

Subsystem Structures, Shifting Mandates and Policy Capacity: Assessing Canada's Ability to Adapt to Climate Change

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Abstract. Adapting to climate change requires governments to design and implement policies capable of dealing with long-term problems. This poses significant policy design and implementation challenges since policies must also be multi-level and multi-sectoral in nature given the cross-sectoral and international character of climate change issues. Responsive policy-making on climate change issues thus requires both sophisticated policy analysis as well as an institutional structure which allows problems to be dealt with in a way which corresponds with changing organizational mandates, resources and network structures. Designing such policies requires matching policy analytical resources in relevant government departments and agencies with new and expanded mandates, a process which is not always necessarily successful. This introductory article presents the framework utilized in a collaborative study of climate change adaptation capacity in four Canadian policy sectors (agriculture, finance, infrastructure, and transportation) and one US case (the energy sector in Colorado). The study framework and subsequent analysis examine policy from a three-level perspective including (1) the macro nature of the subsystem involved, (2) the meso level of the organization or lead-agency in charge of the issue and (3) the micro level nature of policy work being undertaken in each sector.

Résumé. S'adapter au changement climatique exige des gouvernements qu'ils conçoivent et mettent en œuvre des politiques publiques qui permettent de résoudre des problèmes à long terme. Cela pose des problèmes significatifs en termes de conception et de mise en œuvre des politiques publiques, étant donné que ces politiques doivent être multi-nivelées et multisectorielles par nature, en raison du caractère intersectoriel et international des questions liées au changement climatique. L'élaboration des politiques publiques adaptée aux questions du changement climatique demande par conséquent non seulement une analyse des politiques publiques sophistiquée, mais aussi une structure institutionnelle qui permette de résoudre des problèmes, tout en s'adaptant aux mandats organisationnels en changement constant. Concevoir de telles politiques publiques exige des ressources analytiques équivalentes dans les départements et agences gouvernementaux concernés par ces nouveaux mandats, un processus qui ne s'avère pas toujours couronné de succès. Cet article introductif présente le cadre utilisé dans une étude faite en commun sur les capacités d'adaptation au changement climatique dans quatre secteurs canadiens (agriculture, finances, infrastructures et transport). Le cadre de cette étude et l'analyse qui en découle se penchent sur des politiques publiques à partir de trois perspectives : (1) le niveau macro des sous-systèmes concernés, (2) le niveau méso de l'organisation ou de l'agence principale en charge de la question, et (3) le niveau micro du travail de politique publique mené dans chaque secteur.

Introduction: Shifts in Climate Change Organizational Mandates and Their Evaluation

Most governments in Canada claim they have moved beyond climate change mitigation efforts to those dealing with climate change adaptation. That is, from proposing only incremental changes to the status quo to attempting to grapple with the major socio-economic, political and technological challenges and changes required to adapt to a new post-global warming environment. As presently configured, how-

ever, it has been suggested that many of Canada's policy sectors lack either or both the requisite high level of policy analytical capacity or integrative governance arrangements which would allow them to respond effectively to new climate change challenges (Voyer 2007; Dobuzinskis, Howlett and Laycock 2007; Riddell 2007).

Assessing whether or not, or to what extent this is true is a difficult task. As Colebatch and Radin concluded in their 2006 study of the policy analytical activities undertaken in the US, the UK and several other European countries, we need more empirical research on the nature of policy work in

specific contexts in order to be able to assess policy capacity. We need more information on what sort of activity practitioners see as policy work, what sort of policy workers do they recognize, and how these jobs are carried out in specific sectors, issue areas or circumstances such as climate change adaptation. And we need to know how those activities change in response to changing organizational mandates and goal environments. The objective of this special issue is to contribute to the more accurate assessment of the capacity of Canadian governments to meet climate change challenges by providing a detailed empirical examination of the manner in which the Canadian policy bureaucracy operates in a variety of evolving and dynamic climate change-related administrative contexts and to do so from a comparative perspective.

The work presented in this special issue combines the first comprehensive sampling of actual job duties, training and capacity of those policy analysts working on climate change mitigation and adaptation issues in contemporary Canadian governments, and compares this to the American sub-national case.

These studies examine governance relationships and analytical capacities in five sectors— finance, infrastructure, energy, forestry and transportation - in order to determine what kinds of governance arrangements and analytical capacities exist, how they are changing (if at all) and how they inter-relate with the status and evolution of climate change policy-making processes and outcomes in each sector. They include an assessment and mapping of subsystem network structures and detailed case studies of these sectors which help identify capacity gaps and remedial strategies at a meso- or sectoral level. This allows us to draw lessons for these and other sectors pertaining to the capacity of each sector to develop and implement the integrated and high-level analysis required to deal with long-term climate change adaptation challenges.

Combined, the analyses provide an overall picture of governance challenges and capacities which both generates a more accurate picture than heretofore available of actual climate change policy capacity on-the-ground, and shows how less effective policy areas can be re-configured to enhance policy capacity and hence responsiveness to long-term challenges such as climate change.

