identifies three institutional barriers that can prevent policy action at the city level: uncertainty related to the institutional home for climate policymaking; lack of capacity to develop climate policies and programs as well as to oversee, monitor, and analyze GHG emissions; and deficient will to invest financial resources to address climate change as doing so often requires cities to devote significant costs up-front.

EXAMINING THE TOOLS AND TECHNIQUES POLICY ACTORS USE TO DEVELOP CLIMATE AND ENERGY POLICIES

Local action on climate change develops through activism and leadership at the city level, with policies enacted in a wide variety of local governments, ranging from small and medium sized towns to New York City (Rutland & Ayett, 2008). Climate change advocates operate within networks, utilizing these networks to distribute information, gain support, generate policy ideas, and push their leaders to initiate action on climate change (Selin & VanDeever, 2007). While the literature on climate advocates discusses the methods and processes policy actors utilize to develop climate policies, an examination of the tools and techniques and information sources used by policy actors to analyze and evaluate policy alternatives is largely absent.

The constant threat of policy failures often occurs through debilitating political relations but also from the lack of information and adequate tools and techniques for learning and adaptive decision making. Partly in response to the policy successes of operations research during WWII and equally to the policy failures of the Great Society Programs in the 1960s, scholars in public policy have focused on improving the art and

craft of policy advice and the development of tools and techniques to generate information for better policy processes. Lindblom (1959) conceived of two diametric approaches that individuals use to analyze public policy. Under the “root method”, individuals start the process of analyzing policies from the ground-up, beginning anew with each policy. In comparison, the “branch method” involves continually building on current situations, in a step-by-step process and by small degrees. Lindblom argued that while the root method was ideal, individuals often utilized the branch method, resulting in a more incremental, less systematic and methodical form of decision-making. Dror (1967) called for a more sophisticated type of professional knowledge to improve public decision-making. This new type would involve an integration of the fields of political science and public administration and systems analysis, decision theory, and economic theory. Brewer and deLeon (1984) suggested that the effectiveness of policy analysis tools is limited by the skill, experience, and judgments of the individuals as well as the time and resources available, and the characteristics of the problem. In analyzing complex policy situations, individuals could utilize a varying degree of tools and procedures to reduce complexity, uncertainty, and conflict. These tools range from tools requiring individuals to possess high levels of expert knowledge such as macroeconomic models and risk analysis to more stakeholder outreach-focused tools including public hearings and negotiation procedures. Weimer & Vining (2004) have suggested that in analyzing public policies, individuals should know how to collect, organize, and communicate info. In order to be able to confidently predict and assess the outcomes of various policy alternatives, individuals should possess technical skills such as economics and statistics.

Countering the emphasis on formal education and training in sophisticated tools and techniques to assess policies, scholars underscored the threats from technocracy on democracy through removal of the average citizen from the policymaking process. Bobrow & Dryzek (1987) suggest that while formal training and techniques intended to improve public policy have been developed, refined, and widely disseminated, the initial wave of optimism for formal training and techniques has been replaced with skepticism. The post-empiricist policy analysis literature rejects the emphasis on the need for individuals to possess advanced education and formal training to analyze policy, suggesting that traditional policy analysts be replaced with facilitators (Fischer, 2003). Facilitators assist citizens in examining their interests and arriving at their decisions. Ideally, facilitators would play a neutral role and focus on clarifying communication and goal clarification among various groups of actors. This emphasis on replacing the role of the technocratic policy analyst is argued to result in a form of participatory democracy that provides a more direct association between citizens and the political decision-making process (Fischer, 1999).

POLICY ANALYITICAL CAPACITY: COMBINING FORMAL TOOLS AND OUTREACH METHODS

While the policy analysis and policy process literatures have debated whether advanced education and training or more participatory forms of policy analysis and policy making are needed, PAC incorporates both. Drawing from Howlett (2009), PAC refers to the ability of individuals and organizations to acquire and utilize knowledge in the policy process. Policy actors with high levels of PAC are argued to have a higher

chance of shaping policy agendas, impacting the design and content of policies, developing a better understanding of the context in which policies will be implemented, and determining the evaluation of policy outputs and outcomes.

