

Policy Analytical Capacity Inside and Outside of Government: A Case Study of Colorado Climate and Energy Issues

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Abstract. This paper examines the policy analytical capacity of government compared to the non-profit and private sectors and to the research/academic community. Based on original data from a 2011 questionnaire administered to policy actors in the context of energy and climate issues in the state of Colorado, the findings show that government is not as “hollowed out” as expected. While individuals from academia and consulting firms may have higher analytical capacity than government in conducting research, government is higher across most other measures. Nonetheless, nearly all respondents agree that government needs higher levels of policy analytical capacity to address climate and energy issues.

Keywords. Policy analysis, expert-based knowledge, science in policy, policy process

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Outsourcing, public-private partnerships, and downsizing typify continuing trends in government. In recent decades, state and local governments have faced significant challenges to their capacity to govern due in part to New Public Management (NPM) reforms and the rise of anti-government sentiments that deemphasize the role of government and emphasize the role of non-profits and the private sector in policy processes (Edwards, 2009; Peters, 1996; Rhodes, 1994). The effect is an emergent governing environment where pluralism is at an all-time high with diverse sets of non-government actors with considerable resources seeking to influence policy issues. This pressure on government is being applied simultaneously with continuing declines in the public's trust in politicians and bureaucracies and increases in public expectations for transparency and public involvement in the policy process. Expertise from building roads to

Résumé. Cet article examine la capacité analytique du gouvernement en matière de politiques publiques, comparée aux secteurs à but non lucratif et privé et à la communauté universitaire/de la recherche. Fondés sur des données nouvelles émanant d'un questionnaire soumis en 2011 à des acteurs de politiques publiques dans le contexte des questions d'énergie et de changement climatique dans l'État du Colorado, les résultats montrent le gouvernement n'est pas aussi « creux » qu'il n'y paraît. Alors que les personnes du monde universitaire et de sociétés de conseil semblent avoir une capacité d'analyse supérieure par rapport au gouvernement en matière de recherche, le gouvernement est supérieur concernant la plupart des autres instruments de mesure. Cependant, presque toutes les personnes interrogées sont d'avis que le gouvernement a besoin de niveaux plus élevés de capacité d'analyse de politiques publiques pour faire face aux questions de climat et d'énergie.

Mots clefs. Analyse des politiques publiques, connaissance fondée sur l'expertise, science en politiques publiques, processus des politiques publiques

organizing military operations are increasingly privatized to non-government entities leaving a government that is largely perceived as “hollow” (Rhodes, 1994; Milward & Provan, 2000). Finally, the networks of government are no longer closed to hierarchies but now consist of arrangements built upon vertical and horizontal networks (Howlett, Wellstead, & Stedman, 2011). It is in such an environment that this paper seeks to examine the level of analytical capacity of government in comparison to other sectors.

Shrinking governments and shifting societal expectations may have altered the policy analytical capacity of government. Policy analytical capacity refers to the ability of organizations to acquire and utilize knowledge in the policy process (Howlett, 2009a). The number of complex policy issues that governments currently face in combination with the low levels of policy analytical capacity found in recent studies, provide impetus for the need to assess the government's capacity to produce valuable policy-relevant research and analysis (Howlett, 2009a). While recent studies of policy

analytical capacity have established that the policy analytical capacity of government is low, further empirical evidence is needed to better understand policy analytical capacity as it relates to a variety of activities associated with the policy process, and to assess the government's policy analytical capacity in relation to a variety of non-governmental actors engaged in policy analysis and the policy process (Howlett, 2009b). Furthermore, despite an abundance of research on the role of policy analysts, there continues to be a lack of empirical evidence on the daily activities and the tools and techniques employed by policy analysts in their policy work (Howlett, 2009a; Colebatch & Radin, 2006; Wellstead & Steadman, 2011). This paper provides insight into the work performed by policy analysts inside and outside of government.

Two interrelated policy areas in need of high levels of policy analytical capacity include climate and energy policy. As the scientific evidence on climate change has become clearer, governments have become increasingly engaged in a variety of climate change mitigation and adaptation policies at the international, national, state, and local levels. The wide range of current and anticipated climate change impacts as well as the complexity of the issue, forces the question about whether government agencies have the capacity to develop and implement the multi-sectoral and long-term focus of climate change and energy-related policies and programs needed to address the phenomena (Wellstead & Stedman, 2010).

An Overview of Policy Analytical Capacity

Governments serve multiple purposes including the development and enforcement of public policies. To endure, any government must have sufficient capacity to mitigate and adapt to the most severe problems threatening a society. Such "policy capacity" refers to the analytical and administrative potential of governments to undertake the day-to-day activities related to the policy process (Howlett, 2009a). A narrower and more focused subset of policy capacity is the concept, "policy analytical capacity", which relates to the ability of government organizations to produce valuable research and analysis on policy issues (Howlett & Oliphant, 2010). That is, to acquire and utilize information in governing the policy process. While policy capacity and policy analytical capacity have been used interchangeably in previous literature on the subject (Oliphant & Howlett, 2010, p.444), our decision to use policy analytical capacity follows Howlett's (2009a) definition.

The ability of government policy analysts to conduct policy research has been a longstanding concern of the public policy literature (Lasswell, 1971; Wildavsky, 1987; deLeon, 1988; Radin, 2000; Weimer & Vining, 2010). The argument – which partly underpins the development of the field of public policy in the 1950s and 1960s – optimistically builds on the idea that research and policy analysis can help avoid policy failures, learn from mistakes, and improve government effectiveness and society. However, threats of technocracy combined with few indications that policy failures were

avoided turned early optimism into cynicism and frustration. As a result, the centrality of policy analysis waned in policy studies. The subject has received renewed attention, however, particularly from a variety of Canadian scholars in recent years.