Subsystem Configurations, Governance Arrangements, and Policy Analytical Capacity

Modern policy analysis and considerations of institutional design involve the attempt to improve policy outcomes by ensuring that decisions are taken with due regard to the state of available knowledge on a subject area and only once the available options for government activity have been carefully and systematically assessed and compared (Dror 1967; Dunn 1986; Radin 2000).¹ Exactly how this is accomplished, however, is little studied, but can be expected to vary substantially by sector and administrative unit. The aim of this project is to evaluate this issue in the case of climate change, looking at different levels of analysis – macro, meso and micro – with the goal of better understanding both the link-

ages between the levels and how gaps between levels can both be identified and overcome. In general, the working hypothesis of the project is that successful policy-making in turbulent environments requires higher levels of analytical capacity and organizational resources which match or exceed shifts in organizational (lead agency) mandates and network structures.

Macro-Level Capacity Issues: The Evolving Nature of Density and Centrality in Sub-system Structures

Governance context or network structure is key in dealing with all policy issues and especially complex policy issues such as climate change, and evaluations of policy capacity must take the impact of changes to those contexts into account (van Kersbergen and van Waarden, 2004).² The studies contained in this special issue assess the nature of governance arrangements pertaining to climate change adaptation by analyzing the inter-organizational networks present in key climate change policy areas using Virtual Policy Network (VPN) technology and methods. Virtual policy networks are informational networks created by Web-enabled policy communities whose political organizational forms have been transposed into the dedicated network structures of the Web. Policy dynamics originating in the real world shape information flows on the Web so that participation in web-based information policy networks mimics the networked communication and organizational patterns of real world policy communities (McNutt 2006) with flows of information congregating around a specific policy field, issue, event, institution, or coalition (Rethemeyer, 2007).

A centralized position in a network confers power, as actors that are nodal have more access to network resources, more opportunities for exchange and a greater influence on how information and resources flow through the network. These patterns can be used to discern the kinds of governance arrangements present in a sector or issue area by using a Web crawler to retrieve large quantities of data from the Internet on the link structure of each virtual policy network.³

Figure 1 – Subsystem Structures and Capacity: Macro-Level Theory

		Density	
		Increases	Stable or Decreases
Centrality	Increases	Stable Capacity – May require little additional organizational capacity	Enhanced Capacity – May have capacity surplus
	Stable or Decreases	Decreased Capacity – May require additional capacity	Stable Capacity – May require little additional organizational capacity

This research provides a general overview of the multi-level and cross-sectoral links and governance arrangements found in sectors involved in climate change adaptation. It does so by examining how organizational positions have changed in the four sectors under examination, focussing on shifts in density and centrality in network relations. As shown in Figure 1 it is theorized that, generally, capacity increases are required when density increases or centrality decreases, but not when centrality increases or density decreases.

The macro level analysis examines (1) what quadrant a sector falls into (and whether the initial working hypothesis is correct); (2) what level of change has already occurred in the sector; and (3) therefore if additional organizational resources are required. To do so, VPN analysis was conducted in each of the five case studies with an initial web crawl in May of 2010 followed by a second additional crawl in each sector in May 2011. Three key variables prominent in the network analysis literature were used in the assessment of VPNs in all sectors in the eight crawls: density, centralization, and levels of internationalization. Based on initial sampling of expert opinions, the initial positions of each Canadian sectoral case study were hypothesized to fall into the quadrants set out in Figure 2.

Figure 2 – Subsystem Structures and Capacity: Empirics

		<i>Density</i>	
		Increases	Stable or Decreases
<i>Centrality</i>	Increases	INFRASTRUCTURE	FINANCE
	Stable or Decreases	TRANSPORTATION	FORESTRY

VPNs characterized by lower levels of centralization were assumed to be poorly coordinated suggesting greater capacity may need to be developed. The four sectoral hypotheses which were subsequently tested were 1) increased centrality and decreased density in the finance sector VPN; 2) decreased density and centralization in the forestry sector VPN; 3) density and centralization would increase in the infrastructure VPN; and 4) centrality would stabilize or decrease while centrality increased in the transportation VPN.

In her study, Kathy McNutt provides a detailed analysis of each of the four cases with respect to the three variables used in the VPN analysis. This macro level analysis provides a comprehensive overview of the important governance contexts in each sector related to shifting patterns of government agency nodality with respect to both provincial and international actors in each respective VPNs. McNutt finds that both nodality and internationalization across sectors were found to have undergone significant shifts in all sectors.

These analyses of the VPNs, however, found that only two of the four macro level hypotheses set out above were

supported. Support was found for those set out for the infrastructure and transportation cases while those pertaining to the finance and forestry cases were refuted. Overall, lead government departments in all four sectors were found to be in weak nodal positions leading the author to conclude that none of the lead departments in each sector are coordinating network activities efficiently. Moreover, each of the four sectors analyzed was marked by increasing network density and significant network decay. Analysis revealed that each of the four sectors examined were found to be shrinking and increasingly confined to a smaller number of key actors. Moreover, high levels of internationalization and lower levels of provincial representation were detected in three of the four sectors studied. Such developments lead McNutt to raise several interesting questions and tentative hypotheses related to evolutions in the networks themselves as well as government's use of nodality to coordinate policy formulation across various sectors and scales as climate change efforts shifted from mitigation to adaptation over the period observed.

Meso-Level Capacity Issues: Shifting Organizational Mandates and Resource Endowments

The findings of the VPN analyses provide the macro level context and data that establishes the context for the meso level case studies and micro level survey findings reported by the other contributors in this issue. That is, the 'macro-level' network analysis outlined above only sets out which governance contexts require additional sectoral capacity-building. However exactly what kind of organizational arrangements exist in each sector and how these are configured is a second key, meso-level, component of policy analytical capacity which, together with the supply and demand for analysis discussed below, helps to identify the potential for governments to be able to formulate and implement policies which can deal with the complexities of evolving policy mandates such as those related to climate change adaptation.