PAC at the individual level is comprised of several dimensions of various skills and forms of knowledge. Skills can involve different areas of formal training including the ability to conduct applied research, statistical methods, policy analysis, policy evaluation, trends analysis/forecasting, and modeling of various scenarios. Less formal skills can include community-level impact analyses, political feasibility analyses, or facilitation and consensus building. The policy analytical capacity possessed by the individual can also relate to the individuals' level of formal education.

PAC also relates to the organizational affiliation of the policy actor. The majority of individuals do not possess the personal resources to participate in policy subsystems over prolonged periods of time. Many policy actors represent government agencies, businesses, nonprofit organizations, or academic/research organizations with extensive resources. The level of policy analytical capacity possessed by the organization is determined by whether it has adequate knowledge, skills and people to respond to a policy issue. The level of priority of the organization to address a particular policy issue can also determine its policy analytical capacity on the policy issue.

The value in analyzing PAC is to better understand supply and demand among policy actors in their tools, techniques, and information sources. The approach is neither technocratic nor post-empirical policy analyses but rather the acknowledgement that addressing complex problems requires the combination of multiple tools and

techniques. This paper seeks to assess the level and differentiate the relative distribution of PAC among actors involved in climate change and energy issues.

CASE STUDY: COLORADO CLIMATE AND ENERGY POLICIES

Colorado provides a good case study to examine climate and energy policies due to its vast traditional energy resources, the rise of its renewable energy sector, and its vulnerability to climate change. Colorado has long been a major producer of traditional energy with several major fossil fuel-rich basins, major production of coalbed methane, and vast reserves and high levels of natural gas production (US Energy Information Administration, 2009). In recent years, Colorado's renewable energy sector has grown partly in response to the state's renewable energy portfolio standard via ballot initiative in 2004 and a subsequent strengthening of the standard by the legislature in 2010 (Database of State Incentives for Renewables & Efficiency, 2010). The Colorado case is also good to study because of its vulnerability to both current and predicted impacts of climate change, including shorter and warmer winters and increased periods of drought (Ritter, 2007). Scientists project that in the ensuing decades, climate change in Colorado will produce temperature increases of 3 to 4 degrees Fahrenheit, longer and more intense wildfires during the summer seasons, and an increase in water shortages.

Former Colorado Governor Bill Ritter launched an initiative to address climate change statewide, which resulted in the creation of the Colorado Climate Action Plan in November 2007. This plan called for a reduction of the state emission of greenhouse gases by 20% by 2020. This plan for the state was created in a collaborative manner from a diverse set of stakeholders including "business and community leaders, conservationists, scientists and concerned citizens" (State of Colorado 2007, pg 2).

METHODS

A web-questionnaire was administered to people in Colorado actively involved in climate and energy issues at the international, national, state, and local government levels. The sample was collected through a modified snowball sample targeting those individuals involved in Colorado climate and energy issues. The sample was created first by searching the internet for government and nongovernment organizations and the people therein who are involved in climate and energy issues throughout. Additionally, newspapers and online publications were also searched. The online search was complemented by preliminary interviews of five people involved with Denver and Colorado climate and energy issues. The total sample was 793 individuals.

A web-questionnaire was administered from February through April of 2011. Of the total population sampled, 272 people returned fully completed surveys for a response rate of 34% and 87 returned partially completed surveys (the inclusion of which equals 359 respondents and a 45% response rate).

OPERATIONAL MEAURES

To examine capacity on climate and energy issues at the city level, this paper utilizes six groups of variables: level of involvement, formal training, organizational capacity and priority of climate and energy issues, pro-climate change beliefs, and the frequency of use of tools and techniques and information sources. The primary dependent variables are comprised of two categories: tools and techniques used and information sources.

Tools and Techniques Used. To measure the tools and techniques used by policy actors, respondents were asked the following question: “How often have you used the following tools and techniques as part of your work in the past year?” Choices included community impact analysis, political feasibility analysis, risk analysis, modeling, collaborating with those who you agree with, collaborating with those you disagree with, environmental impact analysis, facilitation and consensus building, economic analysis, and informal tools and techniques. Respondents were asked to respond using a scale consisting of never, yearly, monthly, weekly, and daily.