Fellegi (1996) defines policy analytical capacity as an organization's ability to "articulate its medium and long term priorities, test the robustness of its policy options by building alternative scenarios, attach both qualitative and quantitative assessments to different policy options... communicate and defend policy thrusts to its operational arms as well as to its major stakeholders and to the public, [and] formulate policies that can withstand rigorous professional challenge" (pp. 14-15). In contrast, Riddell (2007) emphasizes several different aspects, defining policy analytical capacity as "a recognized requirement or demand for research; a supply of qualified researchers; ready availability of quality data; policies and procedures to facilitate productive interactions with other researchers; and culture in which openness is encouraged and risk taking is acceptable" (p. 7). More recently, Howlett (2009a) has offered a tripartite definition of policy analytical capacity. Under the first part of the definition, policy analytical capacity refers to "the amount of basic research a government can conduct or access, its ability to apply statistical methods, applied research methods, and advanced modeling techniques to this data" (Howlett, 2009a, p. 162). Policy analytical capacity includes, as its second part, the ability of government to employ analytical techniques in the form of environmental scanning, trends analysis, and forecasting methods, to assess the opinions and attitudes of the general public, interest groups, and major policy players, as well as the ability to anticipate the various impacts of future policy. In the third part of Howlett's definition of policy analytical capacity, the concept involves the ability of government to communicate policy-related messages and information to stakeholders, which includes the capacity of individual departments to articulate their medium and long-term goals and priorities and to integrate relevant data, information, and knowledge into the policy process.

Despite differences over the specific individual components that comprise policy analytical capacity, the literature has considerably more agreement as to the differences between high and low capacity and to the benefits of high levels of capacity. Low levels of policy analytical capacity indicate a short-term focus, a decreased ability to react to long-term challenges within the policy environment, and an increased likelihood of policy failures (Howlett, 2009a). Other contextual factors contributing to low levels of policy analytical capacity were identified by Howlett & Oliphant (2010) including: rigidly hierarchical decision structures or organizational cultures, a lack of organizational support for analysts to approach policy problems in innovative ways, a low demand for policy research, inferior quality of the research produced by an organization, lower levels of education, an inability to combine qualitative and quantitative analysis to various policy alternatives, and a lack of access to quality data.

Conversely, organizations with higher levels of policy analytical capacity are more likely to be successful in impacting policy in both the short- and long-terms (Howlett & Oliphant, 2010). High levels of training and education, an open organizational system that values communication of research and analysis, ready access to data and information, and the organization of work to allow for longer periods of analysis have been identified as prerequisites for high levels of policy analytical capacity (Oliphant & Howlett, 2010). Under the idea that effective decisions utilize the most available information, it is expected that the attainment of high levels of policy analytical capacity will enhance the information used in policy decisions. The use of better information in policy decisions and throughout the policy process will result in the avoidance or reduction of policy failures, and an increased likelihood for greater success in achieving policy goals (Howlett, 2009a).

Using Howlett's definition (2009a), the constitutive dimensions of policy analytical capacity fall in five categories. The first relates to the amount of research conducted and accessed. This might involve the timely access to climate and energy research, and the statistical and modeling abilities of individuals. In relation to climate and energy issues, this might include modeling climate change scenarios and energy futures analyses.

The second dimension involves the extent to which the government has the capacity to map political landscapes by assessing the opinion and attitudes of the public, interest groups, and major policy players. Common techniques and skills in this area might include community-level impact analysis, political feasibility analysis, and trends analysis and forecasting.

The third dimension is the ability of government to communicate policy-related messages to stakeholders and other interested parties and is assessed by determining whether governments consult with the public, and coordinate with different networks and other levels of government in their policy work. This may involve facilitation/consensus building efforts from focus groups to roundtables.

The fourth dimension, the level of capacity of government agencies to articulate their medium- and long-term priorities, is assessed by determining the agency's ability to engage in long-term planning, whether short-term or long-term planning takes precedence within the agency, and whether sufficient resources are allocated for long-term planning.

The fifth and final dimension of policy analytical capacity is the ability of government to integrate information into the decision-making stage of the policy process. We determine the frequency that government uses relevant research and information across a variety of sectors, including reports from academics and researchers, industry, consultants, non-profits, and other state and city governments.

These five dimensions of policy analytical capacity are used to generate five guiding research questions that structure the results section, where governments are compared to non-profits, research organizations, and businesses and the private sector. In addition to these five dimensions of policy

analytical capacity, we include two additional research questions related to the policy analytical capacity of government. Our sixth question examines how individuals in the climate and energy sectors view the policy analytical capacity of government, asking respondents whether the capacity of government to analyze policy options has decreased and whether the majority of existing skills and knowledge about climate and energy issues lay inside or outside of government. The final research question examines what the energy and climate sectors perceive are the necessary efforts – including nothing, additional staff, greater coordination, and use of data and technology – that government should undertake to increase its policy analytical capacity.

CASE STUDY DESCRIPTION

National Climate Change Policy

Greenhouse gases trap heat within the Earth's atmosphere. Since the beginning of the industrial age, the burning of fossil fuels has released a large amount of greenhouse gas (GHG) into our atmosphere (IPCC, 2007). According to a 2007 report from the Intergovernmental Panel on Climate Change (IPCC), the leading international scientific institution on climate change research: "Warming of the climate system is unequivocal..." and "Observational evidence from all continents and most oceans shows that many natural systems are being affected by regional climate changes, particularly temperature increases." (IPCC, 2007).

Despite these findings accepted by the majority of the scientific community, there exists a long-standing division between advocates and opponents of progressive climate change policy (Oreskes & Conway, 2010; Layzer, 2006). Disputed is the relative contribution to natural global climate change attributable to human behavior and the need for government intervention through new climate and energy-related policy. These policy disputes and debates exist at the international, national, state, region, and local levels.

Some international policy has obviously been promulgated. On February 16, 2005 the Kyoto Protocol, the international agreement to address climate disruption, went into effect for the 141 countries that ratified it. Despite the fact that the U.S. was a signatory to this agreement, Congress made it clear it had no intention of ratifying the treaty and, thus, the U.S. would not be participating in the Kyoto Protocol (Layzer, 2006). While progress on the creation of a comprehensive climate policy at the national level has yet to be created, many subnational actors such as states and cities have taken matters into their own hands and the study of climate change policy at the subnational level has become a large and growing field (Krause, 2010; Lutsey & Sperling, 2008; Byrne et al., 2007; Fogel, 2007; Selin & VanDerveer, 2007; Rabe, 2004; Bulkeley & Betsill, 2003; Betsill, 2001).