The meso-level analyses separately assess the five policy sectors highlighted above including Forestry (Rayner); Transportation (Perl); Finance (Williams); Infrastructure (Howlett et al.); and Energy (Weible et al.) through detailed case study research. Using publicly available data gleaned from departmental annual reports and other similar sources, assessments are undertaken related to departmental resource changes (budgets and personnel figures) as well as shifts related to official departmental mandates and program activity.

Generally-speaking, taking these two sets of factors into account, existing policy-making arrangements in the different Canadian organizations were expected to fall into the four types set out in Figure 3.

In the turbulent environment which characterizes contemporary climate change policy-making, mandates are expected to increase and it is expected that successful policy-making requires lead agencies will require enhanced capacity resources (budgets and personnel) in order to deal with these increases (Howlett and Rayner 2006; Weber et al 2007).

Figure 3: Criteria for Assessing Policy Capacity: Meso-Level Theory

<i>Resources</i>		
	Increase	Stable or Decrease
<i>Mandates</i>	Increase	Challenging environment met by augmented Policy Analytical Capacity
	Stable or Decrease	Enhanced Policy Capacity to Meet Long-Term Challenges
		Likely ineffective Policy Capacity characterized by Short-Term Fire-Fighting
		Weak Policy-Analytical capacity contributing to propensity for Policy Failures

Overview of Case Study Findings:

Infrastructure (Craft, Howlett, Crawford)

Climate change adaptation involves large-scale changes to the technical structures that support a society, such as roads, water supply, wastewater, power grids, flood management systems, communications (internet, phone lines, broadcasting) (Harchaoui, et al 2002). These infrastructure systems have typically been owned and managed by local or central governments. Changing such systems in the face of climate change challenges is a large and expensive task requiring extensive policy capacity.

In the infrastructure case study, Craft, Howlett, and Crawford examine existing governance arrangements and policy analytical capacity in the lead organization at the federal level: Infrastructure Canada. It provides a basic review of similar provincial activity in the sector and examines both 'internal' capacity and the ability of alternative arrangements to address some of these issues (English and Skellern 2005). An example is Public-Private Partnerships (PPP's or P3's)⁴ which are an alternative tool to public works and a method to develop infrastructure as governments around the world increasingly search for new ways to finance projects, build infrastructure and deliver services (Daniels and Trebilcock, 1996; Grimsey and Lewis 2004).

Using the framework established above, the authors found that significant shifts in mandate and departmental resources pertaining to infrastructure in Canada occurred in three principal phases from 2000-2010. A first phase (pre-2002) consisting of departmental startup capacity building. Phase 2 (2002-2006) saw the federal departmental mandate and resource focus grow to include infrastructure financing and sustainability (with a cities and communities focus). The third phase (2007-2010) consisted of continued budgetary and personal increases along with greater interdepartmental partnership activity and public private partnership and first nations based infrastructure activity.

Most recently, federal infrastructure departmental budgets have spiked and mandate expansion has occurred in the context of economic stimulus spending through the Gov-

ernment of Canada's Economic Action Plan (EAP) and Green Infrastructure Funds. Department wide funding increases have been mirrored by steady growth in departmental human resources which are tracked on a Full Time Equivalent (FTE) basis. However, closer analysis reveals that the increase in overall personnel masks a consistent shortfall of planned versus actual staff for policy, research, and knowledge related program activity lines.

At the provincial level the authors also note infrequent mentions of adaptation explicitly related to infrastructure in official documents. While strategic climate change plans or strategies exist across the board, the actual on-the-ground programming and spending related to infrastructure is generally undertaken through ministries other than infrastructure, particularly ministries of environment, transportation, and agriculture. The sub-national level also demonstrates a fairly clear pattern of regionalized strategic planning with high levels of collaborative partnership between multiple jurisdictions (inter-provincial and/or federal-provincial) and an uneven pattern of formalized institutional policy analytic research capacity.

Based on publicly available federal and provincial reports, the infrastructure case study thus finds uneven patterns of policy analytic capacity related to climate change adaptation. A shortage exists at both levels of government, both with respect to departmental human resource levels explicitly tied to policy analytic work. Secondly, it finds a mismatch to exist between widening departmental mandates as well as strategies/plans acknowledging the critical need for infrastructure adaptation, but limited programs and departmental expenditure explicitly tied to infrastructure adoption.

Finance (Williams)

Policy analytical capacity in the finance sector is generally considered to be quite high as leading Canadian financial institutions, both public and private, have recently demonstrated considerable ability to analyze policy challenges such as the 2007-2008 financial crisis in what is an extremely complex sector. However, despite this high analytical capacity, studies of existing governance arrangements have raised doubts about relations amongst key policymakers and the ability of the sector to implement significant policy changes. Most research has highlighted the role of federalism, and the degree to which finance is a divided jurisdiction, in mitigating effective policy design. Studies have suggested weak federal government governance due to the disinterest of the Bank of Canada in questions of industry regulation (Coleman 1996), the weakness of the federal Office of the Superintendent of Financial Institutions in policy debates given the Provinces' key role in regulating the securities industry (Roberge 2005) and the weakness of the Department of Finance in guiding policy given the high level of politicization over key policy debates in the sector (Harris 2004).