Information Sources. To measure the types of information sources used by policy actors, respondents were asked the following question: “How often do you use the following types of information in your climate and energy-related policy work?” The possible responses were: reports produced by your organization, advice from people you agree with, advice from people you disagree with, reports from non-profits, personal experience, budgets and cost data, academic research, newspapers and news magazines, reports from other state and city governments, reports from consultants, reports from industry, and online social networks. Respondents were asked to respond using the same five-point scale ranging from never to daily.

The independent variables used in this study fall into four categories. The first is level of involvement in climate and energy issues (from city to international). The next two are individual PAC measures: formal training and advanced degree. The fourth is organizational capacity. Finally, one variable is used to control for pro-climate change beliefs.

Level of Involvement. To measure level of involvement, respondents were asked this question: “At what level (international, national, state, or city) do you currently focus your efforts regarding climate-related issues and/or energy policy?” For the choices, “international level”, “national level”, “state level”, and “city level”, respondents could choose “not involved at all”, “somewhat involved”, or “primary involvement.” We coded the items in order as 0, 1, or 2, respectfully. The main variable of interest for this paper are those individuals frequently involved in city-level climate and energy issues compared to involvement at higher levels.

Individual Capacity: Formal Training. To measure the formal training of policy actors, respondents were asked the following question: “In which of the following areas have you received formal training?” Responses included statistics, policy analysis, policy evaluation, trends analysis/forecasting, and modeling. We used a dichotomous code to code whether individuals had received formal training in each of the five variables.

Individual Capacity: Advanced Degree. Respondents were asked “What is the highest level of formal education you have attained?” Responses ranged from “Not a high school graduate”, “High school graduate”, “Some college”, “Bachelor’s degree”, “Master’s or professional degree”, or “Ph.D., MD, or JD”. The “Master’s or professional degree” and “Ph.D, MD, or JD” categories were combined into an Advanced Degree dichotomous variable with one equaling a positive response to one of the two categories and zero not.

Organizational Capacity. To measure the organizational capacity, we asked respondents: “Compared to similar organizations, does your organization have adequate knowledge, skills, and people to respond to climate-related issues and energy policies?” The sample was asked to respond using a five point Likert scale consisting of “very low capacity”, “low capacity”, “medium capacity”, “high capacity”, and “very high capacity”. We coded the items in order ranging from 1 through 5, respectively. To measure climate and energy issues as an organizational priority, we asked respondents: “Compared with other issues that your organization responds to, how much of a priority are climate-related issues and energy policies?” The sample was asked to respond using a five point Likert scale consisting of “much lower”, “lower”, “about the same”, “higher”, and “much higher”. We coded the items in order ranging from 1 through 5, respectively.

Pro-Climate Change Beliefs. While not a component of individual PAC, this study also controls for individual-level beliefs regarding climate issues. The survey asked respondents to report their beliefs on the severity of climate change, its causes, and possible policy approaches for mitigating carbon emissions including energy/carbon taxes, cap and trade systems, and policies promoting renewable energy generation. Respondents were asked to use a five-point Likert scale ranging from -2 = Strongly Agree to +2 = Strongly Disagree. These individual questions were then aggregated into a single-scaled item called “Pro-Climate Change Beliefs”. Responses in this scale ranged from 5 = Strongly Agree to 1 = Strongly Disagree.

RESULTS

The results are presented in two parts. The first is a descriptive analysis of the level of involvement, the formal training, the organizational capacity, the pro-climate change beliefs of actors, and the frequency of use of tools and techniques and information sources by policy actors. The second is more explanatory where ordered logit analyses are conducted to explain the variation in the frequency of the tools and techniques and the information sources used by policy actors.