Subnational Climate Policy

At least thirty states as well as hundreds of cities within the United States have created a climate action plan (CAP) (EPA, 2011; ICLEI, 2011; Maggioni et al., 2012). A CAP typically

outlines policy goals and recommendations that a state or city will employ to address climate change by making specific policy actions towards reducing the GHG emissions of that entity.

To begin at the local level, municipal climate policy is crucial to understand “because cities contain a large proportion of the global human population and exert huge direct and indirect demands on our natural capital, city-scale climate actions have the opportunity to engage vast segments of human populations as well as ameliorate impacts in large spatial areas across the globe” (Ramaswami et al., 2008, p. 6455).

In an effort to address this issue, on the same date the Kyoto Protocol went into effect for the 141 signatory countries, Seattle Mayor Greg Nickels launched the US Mayors Climate Protection Agreement (USMCPA) to advance the goals of the Kyoto Protocol through local government leadership and action (Mayor’s Office, Seattle City Hall, 2008). There are now more than 1,000 signatories to the agreement (now called the US Conference of Mayors Climate Protection Agreement), including Denver, Colorado (US Conference of Mayors, 2011). Participating cities have agreed to reduce community-wide greenhouse gas (GHG) emissions by 2012 to at least 7 percent below 1990 levels or better. The signatory cities commit to meet or exceed these Kyoto Protocol GHG emission targets in their own communities by using a litany of climate-related policies. The number of cities involved in this agreement and the diversity of policy strategies being implemented offers the opportunity for practitioners to learn from one another in regard to which GHG mitigation strategies might be more effective. This variation is also fertile ground for policy process scholars to use in order to further develop public policy theories.

Denver and Colorado Climate Policy

In 2005, then Denver Mayor John Hickenlooper launched Greenprint Denver, a new department in the City and County of Denver created to “advance and further support the integration of environmental impact analysis into the city’s programs and policies, alongside economic and social analysis” (City and County of Denver, 2006, p.2). It is important to note however, that Denver’s action in the climate policy area had at that point a history of over a decade as an early member of the International Council of Local Environmental Initiatives (now known simply as ICLEI) (Bulkeley & Betsill, 2003).

The Greenprint Denver Plan, created in 2006, includes a ten point action agenda to reduce the city’s environmental impact. It is a comprehensive list covering a variety of environmental policies and the research study proposed here will concern those action items dedicated to climate change policy and action. The first and perhaps most ambitious action agenda item from the Greenprint Denver Plan states that the primary goal of Greenprint Denver is to:

Reduce Denver per capita greenhouse gas emissions by 10% below 1990 levels by 2011. Work in partnership with regional mayors, universities, and the business community to develop and implement effective strategies for adaptation to

and amelioration of global climate change” (City and County of Denver 2006 p.6).

These goals are similar to the majority of other signatories to the USMCPA (USMCPA, 2011).

Early climate and energy policy innovations at the state level were categorized and examined by Rabe (2004) and while many of these policies were symbolic at first, later and especially recent developments have become much more aggressive in goal and policy detail (Krause, 2010; Ramseur, 2007). 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 statewide emissions 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.” (Ritter 2007, p.2).

Both the Greenprint plan and the Colorado CAP were preceded by a series of roundtable discussions and public input sessions that provided both the formal and informal discussions between advocates and opponents of citywide climate policies. Such ambitious climate goals will require these individuals and organizations to work together and make substantive policy changes from the status quo (Krause, 2010; Ramaswami, 2008; Lutsey & Sperling, 2008; Byrne et al., 2007; Fogel, 2007; Selin & VanDerveer, 2007; Rabe, 2004; Bulkeley & Betsill, 2003; Betsill, 2001).

It is worth noting that since the inception of these plans former Mayor Hickenlooper, who spearheaded the Denver level climate action plan, has since become Governor and is now leading the charge on the Colorado’s CAP. This change in combination with the fact that Denver is the largest city in Colorado, the state’s capital, and influential in state-level policy developments in climate and energy issues, along with the necessity for states and cities to cooperate on energy and climate policy, this analysis studies government actors from across the state as subnational government actors.

Given that the Denver plan and the Colorado plan are both typical in comparison to the sets of city and state climate action plans in existence, and given that policy analytical capacity has never been examined in U.S. local and statewide policy arenas, a typical-case approach to case selection is, according to Gerring (2007, p. 91-93), “useful for an exploratory study such as this”.

Using the climate and energy sectors in Colorado as a case study, this paper examines the policy analytical capacity of the government compared to other sectors working in the climate and energy fields. Colorado provides a good case study 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 seen considerable growth due in part to the creation of 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 a good case to study because of its vulnerability to both current and predicted impacts of climate change (Ritter, 2007). The effects of climate change felt in Colorado across recent decades 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 (Ritter, 2007). Scientists project that in the ensuing decades, climate change in Colorado will produce temperature increases of 3 to 4 degrees Fahrenheit, an even earlier melting of the snowpack, longer and more intense wildfires during the summer seasons, increased vulnerability to drought, and an increase in water shortages (Ritter, 2007).

Methods

Our analysis uses original data collected through an internet questionnaire administered in the spring of 2011. The questionnaire was sent to a sample of 793 individuals who were directly or indirectly involved in climate-related issues and energy policies in Colorado. The sample was collected using a combination of a modified snowball-sampling technique and internet research focusing on climate and energy policy documents. The modified snowball sampling technique began with suggestions from several leaders within the climate and energy relevant agencies and industries of the names of individuals involved with climate and energy issues in Colorado. Additional names were collected by searching the internet for government and non-government organizations and the individuals involved in climate and energy issues. Internet searches for relevant climate and energy policy documents were also conducted, which produced the names of stakeholders associated with the development of the policy. Finally, prior to the administration of the survey we sent invitations to participate to the sample, which included a request for additional names of stakeholders involved in climate and energy issues.