Despite these challenges, the sector has managed to successfully adapt to globalisation (Coleman and Porter 2004) and associated financial crises without generating some of the policy failures encountered in other jurisdictions. Given

the similar challenges of climate change policy - the role of federalism and jurisdictional problems, the high level of politicization - many lessons can be drawn from the finance sector in assessing the effectiveness of climate change governance arrangements.

The findings from Williams' study of the sector suggest that while resources and levels of policy analytical capacity are important determinants of the finance sector's ability to meet challenges related to adaptation, so too is the degree of complexity and the nature of the climate change adaptation problem itself. Moreover, the importance of political considerations such as institutional and jurisdictional limitations of lead agencies were found to be fundamentally important determinants of adaptation capacity. In general, Williams found financial sector policy analytic capacity and governance arrangements to be closely integrated, except in those areas requiring federal and provincial cooperation and coordination. In those areas, governance arrangements are not well integrated and in fact are often quite conflicted. This conflict is found to characterize the sector's complex policy subsystem which is dotted by significant federal-provincial contention and multi-level governance challenges. These findings are supported by the VPN analysis which also suggested a central and dominant role for the federal finance department and agencies with important linkages to provincial and international organizations but with changes occurring to this pattern over time.

While Williams' study confirms the hypothesized higher levels of policy analytical capacity at the federal level, it notes greater challenges related to PAC the sub-national level. Moreover, related to climate change specifically, survey data collected for the study finds a significant gap to exist between finance officials and non-finance officials on awareness of, engagement in, and concern about, climate change adaptation issues. Through the illustrative case of the Office of the Superintendent of Financial Institutions (OSFI) Williams suggests that when there is a clearly recognized adaptation problem in the finance sector, but that problems can be handled in a well integrated policy environment where agencies' existing mandates match the task at hand. Thus climate change capacity appears to be effective in some areas, however, as argued above, this cannot be claimed to characterize the sector as a whole.

Forestry (Rayner)

The dominant feature of the Canadian forest policy sector compared to finance and infrastructure is the substantial role of the provinces (Howlett and Rayner 2001). Governance of forest resources is almost exclusively under provincial jurisdiction, even where forestry activities take place on federal lands.

Adaptation to climate change, cutting across a number of natural resource policy sectors and issues, such as forestry, poses a significant challenge to policy-making at the provincial level. Analytical capacity is likely to be extremely uneven, depending on the relative importance of forest resources to the provincial economy. Climate change effects, however, do not respect provincial boundaries, and impacts

such as reduced productivity, more frequent fires and changing patterns of pest outbreaks require a coordinated response and call for a high level of policy integration (Johnston et al. 2006).

Unfortunately, in large part because of provincial jurisdiction, past studies have found that Canadian forest policy as a whole suffers from low levels of integration (Beyers and Sandberg 1998; Howlett 2001). Forest policy networks have become more open and less dominated by state and professional actors but this opening has led to further coordination problems in the absence of credible alternative steering mechanisms such as national forest plans (Howlett and Rayner 2006). The federal government has attempted to use the National Forest Strategy, which relies largely on procedural and information instruments, as a coordination mechanism, but with very mixed success. The new draft strategy (2011) identifies the adaptation of forests to climate change as one of two central elements, but the record of previous strategies in enhancing issue co-ordination is not strong (Howlett and Rayner 2007).

Because of the global trade in forest products and the global scope of climate change impacts, forest policy is also an area where significant policy integration around adaptation to climate change could usefully take place at the international level. However international efforts at steering are hampered by competition between different international policy regimes, institutions and actors with an interest in climate change issues.

The forestry case study presented here suggests that both federal and provincial forest policy subsystems support the original hypothesis - mandates are increasing but resources are stable or decreasing, leading to a loss of policy capacity. A review of the mandate/resource dimensions at the federal and provincial levels confirms the variance across levels of government. The sector's subsystem, based on VPN analysis, also confirms many of the inferences from the mandate data. While the first network analysis found a central nodal role for NRCAN the more recent VPN points to the rapid internationalization of climate change adaptation in the forestry sector. The role of non-state actors has also shifted with research organizations, including university departments and industry-university innovation centres seemingly replaced by social media that are typically used by non-governmental organizations or by international organizations seeking to mobilize global civil society actors.

At the federal level the lead department, Natural Resources Canada's, forestry mandate has remained relatively stable over the last five years. The mandate has focused on three core activities: innovation, competitiveness and communities. Rayner notes that the replacement of climate change reporting by the disturbance and adaptation theme represents both a broadening of the mandate itself and a move from a fairly fixed focus to a potentially more open-ended one. At the provincial level, an analysis of two jurisdictions (British Columbia and Alberta) finds that while mandates have expanded significantly and ambitious adaptation related policy goals have been articulated, they have not been matched by an increase in resources available to

meet such mandate shifts. In particular, resource shortages in both sub-national cases were found to have occurred in response to challenges created from wildfires and deforestation due to pine beetle epidemic.

Rayner concludes that overall, at the provincial level, this mismatch between mandates and resources leads to a serious erosion of policy capacity related to adaptation. He suggests that adaptation in this sector is likely to continue to be tackled at the level of management plans as opposed to actual coordination of policy initiatives. As a consequence, it is argued this will contribute to a continued widening of the gap between the capacity and demand, resulting in likely policy failure.