Descriptive Analysis

Table 1 presents the mean and medians for level of involvement in city, state, national, and international scales by organizational affiliation. The results show that involvement in city-level activities is not restricted to local government officials. The median values across all organizational affiliation categories indicate actors are "somewhat involved" in climate-related issues and/or energy issues at the city level with a statistically significant difference for all levels of involvement, indicating significant difference across organizational affiliations ($p<0.01$, based on an independent sample, Kruskal-Wallis Test). As expected at the city level, local governments report the highest levels of involvement in city-level activities (mean = 1.8; median = 2). State and federal governments report the lowest levels of involvement in city-level activities (means < 1; medians = 1). The implication from Table 1 is that city-level effort on climate and energy issues requires attention not only to local government officials but also, and to various extents, the full range of organizational affiliations.

PAC at any level of involvement is partly conditioned by individual level skills and abilities. To assess individual policy analytic capacity, table 2 shows the percent of

respondents by level of primary involvement with formal training in statistics, policy analysis, policy evaluation, applied research, trends analysis/forecasting, and modeling. City-level actors were found to have levels of formal training in statistics, policy analysis, policy evaluation and trends analysis/forecasting that were on par with actors at higher levels of government. There is a significant difference among primary level of involvement with regard to formal training in applied research and modeling ($p<0.05$ and $p<0.10$, respectively). Actors involved at the city-level had the lowest level of applied research training at 25%, while 69% of actors involved at the international level had reported applied research training. City-level actors had the second lowest levels of training in modeling at 23%, while actors at the international level had the highest levels at 38%. More than three quarters of respondents operating within the different levels of federalism hold an advanced degree with percents increasing slightly from city to international levels but the differences are not statistically significant. The results appear to provide nuance to the observations by Betsill (2001) that local governments lack technical capacity; local governments appear lower in their training in modeling and applied research but equally capable in other areas.

Table 3 presents the organizational priority and capacity of climate and energy issues and the mean responses by level of involvement. The organizational priority and capacity on climate and energy issues were statistically significant across primary level of involvement ($p<0.05$ and $p<0.001$, respectively). The organizational priority on climate and energy issues was found to be lowest at the city-level with a mean of 3.4 and highest at the national level with a mean of 4.1. Similarly, the organizational capacity to respond to climate and energy issues was also lowest at the city-level with a

mean of 3.4 and highest at the national level with a mean of 4.1. In contrast to the individual level measures, those organizations engaged in city-level climate and energy issues have lower capacity compared to those organizations involved in other levels.

Table 4 shows the pro-climate change beliefs by primary level of involvement. Respondent beliefs were scaled from 5 = Strongly Agree to 1 = Strongly Disagree, with higher levels values indicating a higher levels of pro climate change beliefs. City level actors reported the strongest pro-climate beliefs with a mean value of 4.3, while state and national actors reported the lowest mean values of 3.8 ($p<0.01$).

Table 5 presents the frequency of use of tools/techniques and information sources. Median values are reported for the frequencies that tools and techniques and information sources are used by primary level of involvement. Actors at the city level are found to have similar frequency of use for tools including collaborating with those they agree/disagree with, informal tools and techniques, economic analysis, facilitation and consensus building, and political feasibility analysis. Statistically significant differences were found in regard to the frequency of use of modeling and environmental impact analysis ($p<0.001$ and $p<0.05$, respectively), with city-level actors reporting yearly use, the lowest frequency among the levels of involvement. City-level actors also reported a median response of having never used risk analysis tools and techniques in the previous year while the other levels of involvement reported higher frequencies of use ($p<0.001$). Actors at the city level reported the highest frequency of use of community impact analysis at a yearly rate, while the other levels of involvement reported having never used this technique within the previous year ($p<0.05$).

City-level actors reported similar frequencies of use as actors at other levels of involvement in regard to the following information sources: personal experience, newspapers/news magazines, advice from people they agree with, budgets and cost data, advice from people they disagree with, reports from other state and city governments, and online social networks. City-level actors used reports from their own organizations on a monthly basis, a rate less frequent than the state and national levels of involvement ($p<0.05$). City, state, and national level actors used reports from non-profit organizations on a monthly basis, while actors at the international level used these reports on a weekly basis ($p<0.05$). City, state and international actors reported using reports from industry on a monthly basis, while state level actors used industry reports on a weekly basis ($p<0.001$). City, state, and national actors all reported using academic research on a monthly basis, while actors working at the international level used academic research on a daily basis ($p<0.001$). Finally, all four levels of involvement used reports from consultants on a monthly basis ($p<0.10$).