Our survey was based upon a modified version of the survey used by Wellstead, Stedman, and Lindquist (2009) to study policy-focused employees within the Canadian federal government. The survey used by Wellstead et al. (2009) was modified to measure the policy analytical capacity of individuals and organizations working on climate-related and energy policy within the public, private, academic, media, and non-profit sectors in Colorado. In addition, new questions were added to study the extent that individuals and organizations were learning in regard to local and state level climate and energy policy. These modifications resulted in a final survey length of 42 questions. The survey was administered to the sample from February through April of 2011 using the SurveyMonkey online survey tool. Of the total sample, 272 individuals returned fully completed surveys for a response rate of 34% and 87 individuals returned partially completed surveys (the inclusion of which equals 359 re-

spondents and a 45% response rate). Per response category, the response rates ranged from 4% to 86% for the government (39%, response number = 84), private sector (26%, response number = 87), non-profit (28%, response number = 55), media (4%, response number = 8) and researchers/academia (86%, response number = 38). Because of the low response rate for the media category, they were excluded from our analysis.

Results

We examine our research questions in three steps. First, we examine the univariate responses from the entire sample of individuals involved in climate and energy policy work. Next, we examine the bivariate relationships between government analysts and our various measures from the four dimensions of policy analytical capacity to compare the government to the other sectors and the broader sample of climate and energy policy analysts. We then test these relationships to see which patterns are statistically significant.

Descriptive Analysis of Policy Actors

Table 1 compares the main demographic characteristics of the broader sample and individuals working in the government sector. Respondents were asked to identify their organization with the following question: "Which of the following best describes your organization?" The possible responses were five: academic/research (n=38), business/private sector (n=87), government (n=84), and non-profits (n=55). These categories were confirmed through manual coding based on the respondents' email address and affiliation. Government officials come from city, state, and federal-level agencies. Researchers represent both those from academia, private consulting firms, and government research organizations (e.g., National Renewable Energy Laboratory). Non-profits consist largely of environmental organizations devoted to energy and climate-related issues in Colorado. The business/private sector is comprised largely of traditional and renewable energy companies, sustainability-focused companies, and consultants.

The majority of respondents in our sample were female with non-profits showing the lowest ratio (40%) and the business/private sector the highest ratio (65% female) with a statistically significant difference between the actor categories. In terms of race, our sample was overwhelmingly homogenous with 90% of the sample responding that their race was white (not of Hispanic origin). Respondents viewed themselves as moderate on fiscal policy (50%), and liberal to very liberal on social policy (a modal response of 39% liberal for the sample, $p < 0.001$, based on an independent sample, Kruskal-Wallis Test), with the majority of researchers/academia responding that they were very liberal (47%) and the majority of government and the business/private sector responding that they were liberal on social policy (42% and 39%, respectively). The formal education level of the respondents was high with more than 62% of all categories earning at least a Master's/Professional Degree or higher ($p < 0.001$). Researchers and academics were the most

likely category to have earned a Ph.D., M.D., or J.D. at 55%. Individuals working on, or involved with climate and energy policy were found to be highly educated, with 44% of the sample and 51% of government employees reporting a Master's degree as the highest level of formal education they had attained. The respondents from this study indicated that more than half have been involved in climate and energy issues for less than 10 years with the modal response being 1 and 5 years ($p < 0.05$). In comparison to the other sectors and the sample as a whole, government officials indicated a shorter time of involvement, with 53% indicating that they had been involved in climate and energy issues from less than a year to fewer than 5 years.

Using a combination of the measures of policy analytical capacity outlined, we develop a set of research questions to study policy analytical capacity that parallel the five dimensions of the concept. The first five research questions are used to determine the level of policy analytical capacity of government in Colorado. Our sixth research question is used to determine how individuals engaged in climate and energy policy perceive the level of policy analytical capacity within government. Our final research question is used to determine what efforts government can take to increase its policy analytical capacity.

1. What is the level of basic energy and climate research that government can conduct or access?

In reference to climate and energy issues, we use three measures from our survey to assess the government's capacity to conduct and one measure about access to research (see Table 2). For conducting research, the first measure asked respondents whether they had received formal training in statistical methods. Statistical training within the sample varied considerably, with non-profits showing the lowest ratio (36%) and the research/academic and government sectors the highest ratios (63% and 51%, respectively). Our second measure asked respondents whether they had received formal training in applied research. The sample showed considerable variation across the sectors, with the non-profit sector showing the lowest ratio (20%) and the academic/research sector showing a considerably higher ratio (66%). In comparison, government respondents showed the second highest level of applied research training, at a ratio of 36%. Our third measure asked the sample the degree to which they applied modeling techniques – daily, weekly, monthly, yearly, or never – in their policy work throughout the previous year. The academic/research sector reported the highest ratio of use throughout the previous year (86%), while the other three sectors showed similar levels of use at 64% ($p < 0.05$).

To measure access to energy and climate research, we asked respondents whether they had timely access to academic literature, peer-reviewed publications and professional research on climate and energy related policy issues. Access to academic research was high with more than 62% of all four sectors agreeing or strongly agreeing that they had timely access to relevant research ($p < 0.001$). The academic/research sector had the highest ratio of access (90%),

while the business/private sector had the second highest ratio of access (72%) and government (63%) had slightly higher levels than the non-profit sector (62%).

In summary, researchers were shown to have similar to considerably higher levels of ability to conduct or access research when compared to the other sectors. Researchers have the highest ratios of training in statistical methods, and slightly higher levels of training in applied research and the use of applied modeling. In comparison, government had the second highest ratios of formal training in statistics and applied research, and had the highest frequency of use for modeling techniques among the 4 sectors. The majority of government officials had timely access to academic and professional research on climate and energy policy, but ranked considerably lower than the academic/research and business/private sectors.

2. What is the capacity of government to employ analytical techniques to assess the opinion and attitude of the general public, interest groups, and major policy players?

We use two measures from our survey to assess the capacity of government to employ analytical techniques to assess the opinions and attitudes of stakeholders (see Table 3). The first measure asked respondents how often they used political feasibility analyses – daily, weekly, monthly, yearly, or never – within the past year. A majority of respondents in our sample (39%) indicated that they had never used political feasibility analyses within the past year. Non-profits reported the highest ratio of use (61%), while business ranked second among the four sectors at a ratio of 52%, and government and the academic sector reported a ratio of 50%. Our second measure asked respondents how often they used community-level impact analyses within the past year. The sample showed low levels of use for community-level impact analyses with more than 58% of all categories having never used the technique within the previous year. Government reported the highest ratio of use among the four sectors, with 42% of government respondents having used the technique in the previous year.