Transportation (Perl and Newman)

Canada's transport sector has exhibited a 30% growth in greenhouse gas emissions from 1990 to 2004. This increase was '... driven primarily by energy used for personal transportation ... (Environment Canada, 2006: 41). Transport Canada has identified a shift in urban transport from automobile to bus and rail transit as a promising means of reducing energy use and GHG emissions from transportation (Transport Canada, 2008).

Making and implementing such decisions, however, typically occurs at the municipal level, with funding and guidance provided by provincial governments. The transportation case study explores these relationships by examining the policy capacity of civil servants in the transportation sector in two Canadian provinces: British Columbia and Ontario. Research included both content analysis of official documents as well as primary interviews with policy managers in the relevant ministries. The authors use the policy capacity concept to qualitatively measure the effectiveness of instruments in advancing goals in the sector where established transportation policy paradigms may not be congruent with new initiatives related to adaptation and mitigation.

Perl and Newman contend that significant challenges exist in both jurisdictions due to the incompatibility of recent climate action policy goals and established policy goals and existing instruments. This incompatibility leads to policy layering (Kern and Howlett, 2009) whereby transportation policies create a particular bureaucratic constraint in which certain policy instruments are judged to be incompatible with established policy goals, resulting in what the authors call 'institutionalized policy inhibition'.

Conflicting layers of policy goals and instruments also sharply constrain the available policy capacity to meet policy challenges. The study finds that transportation policy options in both provincial cases are developed to advance the identified market inspired paradigm: improving market competition, increasing private carrier revenues, and decreasing government intervention. Perl and Newman suggest the longstanding market-based Canadian transportation policy paradigm initiated at the federal level and mirrored provincially has served to elevate market principles into core beliefs that orient future policy choices. As a result they conclude that capacity for policy workers in the sector are constrained by the conflict produced through the layering of

newer climate related policy goals over existing market-based transportation policy and instruments.

The authors, echoing findings from the finance case, point to the importance political actors can play in providing leadership to overcome the impacts of policy layering. They conclude that for adaptation efforts to be successful in this sector they will need to be reframed in accordance with the marketized transportation policy paradigm or be backed by the kind of political and policy leadership which can successfully re-prioritize policy goals in a long-established policy regime

Energy (Elgin, Pattison and Weible)

Using the energy sectors in Colorado as a case study, Weible et al examine the policy analytic capacity of government compared to other non-governmental cohorts working in the climate and energy sector and provide a cross-national comparison to the four Canadian cases discussed above. The authors note that significant energy resources and a growing energy sector combined with the state's vulnerability to climate change make Colorado an ideal choice for assessment of the American response to climate change. Moreover, the authors note that the municipal (Denver) and state (Colorado) plans are typical in comparison to the sets of city and state climate action plans in existence.

Weible et al report on original survey data collected in 2011, finding that governments in Colorado have a mixed level of policy analytic capacity, with high capacity in some areas, and considerably lower capacity in others. Based on these results the authors conclude, as do the Canadian authors, that US state governments are not as "hollowed out" as expected. In particular, the Colorado government was found to have sufficient capacity to communicate its policy messages to the public, and sufficient capacity to integrate relevant research and information into the decision-making stage of the policy process. However, the authors note that government was found to have lower levels of capacity to assess the opinions and attitudes of the public and stakeholders on climate and energy policy as well as limited capacity to articulate its medium and long-term policy priorities. Respondents in both government and non-governmental spheres strongly suggested that government capacity must increase to match challenges related to energy and climate change issues in the state.

Taken together, these case studies suggest that the five sectors differ in terms of the ability of existing levels of capacity and resources to deal with mandate changes (see Figure 4). In terms of the working hypotheses by sector in Canada, the study had expected (at the meso level) that infrastructure would be found to be expected to be structurally-impaired (high capacity but low integration) (Ericson 2008); this was rejected as departmental resources increased but went unmatched by increases to PAC while the sector as a whole saw significant expansion of its mandate. In finance/banking the initial hypothesis was that the sector would demonstrate high capacity and high level of integration (Williams 2009). While capacity was found to be high in

some issue areas, specifically related to climate change the results were quite the opposite.

Figure 4: Criteria for Assessing Climate Change Policy Capacity In Five Key Sectors

		<i>Resources</i>	
		Increase	Stable or Decrease
Mandate	Increase	<p><i>TRANSPORTATION</i></p> <p>Challenging environment requiring augmented Policy Analytical Capacity</p>	<p><i>FORESTRY (US ENERGY)</i></p> <p>Likely ineffective Policy Capacity characterized by Short-Term Fire-Fighting</p>
	Stable or Decrease	<p><i>BANKING</i></p> <p>Effective Policy Capacity to Meet Long-Term Challenges</p>	<p><i>INFRASTRUCTURE</i></p> <p>Weak Policy-Analytical capacity contributing to propensity for Policy Failures</p>

Moreover, the governance arrangements were found to vary considerably in different areas, highlighting the need to avoid generalizing across sectors. Some hypothesized relationships were found to hold, however. Forestry, for example, was expected to demonstrate ineffective capacity given its decentralized nature and the few administrative resources devoted to planning in the area (Ruth et al 2000). This hypothesis was supported by the case study presented in this issue. The transportation sector was also expected to display low capacity and high levels of integration and therefore to be analytically-impaired (Dudley 2003), an expectation which was also supported by the institutional inhibition and layering identified by Perl and Newman.