Explanatory Analysis

Table 6 presents the multivariate analysis explaining the variation in frequency of tools and techniques used in climate and energy issues. Ordinal logits were conducted for each tool and technique with the explanatory variables organized by primary level of involvement, organizational capacity, climate beliefs, the sum of an individual's formal training, and whether an individual possessed an advanced degree. Table 6 lists the unstandardized coefficients. The model shows good fit with Chi^2 probability and low Pseudo R^2 scores ranging from 0.02 to 0.14.

Three variables were most consistently associated with the frequency of tools and techniques used in climate and energy issues. The most consistent variable by level of involvement was city-level. Positive coefficients relating to city-level involvement occur for community impact analysis, facilitation, informal tools (e.g. brain storming), collaborating with those you disagree, and collaborating with those you agree. Notably, these types of tools involve outreach and engagement. Those actors involved in state level efforts show similar patterns but without significant association for community impact analysis and facilitation and positive and significant association for political feasibility analysis. Those actors involved in city-level climate and energy issues are not involved in political feasibility analysis, risk analysis, modeling, environmental impact analysis, and economic analysis – most of which involve more modeling, more technical proficiency, and less outreach and engagement. These technical tools and techniques are notably associated with those actors involved at broader national and international scales.

Organizational capacity had significant coefficients and was also significant in five of the ten tools and techniques with a leaning toward technical tools and techniques (political feasibility analysis, risk analysis, and modeling) and less outreach/engagement (exceptions include informal tools and collaborative with those you agree). Finally, pro-climate beliefs was also significant in five out of ten categories with significant coefficients across all types. Those who agree strongly with the pro-climate change belief scale are more likely to engage in community impact analysis and facilitation, collaborate with those who they agree with, and engage in political feasibility analysis. They are less likely to be collaborative with whom they disagree. Of the two remaining

individual level variables, formal training provide little explanatory power in the models in Table 6 and advanced degree is associated with three of the ten tools and techniques.

Table 7 presents the multivariate analysis explaining the variation in frequency of information sources used for climate and energy issues. Academic research is only associated with those working at international scales. In contrast, city-level involvement is associated with reports from state/city organizations and NPOs. Both high levels of city and state involvement were associated with seeking advice from those they agree with, budget and cost data, personal experience, and news outlets. In contrast, national and international level of involvement relied upon consultants, industry, and their own organization. The differences among levels of involvement do not show the stark patterns found in tools and techniques but do suggest that city level involvement involves, as might be expected, more informal and locally-focused sources of information (personal experience, NPOs) whereas involvement at broader scales (national and international) involves more formal and broadly-focused sources of information (reports produced by national and international organizations, reports from consultants and industry, and academic research).

Organizational capacity shows probably the most consistent association with information sources; apparently, respondents from organizations with high capacity are more likely to draw upon information from multiple sources at high frequencies. The exception for organizational capacity involves seeking advice from those who they disagree (perhaps because there is no need) and academic research.

There is little explanatory power provided by climate beliefs, formal training, and advanced degree in explaining patterns of information uses.

CONCLUSION

Plaguing the use and development of policy-related information is the constant tradeoff between technocracy and democracy. Are and should decisions be motivated by technical experts? To what extent and how should citizens be involved in complex policy decisions? This analysis shows that the tools and techniques used as well as information sources in one salient public policy issue, climate and energy issues, is partly conditioned by the level of involvement in the federal system. The implications from such differentiation are several.

First, *local capacity to respond to climate and energy issues should not be restricted to local government officials*. To understand city-level involvement in climate and energy issues requires a broader perspective that looks at the system of actors engaged at this level of government rather than a perspective focusing solely on those actors employed by local government agencies. Actors can be found in other sectors including non-profit organizations, academics and consultants, and the business community, as well as in organizations at higher levels of government including state and federal agencies.