This section indicates that government has mixed capacity to assess the opinions and attitudes of the general public and stakeholders in relation to its work on energy and climate policy. While government had the lowest use of political feasibility analysis, it reported the highest ratio of use of community-level impact analyses across the four sectors.

3. What level of capacity does government have to communicate its policy-related messages to interested parties and stakeholders?

Three measures are used to evaluate the government's capacity to communicate its climate and energy policies to interested parties and stakeholders (see Table 4). The first measure asked respondents to use a five point Likert scale, from strongly agree to strongly disagree, to respond to the following statement: "I am increasingly consulting with the public as I do my policy-related work". The majority of re-

spondents in the academic, business/private, and non-profit sectors responded with agreement to strong agreement with the statement, while modal responses in the government sector were divided between neither disagreeing nor agreeing and agreement/strong agreement (43% each)

Our second measure asked respondents once again to use the five point Likert scale to respond to the following statement: "My policy-related work increasingly involves networks of people across regions or levels of government, or even outside of government". All four sectors indicated that their policy-related work increasingly involved networks of people across regions and inside and outside of government, with more than 73% of all sectors agreeing or strongly agreeing ($p < 0.01$). At a ratio of 73%, the majority of government respondents indicated agreement or strong agreement, ranking government last among the four sectors. Our third measure used a five-point Likert scale ranging from daily to never to ask respondents how often they engaged in facilitation/consensus building activities such as focus groups and round tables. Modal responses from the research/academic and business/private sectors indicated that these activities were conducted on a yearly basis, while the government and non-profit sectors reported monthly as the modal response, indicating a higher frequency of use ($p < 0.05$).

This section indicates that government has varied capacity to communicate policy-related messages to stakeholders and interested parties. The modal response of government employees was equally divided between neutral and agreement/strong agreement when asked if their policy work increasingly involved consulting with the public. Of the four sectors, government employees responded with the lowest ratio that their work increasingly involved networks of people across regions, across different levels of government, and with individuals outside of government. However, in regard to the use of facilitation and consensus building activities, government reported the second highest frequency of use.

4. What is the capacity of government to articulate its medium- and long-term policy priorities?

We use three measures to assess the capacity of government to articulate its medium and long-term energy and climate policy priorities (See Table 5). We first asked respondents the degree to which they were able to engage in tasks of long-term planning lasting a year or more. Using the same five-point Likert scale ranging from strong agreement to strong disagreement, the majority of respondents agreed or strongly agreed with a minimum of 62% of all sectors indicating that they were able to engage in long-term planning. Of the four sectors, government had the lowest ratio of agreement (62%), while the research/academic had the highest ratio (84%).

We then asked respondents whether they were provided with enough time and resources to engage in long-term planning. Modal responses for all four sectors indicated that they did not have enough time and resources to engage in long-term planning, with the research/academic sector

showing the lowest ratio of disagreement (37%) and government showing the highest ratio (48%).

In the third measure, we sought to determine whether members of our sample were focusing the majority of their time on immediate, short-term issues or long-term planning by asking respondents to respond to the following statement: "Urgent day-to-day issues seem to take precedence over thinking 'long-term'". All four sectors showed similar levels of agreement or strong agreement, with the non-profit sector reporting the lowest ratio of agreement (64%) and government and the private sector reporting the highest ratios (72%).

This section indicates that government has limited capacity to articulate its medium and long-term policy priorities. When first asked whether they were able to engage in long-term planning, a majority of government employees at 62% indicated that they regularly engaged in long-term tasks. However, when asked whether they were provided with the necessary resources and time to engage in long-term planning, government analysts responded that they were not provided with sufficient time and resources. Furthermore, when asked whether short-term issues took precedence over long-term thinking, 72% of government analysts were in agreement.

5. To what degree does government integrate various sources of information and data into the decision-making stage of the policy process?

To determine the capacity of government to integrate information into the decision-making stage of the policy process, we use a combination of six measures (See Table 6). Using a five-point Likert scale ranging from daily to never, we asked respondents how often they used information from the following sources in their policy-work: reports produced by their organization, academic research, reports from industry, reports from consultants, reports from other state and city governments, and reports from non-profit organizations. All four sectors showed high levels of the use of reports produced or created by their organization, with more than 87% of all sectors having used these reports during the previous year. Government employees were the most likely to use their own reports (95%), while the business/private sector reported the lowest ratio of use (87%). All four sectors showed very high levels of use of academic research, with more than 93% of all sectors having used academic research during the previous year ($p < 0.001$). The research/academic sector reported the highest ratio of use at 100%, while the business/private sector reported the lowest ratio of use (93%). All four sectors reported extremely high levels of use of industry reports with more than 95% of all sectors having used reports from industry in the previous year ($p < 0.001$). Reports from consultants had high levels of use as more than 88% of all categories had used the reports throughout the previous year. Of the four sectors, non-profits had the highest ratio of use (94%), while the private sector had the lowest ratios of use at 88%. The use of reports from other state and city governments had high levels of use with more than 92% of all sectors having used the reports in the previous year.

The business/private and non-profit sectors used these reports on a daily/weekly basis (40% and 44%, respectively), while the research/academic and government sectors used these reports on a monthly basis (58% and 49%, respectively). Finally, when asked how often they used reports from non-profits, the four sectors had high levels of use with more than 86% of all sectors using the reports throughout the previous year ($p < 0.001$). However, considerable differences were found in the ratio of use in the sectors, with the research/academic and non-profit sectors having nearly unanimous use (100% and 98%, respectively) while the business/private sector had a considerably lower level of use (86%).

This section suggests that government has a high level of success in integrating information and data into the decision-making stage of the policy process. A minimum of 89% of government employees indicated that they had utilized research and information from the public, private, academic, and non-profit sectors in their policy work throughout the previous year.