Micro-Level Capacity Issues: Training and Activities of Policy Workers

Macro subsystem and meso-level organizational aspects of policy capacity do not exhaust the subject. A key component of policy capacity concerns the micro-level capacity of policy workers, namely their education, training and management, which all condition their ability to enhance the knowledge-base of policy decisions. While it has often been thought that policy analysts undertake a kind of 'rational' cost-benefit or utilitarian kind of analysis, for example, empirical studies of the actual behaviour and performance of policy analysts in their jobs have consistently revealed a wider variety of jobs and duties actually performed by policy analysts in government bureaucracies; ones closely aligned to tasks such as process design and manipulation, outcome legitimation and political strategizing as well as 'objective' quasi-scientific, fact or 'evidence-based' research and technical analysis of policy options (Parsons 2004, Page and Jenkins 2005, Hird 2005, and Colebatch's 2005 and 2006).

Whichever style or mode of analysis is practiced⁵, all rely on the existence of an appropriate level of policy analytical capacity in order to be effective. As Fellegi (1994) has argued, policy analytical capacity (PAC) can be considered to include, '...the whole gamut of issues associated with the government's arrangements to review, formulate and implement policies within its jurisdiction. It obviously includes the nature and quality of the resources available for these purposes – whether in the public service or beyond – and the practices and procedures by which these resources are mobilized and used.'

At its most simple, at the micro-level policy analytical capacity can be measured by examining the interaction of three key organizational features; leadership, human resources and infrastructure support. These aspects of PAC can be thought of as existing in a 'production function' model whereby the quality of policy advice provided depends on a matching of the 'supply' and 'demand' for policy analysis. The most effective policy organisations are those that have the capacity to be able to anticipate in advance likely policy demands that may be made of them and as a result have already completed much of the research in advance of the demand for action being made. This enables a consistently high standard of research methodology to be maintained and helps ensure possible solutions are not missed as a result of performing analysis in an ad-hoc manner or "on the hop" (research) - doing only the best job possible in the (limited) time available. This is easier said than done, however, in the context of changing mandates and policy goals, coupled with a great deal on uncertainty and turbulence in policy environment.

But little is known about this equation in the context of climate change adaptation. What do policy analysts actually do in contemporary Canadian governments with respect to climate change? Is this what theorists expect them to do? How are they trained? Is their training and organization appropriate to meet the contemporary governance challenges of climate change adaptation? And how, if at all, does this differ from the pattern found in other jurisdictions?

Building on hypotheses flowing from existing literature, a variety of factors have been argued to be related to high levels of PAC (Howlett & Oliphant, 2010; Oliphant and Howlett, 2010; Fellegi, 1996). As per figure 5 below, these factors can be conceived as grouped within the three categories of organizational structure/culture, research supply and research demand.

The first factor cited in the literature pertaining to high levels of PAC is one of two related to organizational culture and structure affecting where and how new ideas originate within an organization. Riddell (1998:5), for example, has argued that "a culture in which openness is encouraged and risk taking is acceptable" strengthens the capacity of an organization's policy research and analysis. Secondly, organizational culture/structures that promote and encourage innovative thinking have also been cited as research suggests that PAC is strengthened when individual analysts have the freedom to take risks and create new and innovative programs or policies (Fellegi, 1996:14-15).

Three demand side factors have been suggested as required for high levels of PAC related to the nature and source of demand for an organization’s research output and analyses. Riddell (1998:5) notes that a basic ‘market’ or demand for the research must exist. Suggesting that organizations without a high demand for their research will have lower capacity, as this lack of demand is likely to negatively impact the quality of final product. Fellegi (1996) notes that some of this demand may stem from the presence and fulfillment of legal and process requirements, such as mandated departmental evaluations or annual reviews.

Figure 5 – Micro-Level PAC Determinants

PAC Category	PAC Factor
ORGANIZATIONAL CULTURE AND STRUCTURE	ORGANIZATIONAL CULTURE OF OPENNESS AND RISK TOLERANCE
	PROMOTION OF INNOVATIVE THINKING IN ORGANIZATION
RESEARCH DEMAND	MARKET FOR RESEARCH PRODUCED
	RIGOROUS RESEARCH (WITHSTANDS PROFESSIONAL CHALLENGE)
ANALYTICAL SUPPLY	EDUCATIONAL BACKGROUND OF EMPLOYEES OF ORGANIZATION
	ORGANIZATIONAL ANALYTICAL RESOURCE INTEGRATION ABILITY
	AVAILABILITY OF QUALITY DATA

A second key demand variable will relate to the quality of research requested. Fellegi (1996) notes that organizations that “formulate policies that can withstand rigorous professional challenge” (1996, 14-15) are likely to have higher capacity, not simply because there is a demand for *any* research, but because those who are interested in the research and analysis are seeking a strong final product. Moreover, he suggests that the quality of research factor should also be contextualized by its relation to public expectations noting that while prone to vacillation, states “the prime issue is the relevance and value of the work done . . . channeling public funds in the right direction and the avoidance of costly mistakes quickly justifies the cost of good policy work” (13). Lastly, both Anderson (1996) and Fellegi (1996) argue that demand is affected by the orientation of management which impacts the nature and direction of the policy process. Policy managers, defined here as the Deputy Minister, Associate Deputy Minister, and Directors of Policy and Planning, are of obvious importance in this regard given their ability to direct projects, set agendas, and provide leadership. All four of these factors have been identified as key demand side variables required for high levels of PAC.