Second, the *individual-level capacity of actors engaged at the city-level is roughly on par with other organizations engaged at high levels, but organizational level capacity at the city-level is under par.* City-level actors have about the same level of formal training in areas of statistics and policy analysis but less so in areas of applied research,

trends analysis/forecasting, and modeling. However, the organizational capacity and priority of local government and organizations involved in city-level activities is lower than organizations involved in state/national/international levels. The result of the latter, however, could reflect specialized national and international organizations that deal exclusively with energy and climate issues whereas city-level organizations possibly handle more diverse issues.

Third, *there is differentiation among actors/organizations involved in city-level efforts, with actors/organization at this level more likely to use different tools/techniques and information sources.* Perhaps through the combination of devolution and political stagnation at the federal level, effort on climate and energy issues has shifted toward city level activities. The close proximity to citizens and the need for local engagement perhaps motivates these actors to apply tools and techniques that are less technocratic and more engaging, such as facilitation, community impact analysis, informal tools (brain storming), and collaborating with whom those you agree and disagree. More technocratic tools and techniques (e.g., risk analysis, modeling, environmental impact analysis, and economic analysis) are more likely associated with those actors engaged at higher levels, especially national and international levels. Similarly, information sources for city level involvement are not associated with use of academic research or consultant reports but from more informal outlets. Speculating, these outlets (online social networks, news outlets, personal experience, reports from state/city and NPOs) are possibly more attuned to local conditions than academic research.

This paper contributes to our understanding of policy actors and policy processes by exploring the policy capacity of the individuals and organizations involved in the

policy process and the tools and techniques and information sources they use. Clearly, any interpretation of these results should recognize the absence of any criteria of successful decision making in response to high or even low levels of PAC. What's needed is longitudinal and cross-sectional analysis to assess whether PAC actually leads to better decision making. Alternately, perhaps evidence-based policy making, as might be generated by high levels of PAC, is continuously being trumped – for better or for worse – by values and conflicts. Given the complexity of climate and energy issues, however, and the pervasive short and long-term impacts these issues have on the quality of life of nearly every citizen today and into the future, what's needed is an analysis of collective action conflicts simultaneously with the policy analytic capacity of those involved.

Despite these caveats, this paper provides insight to our understanding of local-level climate and energy policy and the individuals and organizations involved. In contrast to the debate over whether advanced education and training or more participatory forms of policy analysis and policy making are needed, this paper suggests that addressing complex local policy problems, such as climate change, involves a combination of varying tools, techniques, and information with outreach and engagement among them. For example, the findings suggest that, while city-level actors are more engaged in outreach activities, they are also involved in other, more technical activities. The associations, thus, should not be interpreted as a strict dichotomy of roles but rather as a reflection of tendency to use certain tools and techniques to fit particular problems and needs over others at any particular level of government.

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Table 1. Level of Involvement of Actor Categories

		Organizational Affiliation (mean / median)						
		Local Govt	NPO	Acad / Consult	Bus	Fed Govt	State Govt	Total
Level of Involvement	City	1.8 / 2	1.3 / 1.5	1.1 / 1	1.0 / 1	.9 / 1	.8 / 1	1.2 / 1
	State	1.2 / 1	1.6 / 2	1.2 / 1	1.4 / 1	1.3 / 1	1.7 / 2	1.4 / 1
	National	.5 / .5	1.1 / 1	1.1 / 1	1.2 / 1	1.4 / 1	.7 / 1	1.1 / 1
	International	.1 / 0	.5 / 0	.9 / 1	.4 / 0	.5 / 0	.2 / 0	.4 / 0

Note: Affiliations ordered from left to right by level of involvement at the City level. 0 = "Not Involved at All", 1 = "Somewhat Involved", 2 = "Primary Involvement". Kruskal-Wallis test indicates $p<0.01$ for all levels of involvement, indicating significant difference across affiliations.