In addition to assessing the policy analytical capacity of government, we sought to determine the perceptions of government's policy analytical capacity among individuals working in the climate and energy policy sectors. This inquiry led us to the following research question:

6. How do individuals working in the climate and energy sectors perceive the policy analytical capacity of government?

To examine the perceptions of government's policy analytical capacity, we use two measures (see Table 7). In the first measure, we asked our sample to respond to the following statement using the five-point Likert scale: "There seems to be less governmental capacity to analyze policy options than there used to be." The modal responses for the research/academic (50%), business/private (46%), and non-profit sectors (42%), was neither disagreement nor agreement with the statement, while modal responses for government were divided between neither disagreement nor agreement and agreement to strong agreement (40%). Our second measure asked the sample to respond to the following statement, using the same five-point Likert scale: "Much of the existing skills and knowledge about climate and energy issues lay outside the formal structure of government". The majority of respondents in all sectors agreed or strongly agreed with the statement, with more than 53% of all sectors indicating agreement. Of the sectors, government had the lowest level of agreement (53%) while the business/private sector had the highest level of agreement at 85% ($p < 0.001$).

These two measures indicate mixed perceptions among individuals involved in climate and energy in regard to the policy analytical capacity of government. While majorities of our sample and government employees were neutral in regard to whether government possessed less capacity to analyze policy options, majorities in both groups indicated that the majority of skills and knowledge on climate and energy issues lay outside of formal government.

After assessing the level of policy analytical capacity within government and examining the external perceptions of its policy analytical capacity, we sought to determine what efforts government could undertake to improve its capacity on climate and energy policy. This led us to the following research question:

7. What efforts do individuals working in the energy and climate industries believe that government should undertake to increase its policy analytical capacity?

To assess what individuals in the energy and climate sectors believed that government needed to do to increase its capacity, we began by asking our sample to respond to the following statement: "What do you think is needed within the Colorado public sector (e.g. city or state-level) to increase its capacity to deal with climate-related issues and energy policy?" We then asked respondents to use a five-point Likert scale to show their level of agreement or disagreement with 12 efforts that government could undertake to increase its capacity, including: additional staff, greater coordination with public or private organizations, increased information sharing, additional training, increased access or use of data and technology, greater commitment from elected officials, greater commitment from non-government entities, or nothing (see Tables 8-10). In response to the answer that nothing should be done, more than 55% of all sectors indicated disagreement or strong disagreement ($p < 0.05$) (see Table 8).

We then asked the four sectors to respond to a variety of efforts at the organizational level – focusing on staff changes and organizational mandates – that could be taken to improve the capacity of government. When asked if more administrative staff was needed, approximately 30% of all respondents agreed or strongly agreed with business/private least likely to agree (24%) and government and scientists most likely to agree (37-38%) ($p < 0.05$). Nearly half of all respondents agreed or strongly agreed that better staff recruitment and retention of government employees was needed. All four sectors agreed/strongly agreed that more research staff was needed in government, with ratios ranging from 41% in business/private to 61% in government ($p < 0.01$). Asked if stronger and clearer organizational mandates were needed to increase the PAC of government, all sectors agreed or strongly agreed, with the business/private sector having the lowest ratio (70%) and the non-profit sector having the highest ratios at 80%. Finally, in regard to the need for better training on climate issues and energy policies, agreement/strong agreement was found across all sectors, with non-profits reporting the lowest ratio (71%) and the research/academic sector reporting the highest ratio (85%).

A second area of focus asked respondents whether government should undertake efforts focusing on data and technology to increase its policy analytical capacity (see Table 9). When asked if increased use of available data and technology was necessary, the research/academic sector responded with the highest ratio of agreement and strong agreement (79%), while the business/private sector had the

lowest ratio of agreement and strong agreement (73%). The four sectors had differing levels of agreement/ strong agreement, ranging from research/academic (58%) to the non-profit sector (73%) in regard to the need for increased access to available data and technology.

A third area of focus asked respondents which coordination-related efforts government should undertake to improve its policy analytical capacity (See Table 10). When asked if more information sharing among organizations was needed, the research/academic, business/private and non-profits sectors showed similar levels of agreement and strong agreement (ranging from 80-83%), while government showed the highest level at 88%. All four sectors indicated high levels of agreement or strong agreement in regard to the need for greater commitment from elected and appointed officials. The ratio of agreement and strong agreement ranged from the business/private sector on the low end (77%) to non-profit on the high end (90%), with strong agreement as the modal response for all four sectors. The four sectors showed similar levels of agreement or strong agreement when asked if greater coordination with private organizations was needed, with the non-profit sector showing the lowest ratio of agreement (76%) and research/academic having the highest ratio (86%). When asked if greater engagement of non-government entities was needed to increase the PAC of government, all four sectors indicated high levels of agreement to strong agreement, ranging from a low within government and the business/private sector (74% and 76%, respectively), while the non-profit sector reported the highest ratio of support at 88%. Finally, all four sectors indicated agreement or strong agreement when asked if greater coordination with other public organizations was needed to improve the PAC of government, with government showing the highest ratio (83%) and business/private sector showing the lowest (72%).

This section indicates a wide range of opinions across the sectors in regard to the efforts that government should undertake to increase its policy analytical capacity. When asked if nothing should be done, the modal response across all sectors was strong disagreement. Levels of support for efforts at the organizational level focusing on staff and organizational mandates ranged from neutral on additional administrative staff and better staff recruitment and retention (with the exception of the business/private sector) to agreement or strong agreement for additional research staff, stronger and clearer organizational mandates, and better training on climate and energy issues and policies. In regard to efforts focusing on data and technology, the four sectors responded with agreement/strong agreement for increased use and increased access to available data and technology. Finally, in regard to the need for coordination-related efforts, the four sectors indicated agreement/strong agreement for more information sharing among organizations, greater commitment from elected and appointed officials, greater coordination with private organizations, greater engagement of non-government entities, and greater coordination with other public organizations.