Other factors highlighted in the literature can be grouped under the supply side of the equation. Fundamentally, a requisite level of personnel with the appropriate analytic skill levels and training are essential. As Riddell (2007) points out “research cannot occur without people who are curious, knowledgeable about the relevant theoretical and

empirical literature, skilled in the use of such research techniques as statistical analysis, modeling and scenario building and [are] capable of moving from issues to research and research to issues”. Moreover, high levels of management skills and training have also been identified as another key supply side factor. Policy managers should possess skills and qualifications akin to but beyond those of policy analysts. In his *The Policy Capacity of Government*, Guy Peters (1996) identifies the importance of having policy executives with “some substantive knowledge of the policies for which they are responsible [and] they should also have the skills required to put them in effect”.

Furthermore, a key supply side factor relates to the appropriate levels of analytical techniques employed by an agency’s policy personnel. Ensuring both the appropriate personnel resources and appropriate levels of analytical techniques are available can be assessed through evaluations of budgetary trends. Budgetary trends are indicative of resource availability which, in turn, indirectly testifies to the changing nature of an agency’s PAC. Indeed, by listing budgetary constraints as a harbinger of the “erosion of policy capacity within the public service” Rasmussen (1999) highlights how the importance of a robust policy budget is best seen in its absence. The availability of personnel and analytical techniques is related to an additional supply side factor, related to the organizations ability to combine the use of different styles or techniques of analysis. Fellegi (1996:14-15) underscores this type of factor arguing that PAC is strengthened when organizations’ research and analysis can “attach both qualitative and quantitative assessments to different policy options” (1996, 14-15). A final supply side PAC identified relates to the quality and quantity of the data produced by an agency. While various methods can be used in this regard, fundamentally the presence of timely and appropriate information on a subject under consideration enhances the quality of the policy analysis provided.

Taken together these criteria form the basis for an assessment of this micro-level component of overall policy capacity (see Figure 6 below).

Figure 6: Criteria for Assessing Climate Change Policy Capacity Among Policy Workers: Micro-Level Theory

	Training and Data		
	Adequate	Inadequate	
Management	Strategic, Evidence-Based	High Capacity	Supply-Constrained Capacity
	Short-term, Fire-fighting	Demand Constrained Capacity	Low Capacity

At the micro level in this issue Wellstead and Stedman present findings from a web enabled survey of Canadian policy workers at the federal and provincial levels distributed in 2010 while Weible, Elgin and Pattison replicate this work at the US state level.

In Wellstead and Stedman's Canadian study, surveys were distributed to government policy workers in the four policy sectors included in the project and in four additional sectors (climate change, environment, natural resource management, and water resource sectors) as a control measure. The surveys included a battery of questions to probe the nature and frequency of the tasks undertaken by policy workers in government, the range and frequency of the techniques they use, concern for climate change, their interactions with other policy actors, their attitudes to and views of various aspects of climate change and policy-making processes.

From a sample of 636 usable responses (a response rate of 43.3%), the authors test six hypotheses that are framed to contrast PAC and adaptation capacity in 'natural resource' sectors (e.g. forestry) versus 'non-natural resource sectors' (e.g. Finance). The analysis undertaken includes a presentation of descriptive analysis and exploratory factor analysis.

Wellstead and Stedman provide detailed breakdowns of the data of the various activities at the individual and sectoral level. They found, for example, that across sectors the forestry case stands out with a high frequency of activity across all three task areas (briefing, consulting activities, and policy work). In contrast, those who worked in the climate, infrastructure and transportation sectors were engaged more frequently in briefing type of activity. Infrastructure and transportation based employees were more involved in consultation type activities.

In terms of perceived adaptive capacity the authors found that almost half of the respondents state their organization had a 'medium' capacity to deal with climate change adaptation and contributed to increasing the overall capacity to adapt to climate change. However respondents also reported that while adaptation was relevant to their departmental mission, it was perceived as less relevant to the daily operations of their organizations. When concern related to adaptation was assessed on a sectoral basis the authors found that forestry, climate change, environment, natural resources, and water sectors presented a higher than average concern for climate change while those in the finance and transportation sectors presented an overall lower concern for climate change.

These findings are echoed in the US case in the study of policy analytical capacity and policy activities in Colorado undertaken by Weible, Elgin, and Pattison. This study investigated policy actors in the context of Colorado climate and energy issues with a particular emphasis on the types and level of their engagement in policy activities. The conceptual framework guiding the study centers on the ability of key actors in policy networks to acquire and use information in the policy process. High policy analytical capacity is expected to be associated with high levels of information availability and use, and more diverse kinds, of policy activities.

Through a web based study with data collected in 2001, based on a sample of 359 respondents (45% response rate), the survey assessed the policy analytic capacity of government as compared to the non-profit and private sectors as well as to the research/academic community. Using five dimensions of Policy Analytic Capacity (Howlett, 2009) the

study investigates the amount of research conducted and accessed, government capacity to map political landscapes, the ability of government to communicate policy-related messages to interested parties, the level of capacity of government agencies to articulate their medium- and long-term priorities, and finally the ability of government to integrate information into the decision-making stage of the policy process. In a similar fashion to the goals of the aforementioned Canadian survey, Weible et al focus on an assessment of the activities that policy actors actually undertake at the individual and organizational level. The policy activities were grouped into three general categories of information, administration, and political activity.