Table 2. Formal Training and Education by Primary Level of Involvement

		Area of Formal Training						Education Level
		Statistics	Policy Analysis	Policy Evaluation	Applied Research[a]	Trends Analysis / Forecasting	Modeling[a]	Advanced Degree
Primary Level of Involvement	City	59%	45%	43%	25%	23%	23%	70%
	State	44%	46%	44%	30%	24%	22%	76%
	National	43%	58%	49%	38%	30%	30%	82%
	International	46%	46%	38%	69%	54%	38%	85%
	Total	47%	49%	45%	33%	27%	25%	77%

a. Kruskal-Wallis Test reports significant differences among primary level of involvement categories for applied research ($p<0.05$) and for modeling ($p<0.10$).

Table 3. Organizational Capacity and Priority for Climate/Energy Issues by Level of Involvement

		Mean Organizational Priority on Climate-related issues and energy policies[a]	Mean Organizational Capacity on Climate Related issues and energy policies[b]
Primary Level of Involvement	City	3.4	3.4
	State	3.8	3.6
	National	4.1	4.1
	International	3.7	4.3
	Total	3.8	3.8

a. Exact wording: "Compared with other issues that your organization responds to, how much of a priority are climate-related issues and energy policies?" (1 = Much Lower; 2 = Lower; 3 = About the Same; 4 = Higher; 5 = Much Higher). ANOVA test indicates $p<0.05$ for organizational priority and $p<0.001$ for organizational capacity.

b. Exact wording: "Compared to similar organizations, does your organization have adequate knowledge, skills, and people to respond to climate-related issues and energy policies?" (1 = Very Low Capacity; 2 = Low Capacity; 3 = Medium Capacity; 4 = High Capacity; 5 = Very High Capacity). ANOVA test indicates $p<0.001$ for organizational priority and $p<0.05$ for organizational capacity.

Table 4. Pro-Climate Change Beliefs by Level of Involvement

		Mean Pro-Climate Change Beliefs Scale
Primary Level of Involvement	City	4.3
	State	3.8
	National	3.8
	International	3.9
	Total	3.9

Notes: 5 = Strongly Agree; 4 = Somewhat Agree; 3 = I Neither Agree Nor Disagree; 2 = Somewhat Disagree; 1 = Strongly Disagree. An ANOVA test indicates significant difference for primary level of involvement ($p<0.01$).

Table 5. Frequency of Use of Tools/Techniques and Information Sources (medians reported)

		Primary Level of Involvement (median frequencies reported)				
		City	State	National	Internet	Total
Tools/Techniques	Collaborate with those you agree	Weekly	Weekly	Weekly	Daily	Weekly
	Informal tools/techniques	Monthly	Weekly	Weekly	Weekly	Weekly
	Collaborate with those you disagree	Monthly	Monthly	Monthly	Weekly	Monthly
	Economic analysis	Monthly	Monthly	Monthly	Weekly	Monthly
	Facilitation/Consensus building	Monthly	Monthly	Monthly	Monthly	Monthly
	Modeling***	Yearly	Yearly	Monthly	Monthly	Yearly
	Environmental impact analysis**	Yearly	Yearly	Monthly	Monthly	Yearly
	Risk analysis***	Never	Yearly	Yearly	Monthly	Yearly
	Political feasibility analysis	Yearly	Yearly	Yearly	Never	Yearly
	Community impact analysis**	Yearly	Never	Never	Never	Never
Information Sources	Personal experience	Daily	Daily	Daily	Daily	Daily
	Newspapers / News magazines	Weekly	Daily	Weekly	Daily	Weekly
	Advice from people you agree	Weekly	Weekly	Weekly	Weekly	Weekly
	Reports from your organization**	Monthly	Weekly	Weekly	Monthly	Monthly
	Budgets and cost data	Monthly	Monthly	Weekly	Weekly	Monthly
	Advice from people you disagree	Monthly	Monthly	Monthly	Weekly	Monthly
	Reports from NPOs**	Monthly	Monthly	Monthly	Weekly	Monthly
	Reports from industry***	Monthly	Monthly	Weekly	Monthly	Monthly
	Academic research***	Monthly	Monthly	Monthly	Daily	Monthly
	Reports from other state/city govts	Monthly	Monthly	Monthly	Monthly	Monthly
	Reports from consultants*	Monthly	Monthly	Monthly	Monthly	Monthly
	Online social networks	Monthly	Never	Never	Yearly	Yearly