Conclusion

How does government compare to other sectors in its policy analytical capacity? Are there demands for increased capacity within government? These questions were examined in the context of Colorado climate and energy issues. The results indicate that government has a mixed level of policy analytical capacity, with high capacity in some areas, and low capacity in others. Government was found to have mixed capacity to conduct and access relevant climate and energy research. It was also found to have mixed capacity to assess the opinions and attitudes of the public and stakeholders and mixed capacity to communicate its policy messages to the public. Government had a high level of success in integrating relevant research and information into the decision-making stage of the policy process. However, government was shown to have very limited capacity to articulate its medium and long-term policy priorities. The varying levels of capacity are likely to be a contributing factor to the negative perceptions of the policy analytical capacity of government among individuals working in climate and energy in Colorado. These findings raise questions about whether government in Colorado will be able to develop effective climate and energy policies to address climate change.

The respondents to this study were nearly unequivocal in their views that policy analytical capacity within the public sector needs to increase. While this may relate to the trend towards increased expectations for government mentioned earlier, it also reflects the opinions of "those in the know" that the government in Colorado has little analytical capacity regarding energy and climate policy in Colorado, which is troubling. When asked about the efforts that the government should undertake to increase its capacity, the respondents demonstrated mixed support for efforts focused on government staff and strong support for efforts related to increased access and use of data and technology and a variety of efforts focused on increasing the coordination of government with the other sectors engaged in climate and energy issues and policy.

Drawing lessons from this study for policy analytical capacity in Colorado climate and energy issues or in other areas and topics should be tempered by several limitations of the data and measures. For simplification, this analysis treated government as a homogenous actor category fusing levels and agencies. Such simplified grouping was necessary to analyze the number of variables in this paper and to answer our research questions. Further research needs to analyze policy analytical capacity of government at the federal, state and local levels and by government agency. Similar arguments can be made of the private sector, researchers, and non-profits. Additionally, like all opinion-based research, the results herein are but perceptions most likely constrained by ideological positions and analytical training. Ideally, scholars would ascertain through resumes and actual job duties the policy analytical capacity within a government and then to track this over time. Such a research design, however, is beyond this paper and our current means as researchers. Finally, a major assumption of this paper and

in the policy analytical capacity literature is that policy analytical capacity actually matters in the performance of government – hence, we are just repeating the mistakes of the past by over-emphasizing technical aspects of problems over value conflicts and with optimism that greater capacity will lead to better futures (see, for example, Montpetit, 2011). Not only is there an assumption that policy analytical capacity matters but we have no bench mark indicating how much policy analytical capacity government – or any organizational category for that matter – should have. All we know is the relative capacity of the government compared to other sectors. One way to mitigate this problem is to begin to develop performance measures of policy subsystems and governments of various levels of capacity over time. Until this happens, the best we can do is to comparatively assess capacity either over time or across sectors.

The argument that governments have been hollowed out and lack the capacity to handle complex societal issues, like climate and energy issues, is not completely supported by this paper. The data collected in this study suggest a more nuanced argument that governments may lack capacity in some areas but possess strong capacity in still others. Nearly all respondents, however, see a need for increased capacity within the public sector.

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Table 1. Descriptions of Policy Actors

	Research/ Academic	Government	Business/ Private Sector	Non-Profit	Total
Number of Respondents	38	84	87	55	272
Percent Female	55%	51%	65%	40%	54%
Percent White (not of Hispanic origin)	90%	92%	98%	96%	94%
Fiscal Policy					
Very Liberal/ Liberal	50%	30%	21%	27%	29%
Moderate	42%	49%	51%	54%	50%
Conservative/ Very Conservative	8%	21%	28%	19%	21%
Social Policy***					
Very Liberal/ Liberal	81%	77%	57%	84%	73%
Moderate	16%	19%	31%	15%	22%
Conservative/Very Conservative	3%	5%	11%	2%	6%
Formal Education***					
High School	0%	1%	0%	0%	0%
Some College	0%	4%	1%	2%	2%
Bachelor's Degree	11%	27%	21%	36%	25%
Master's/ Professional Degree	38%	51%	40%	44%	44%
PhD, MD, JD	51%	17%	38%	18%	29%
How Many Years Involved*					
Less than 1 year – 5 years	52%	53%	40%	38%	46%
6-9 years	19%	19%	19%	16%	19%
10 or more years	30%	28%	41%	46%	35%

Note: Independent-Sample Kruskal-Wallis Test with significance levels at *p<0.05, **p<0.01, ***p<0.001

Table 2. Capacity to Conduct or Access Energy and Climate Research

	Research/ Academic	Government	Business/ Private Sector	Non-Profit	Total
Timely access to academic literature, peer-reviewed publications and professional research***					
Strongly disagree/Disagree	5%	15%	15%	26%	17%
Neither disagree or agree	5%	23%	13%	13%	15%
Agree/Strongly Agree	90%	63%	72%	62%	69%
Percent with Statistical Training	63%	51%	43%	36%	46%
Use of Modeling (e.g. climate change scenarios, energy futures analysis)*					
Daily/Weekly	16%	5%	7%	14%	11%
Monthly	41%	24%	33%	13%	27%
Yearly	30%	35%	27%	38%	32%
Never	14%	36%	36%	36%	32%
Percent with Applied Research Training	66%	36%	30%	20%	34%

Note: Independent-Sample Kruskal-Wallis Test with significance levels at *p<0.05, **p<0.01, ***p<0.001

Table 3. Capacity to Employ Analytical Techniques to Assess Opinions and Attitudes

	Research/ Academic	Government	Business/ Private Sector	Non-Profit	Total
Use of Political Feasibility Analysis (e.g. SWOT analysis, polling data)					
Daily/Weekly	0%	5%	6%	4%	5%
Monthly	13%	16%	16%	19%	16%
Yearly	37%	30%	31%	39%	33%
Never	50%	50%	48%	39%	47%
Use of Community-level Impact Analysis (e.g. neighborhood surveys)					
Daily/Weekly	3%	0%	0%	2%	1%
Monthly	5%	7%	11%	7%	8%
Yearly	24%	35%	28%	29%	30%
Never	69%	58%	61%	62%	61%

Note: Independent-Sample Kruskal-Wallis Test with significance levels at * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4. Capacity to Communicate Policy-Related Messages