The study found actors from government and the non-profit sector to report the highest policy analytical capacity and highest and most diverse range of policy activities. However, researchers, despite relatively high levels of policy analytical capacity, report involvement in just a few activities beyond conducting research. Actors with strong educational backgrounds in the physical sciences are more likely to be involved in conducting research whereas those with strong backgrounds in the social sciences are more likely to be involved in evaluating and appraising policies and working with the public.

At the individual level, PAC – measured by highest degree, social and physical science courses taken, and formal training – was found to be an important explanatory variable in information-related activities and in activities that blur research-administrative-political boundaries including consulting the public and negotiating with stakeholders. At the organizational level, contrary to expected results, researchers were found to be most involved in conducting research and less involved in other activities. Actors from government, businesses, and nonprofits show more diverse and higher levels of activities.

Conclusions

Two key questions with respect to any jurisdiction's ability to cope with climate change adaptations are (1) do governments have the capacity to design and implement the complex policy initiatives required for climate change adaptation and, relatedly, (2) are governance arrangements and policy-making processes structured in such a way so as to facilitate complex policy-making and achieve long-term climate change policy goals and objectives?

The articles in this special issue assess these questions against evidence taken from three levels of capacity in four Canadian policy sectors and one American sub-national sector. The surveys and case studies examine climate change policy-making at the aggregate level while providing additional detailed information on sectoral and organizational variations in policy analytical capacity and governance arrangements as well as the micro-level of the behaviour of policy workers in the area

Taken together the article presented in this issue move some way towards the improved operationalization of capacity issues and their significance in the area of climate change

adaptation. The models used to frame the study help provide an overview of the key factors affecting adaptive capacity in different sectors and reveal the existence of complex patterns in each sector and country.

In general, however, the findings are that in all of the sectors examined, capacity is weak or where it is not weak it is not realized for various reasons: some having to do with long-term events and structures such as constitutional structures, policy legacies or changes in network positions, but others having to do with weak leadership and management. While some of these limitations are more difficult to change than others, the studies help focus attention on what elements of existing policy regimes are susceptible to improvement in the climate change case and provide insights into how to go about making the changes required if governments are serious about responding adequately to the challenges posed by climate change.

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- cesses in areas such as defence, urban re-development and budgeting (Lindblom 1958; Wildavsky 1969; MacRae and Wilde, 1985; Garson 1986). It represents the efforts of actors inside and outside formal political decision-making processes to improve policy outcomes by applying systematic evaluative rationality (Majone 1989). Policy analysis texts usually describe a range of qualitative and quantitative techniques which analysts are expected to learn and apply in specific circumstances, providing advice to decision-makers about ostensibly optimal strategies and outcomes to pursue in the resolution of public problems (Elmore 1991; Weimer and Vining 1999; Patton and Sawicki, 1993).
- 2 At the national level, studies have focused on four basic or 'ideal' types - legal, corporatist, market and network governance - found in many jurisdictions and sectors in liberal democratic states (Considine, 2001; Considine and Lewis 2003). Each mode - legal governance, corporatist governance, market governance and network governance - has a different focus, form of control, aim and preferred service delivery mechanism and procedural policy orientation. This thinking has reflected the general idea of governance arrangements varying from steering via hierarchical, imperative coordination to steering through reflexive self-organization ("plurilateralism"). This, however, represents only one key axis along which any effort to operationalize transitions in governance will be made (Zielonka, 2007; Cerny, 1993). The relative strengths of the public and private actors involved is also a key factor (Knill and Lehmkuhl, 2002) which can affect the ability of a government to de-centralize or de-concentrate authority to non-state actors, ultimately affecting the choice of policy instruments or regulatory techniques utilized in specific policy contexts (Pontusson, 1995; Haas, 2004; Daugbjerg, 1998; Harrop, 1992).
 - 3 Web crawlers trace hypertexts on the web so as to retrieve certain information literally crawling the Web by following its link-structure, collating, indexing and retrieving information as it is found). The more links a website receives, the more relevant the information hosted by that policy actor is considered to be by other members of the community. Thus websites with numerous inbound links or high in-degrees have good reputations for producing trustworthy information.
 - 4 Public-private partnerships span a spectrum of models that progressively engage the expertise or capital of the private sector. At one end, there is straight contracting out as an alternative to traditionally delivered public services. At the other end, there are arrangements that are publicly administered but within a framework that allows for private finance, design, building, operation and possibly temporary ownership of an asset (http://www.pppcouncil.ca/aboutPPP_definition.asp).
 - 5 In a very useful study, drawing on European experience, Mayer, van Daalen, and Bots (2001) have outlined six elements of the analytical task - research, clarification, design, advise, mediation and democratization - that can be combined in specific ways to produce six predominant styles of policy analysis - Rational, Client Advice, Argumentative, Interactive, Participative and Process-Oriented - practiced in any sector.

Endnotes

- 1 Policy analysis is a relatively recent movement, dating back to the 1960s and the US experience with large-scale planning pro-