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Partners for Climate Protection

Engaging Municipalities: Voluntary Climate Change Action in Canada

By:

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Engaging Municipalities:

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About the Report

Voluntary municipal programs are advancing local carbon reduction in the wake of weak national commitments to climate change mitigation. While the potential for action at a local level is huge, participation varies widely among municipal members, with significant capacity remaining under-utilized. This study examines a subgroup of the Partners for Climate Protection Program (PCP) in Canada who have joined a network to reduce emissions, but have not yet completed community and corporate greenhouse gas inventories. The goal of the study is to determine what specific barriers these municipalities face in taking actions to combat climate change, and how they might be better supported in moving forward. In a survey completed by 49 of the 102 inactive members, respondents indicated that their major challenges were staff capacity, funding, and the complexity of the data involved. Recommendations include streamlining guidelines for the greenhouse gas inventory, partnering to build capacity at the local level, and realigning broader policy incentives to encourage innovative long-term mitigation strategies.

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About the Author

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Cover Illustration

Provided by the Partners for Climate Protection program, a partnership between the Federation of Canadian Municipalities and ICLEI – Local Governments for Sustainability. Partners for Climate Protection is the Canadian component of ICLEI's international Cities for Climate Protection program.

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1. *Introduction*

1.1 Background

Municipalities are critical actors in global efforts to mitigate climate change. The International Energy Agency estimates that urban areas, which contain more than half of the world's population, are responsible for 67 percent of the world's primary energy demand and produced more than 70 percent of global CO2 emissions in 2006 (Mexico City Pact 2010). Urban areas have already expanded by five percent since 2006, and with population growth greenhouse gas emissions will continue to rise rapidly unless major mitigation initiatives are undertaken. Underscoring the seriousness of the problem are the by-products of climate change, including extreme weather events, rising sea levels, loss of habitat and decreased agricultural yields, all of which impact urban areas (IPCC 2010).

In the absence of meaningful national commitments to climate change mitigation, cities around the globe are taking voluntary action to reduce their greenhouse gas emissions. Local governments have an enormous potential to lower emissions through energy efficiency measures, waste management, transportation initiatives, and broader land use planning efforts (Agyeman et al. 1998, DeAngelo and Harvey 1998). While voluntary municipal climate change programs have been expanding in scope, membership in these organizations does not guarantee municipal participation or the ultimate reduction of greenhouse gas emissions.

The PCP program based in Canada is one such voluntary program. With membership representing over 220 municipalities and 85 percent of Canada's population, PCP offers organizational guidance, grant-based funding, and official recognition to municipalities seeking to reduce their greenhouse gas emissions. Despite PCP's broad reach, however, over half of participating municipalities have not completed the initial greenhouse gas inventory that forms the basis of a larger process to set targets and reduce emissions. Considering the urgency of the climate crisis and the potential for urban areas to lead mitigation efforts, inactive participants represent a critical lost opportunity. This report will examine the factors impeding municipal action on climate change within the context of the PCP program, and explore strategies to motivate and support latent leaders.

The report first offers a brief introduction to the state of voluntary municipal climate change planning internationally, and then outlines the background of the Canadian program within a broader national framework. The literature review examines the successes and barriers of voluntary municipal climate change mitigation programs, but points to a paucity of scholarship regarding the specific problem of inactive members. The research design section lays out the framework for investigating why certain municipalities do not complete their greenhouse gas inventory after joining PCP, while the data analysis section compares the characteristics of active and inactive members as well as examining survey responses in order to get a more nuanced understanding of the specific challenges and opportunities facing inactive members. Recommendations for future actions are based on research findings within the broader Canadian context.

1.2 Voluntary Programs

International networks have been remarkably successful at spurring local participation in climate change mitigation efforts. ICLEI- Local Governments for Sustainability heads the Cities for Climate Protection Campaign (CCP), the umbrella organization for the Canadian-based PCP. ICLEI represents over 1000 local governments

worldwide, with members originating from over 70 countries (PCP 2010). Under their jurisdiction, the CCP program provides a framework for local efforts by outlining a structure to reduce emissions, supplying technical support and training, and linking members to an international network of local government leaders. The mission of CCP is based on a five-milestone process to reduce local greenhouse gas emissions that includes:

1) Measuring greenhouse gas emissions generated through the local government administration (municipal emissions) and through the actions of the community that they serve (community emissions)

2) Committing to an emissions reduction target for municipal and community emissions with respect to a base year and target year

3) Developing a local action plan designating responsibility, funding, and a time line for achieving emissions reductions targets