	Research/ Academic	Government	Business/ Private Sector	Non-Profit	Total
Policy-related work increasingly involves networks of people across regions, or levels of government, or even outside of government**					
Strongly disagree/Disagree	3%	6%	1%	2%	3%
Neither disagree or agree	14%	21%	14%	9%	16%
Agree/Strongly Agree	83%	73%	85%	89%	81%
Increasingly consulting with the public when doing policy-related work					
Strongly disagree/Disagree	5%	14%	24%	9%	15%
Neither disagree or agree	38%	43%	33%	39%	38%
Agree/Strongly Agree	56%	43%	44%	52%	47%
Use of facilitation/consensus building (e.g. focus groups, roundtables)*					
Daily /Weekly	18%	18%	13%	25%	18%
Monthly	26%	33%	23%	36%	30%
Yearly	37%	32%	35%	31%	33%
Never	18%	17%	28%	7%	19%

Note: Independent-Sample Kruskal-Wallis Test with significance levels at * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 5. Capacity to Articulate Medium- and Long-Term Policy Priorities

	Research/ Academic	Government	Business/ Private Sector	Non-Profit	Total
Provided enough time and resources to undertake tasks and planning that are engaging for more than a year					
Strongly disagree/Disagree	37%	48%	38%	39%	41%
Neither disagree or agree	32%	24%	30%	22%	27%
Agree/Strongly Agree	32%	29%	32%	39%	32%
Regularly engage in tasks which relate to long-term planning (e.g. more than a year)					
Strongly disagree/Disagree	11%	18%	20%	9%	16%
Neither disagree or agree	5%	20%	13%	22%	16%
Agree/Strongly Agree	84%	62%	67%	68%	68%
Urgent day-to-day issues take precedence over thinking "long-term"					
Strongly disagree/Disagree	11%	11%	11%	11%	12%
Neither disagree or agree	21%	17%	17%	26%	18%
Agree/Strongly Agree	68%	72%	72%	64%	70%

Note: Independent-Sample Kruskal-Wallis Test with significance levels at * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 6. Capacity to Integrate Various Sources of Information and Data into the Decision-making Stage of the Policy Process

	Research/ Academic	Government	Business/ Private Sector	Non-Profit	Total
Use of Reports produced/ created by organization					
Daily /Weekly	48%	33%	52%	35%	41%
Monthly	29%	39%	23%	36%	32%
Yearly	13%	24%	12%	20%	17%
Never	11%	5%	13%	9%	9%
Use of Academic Research***					
Daily/Weekly	73%	26%	35%	38%	38%
Monthly	22%	52%	40%	47%	43%
Yearly	5%	17%	19%	9%	14%
Never	0%	5%	7%	6%	5%
Use of Reports from Industry***					
Daily/Weekly	35%	23%	55%	55%	40%
Monthly	36%	51%	27%	35%	37%
Yearly	24%	23%	13%	17%	19%
Never	5%	2%	5%	4%	4%
Use of Reports from Consultants					
Daily/Weekly	20%	20%	42%	31%	30%
Monthly	39%	49%	34%	43%	41%
Yearly	33%	22%	13%	20%	20%
Never	8%	8%	12%	6%	9%
Use of Reports from Other State & City Governments					
Daily/Weekly	24%	28%	40%	44%	35%
Monthly	58%	49%	37%	35%	43%
Yearly	13%	17%	15%	15%	15%
Never	5%	6%	8%	7%	7%
Use of Reports from Non-Profits***					
Daily/Weekly	39%	20%	27%	55%	32%
Monthly	40%	46%	34%	38%	40%
Yearly	21%	23%	26%	6%	20%
Never	0%	11%	14%	2%	9%

Note: Independent-Sample Kruskal-Wallis Test with significance levels at *p<0.05, **p<0.01, ***p<0.001.

Table 7. Perceptions of the Policy Analytical Capacity of Government

	Research/ Academic	Government	Business/ Private Sector	Non-Profit	Total
There seems to be less governmental capacity to analyze policy options					
Strongly disagree/Disagree	19%	20%	18%	10%	17%
Neither disagree or agree	50%	40%	46%	38%	43%
Agree/Strongly Agree	32%	40%	36%	51%	38%
Much of the existing skills and knowledge about climate and energy lies outside the formal structure of government***					
Strongly disagree/Disagree	11%	18%	2%	8%	10%
Neither disagree or agree	18%	29%	13%	16%	19%
Agree/Strongly Agree	71%	53%	85%	77%	71%

Note: Independent-Sample Kruskal-Wallis Test with significance levels at *p<0.05, **p<0.01, ***p<0.001.

Table 8. Efforts that Government should Undertake to Increase its Policy Analytical Capacity (Agree/Strongly Agree)

	Research/ Academic	Government	Business/ Private Sector	Non-Profit	Total
Nothing*	3%	3%	5%	2%	3%
More Administrative Staff*	37%	38%	24%	28%	31%
Better Staff Recruitment and Retention	49%	48%	46%	45%	47%
More Research Staff**	56%	61%	41%	59%	53%
Stronger and Clearer Organizational Mandates	79%	75%	70%	80%	74%
Better Training on Climate Issues and Energy Policies	85%	84%	76%	71%	79%

Note: Independent-Sample Kruskal-Wallis Test with significance levels at * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 9. Efforts that Government should Undertake to Increase its Policy Analytical Capacity (Agree/Strongly Agree)

	Research/ Academic	Government	Business/ Private Sector	Non-Profit	Total
Increased Use of Available Data and Technology	79%	75%	73%	78%	76%
Increased Access to Available Data and Technology	58%	69%	62%	73%	67%

Note: Independent-Sample Kruskal-Wallis Test with significance levels at * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 10. Efforts that Government should Undertake to Increase its Policy Analytical Capacity (Agree/Strongly Agree)

	Research/ Academic	Government	Business/ Private Sector	Non-Profit	Total
More Information Sharing Among Organizations	80%	88%	83%	83%	84%
Greater Commitment from Elected and Appointed Officials	88%	85%	76%	93%	83%
Greater Coordination with Private Organizations	88%	78%	82%	79%	81%
Greater Engagement of Non-Government Entities	85%	75%	76%	90%	80%
Greater Coordination with other Public Organizations	82%	84%	72%	80%	79%

Note: Independent-Sample Kruskal-Wallis Test with significance levels at * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.