Notes: Scale ranged from Never, Yearly, Monthly, Weekly, and Daily. Kruskal-Wallis Test for significance across levels (*p<0.10, **p<0.05, ***p<0.001)

Table 6. Explaining Variation in Frequency of Tools and Techniques Used in Climate/Energy Issues

	Comm impact analysis	Facil.	Informal tools	Collab with those disagree	Collab with those agree	Political feas. analysis	Risk analysis	Modeling	Env impact analysis	Econ analysis
City	1.05***	0.57**	0.57**	0.42***	0.52**	0.27	0.12	0.13	0.08	0.31
State	0.15	0.40	0.40***	0.61***	0.60**	0.71*	0.22	0.01	0.03	0.07
National	0.11	0.10	0.22	0.36	0.44***	0.06	0.66***	0.97***	0.66*	0.24
International	0.07	0.29	0.23	0.62**	0.80**	0.39	0.22	0.33	0.45*	0.48*
Org Cap	0.03	0.12	0.38***	0.14	0.72***	0.43**	0.35**	0.36**	0.05	0.14
Clim Beliefs	0.23***	0.37**	0.06	-0.32**	0.31**	0.47***	0.10	0.01	0.12	0.06
Form Train	-0.05	-0.08	-0.05	-0.01	-0.00	0.07	0.04	0.08*	-0.08	-0.03
Adv Degree	0.22	0.70***	0.39	-0.16	0.01	0.45*	0.48	0.73	0.69***	0.30
Psuedo R^2	0.09	0.05	0.06	0.06	0.14	0.07	0.06	0.10	0.05	0.02
Prob>Chi^2	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Note: Models are ordered logit analysis clustered by organizational affiliation. ***p<0.001, **p<0.05, *p<0.10.

Table 7. Explaining Variation in Frequency of Information Sources in Climate/Energy Issues

	Reports from state / city	Reports from NPOs	Advice from those who agree	Budget and cost data	Personal experience	News outlets	Online social networks
City	0.72***	0.39***	0.34***	0.30**	0.42**	0.29*	0.84***
State	0.31	0.18	0.45**	0.37**	0.25***	0.41**	0.10
National	0.12	-0.12	0.31	0.13	0.22	0.24	0.47**
International	0.60***	1.4***	0.62**	0.35	0.44**	0.33	0.42**
Org Cap	0.36**	0.41**	0.44***	0.38**	0.47***	0.49***	0.10
Clim Beliefs	-0.23	0.22	-0.26	0.01	0.04	0.18	0.36**
Form Train	-0.10	-0.06	-0.01	0.12	0.15	-0.00	0.02
Adv Degree	-0.07	-.38	-0.65	0.33	-.31	0.42	-0.02
Psuedo R^2	0.07	0.10	0.08	0.04	0.06	0.06	0.06
Prob>Chi^2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Note: Models are ordered logit analysis clustered by organizational affiliation. ***p<0.001, **p<0.05, *p<0.10.

	Reports from your organization	Advice from those who disagree	Reports from consultants	Reports from industry	Academic research
City	0.04	0.16	0.11	-0.01	0.18
State	0.32**	0.45**	0.39*	0.41**	0.05
National	0.24*	0.21	0.45**	0.49***	0.24
International	0.70***	0.58	0.20	0.02	1.56***
Org Cap	0.66***	0.22	0.37*	0.49***	0.39
Clim Beliefs	-0.49***	-0.49	-0.12	-0.20	0.00
Form Train	-0.01	-0.16	-0.08	-0.05	0.08
Adv Degree	0.07	-0.08	0.22	0.26	0.35
Psuedo R^2	0.08	0.06	0.04	0.06	0.12
Prob>Chi^2	0.0000	0.0000	0.0000	0.0000	0.0000

Note: Models are ordered logit analysis clustered by organizational affiliation. ***p<0.001, **p<0.05, *p<0.10.