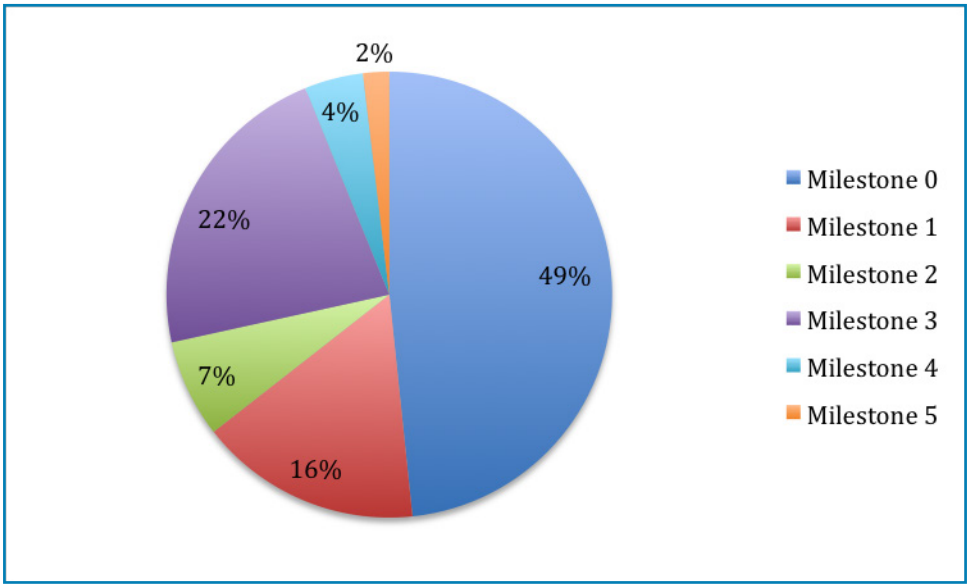
4) Implementing the action plan; and

5) Monitoring emissions reductions achieved by implementing the action plan.

Though it is not required, generally the milestones are completed sequentially, beginning with the greenhouse gas inventory. This initial step provides feedback into the other milestones by guiding priorities in terms of the local action plan, and locating energy data in order to report and monitor progress toward emissions targets.

While there is some inherent value to involvement in a network, including the ability to pressure national and international interests and share knowledge across jurisdictions (Harrison 1999, Kouskey and Schneider 2003, Gore 2010), critics contend that the actual impacts of the ICLEI program have been small in terms of total greenhouse gas reductions, which at 60 million tons of ECO2 constitute only about six percent of global urban emissions (ICLEI 2006). The discrepancy between the wide membership base but relatively modest progress in reductions raises the question of why certain municipalities do not do more once they join the program. This concern is reflected in the case of PCP, where nearly 70 percent of member municipalities have not progressed past milestone 3 (see Figure 1). This finding should not discount the very real impact of actions taken by PCP members, who have recorded 1.7 million tones of greenhouse gas reductions since 2008 through investments worth over $1 billion (Jackson 2011). However, it points to the need to understand why simply belonging to the program does not necessarily result in sustained actions to reduce emissions (FCM website 2012).

Figure 1: Milestone achieved by PCP member municipalities as of September 2011



At the national level, the PCP Program is a partnership between the Federation of Canadian Municipalities (FCM), an organization that represents the interests of municipalities on matters of federal jurisdiction, and ICLEI – Local Governments for Sustainability. Their mission is to encourage and support Canadian municipalities to mitigate climate change. In order to join PCP, municipalities must pass a resolution through their local Council, designate a contact person for climate change mitigation efforts, and submit proper documentation. The potential for funding, technical support, and recognition, as well as the relatively low barriers to joining the program may contribute to PCP's broad membership base but relatively low rates of participation. PCP is financed by the Green Municipal Fund (GMF), a federal endowment of over $550 million, of which a maximum of $92 million each year is available to municipalities to aid climate change efforts in the form of loans and grants. Through 2011, resources from the GMF were only available to fund milestones 3 and above, but recently they expanded the fund to cover 50 percent of the cost of completing milestones 1-3 as part of a comprehensive greenhouse gas reduction plan for member municipalities, provided that all three milestones were achieved within a two-year period. Since then, PCP has received 5 new applications for milestones 1-3, and accepted nine new member municipalities (FCM website 2012).

Figure 2: Distribution of PCP membership within Canada (Credit: Partners for Climate Protection Program 2009)

1.3 The Canadian context

The capacity of PCP staff to support municipal efforts at greenhouse gas reduction is bounded by the wider political context of climate change planning in Canada. In December of 2011, Canada became the first signatory from the developed world to withdraw from the Kyoto protocol after it became clear that they would not meet their goal of six percent total reduction of greenhouse gases from 1990 levels by 2012. This type of backpedaling by the federal government on the issue of energy management is not unprecedented. In 1980, the Liberal government passed the unpopular National Energy Policy, designed to foster Canadian fuel independence, energy security, and reduce the federal deficit through a series of gas taxes, investments in alternative energy, and incentives for oil drilling. The policy proved immensely divisive along east/west lines and was ultimately dismantled by the Progressive Conservatives in 1984. Since then, the Federal government has proved reluctant to institute a comprehensive long-term energy plan for the country, though they have committed under the Copenhagen Accord to reduce emissions by 17 percent relative to 2005 levels by 2020. The lack of clear Federal guidelines outlined for achieving this goal, however (Economist 2011) highlights the need for municipalities to take a leading role in crafting strategies to lower emissions.

Local progress on climate change mitigation goals is complicated by widely differing policies on climate change at the provincial level. Unlike municipalities, provinces are recognized as sovereign powers under the Canadian constitution, and control energy use in their jurisdiction. As described by the political scientist Christopher Gore (1999, 5):

> … from Quebec's reliance on hydroelectric power and promotion of action on climate change, to Alberta's increasing contribution to Canadian and global greenhouse gas emissions through the development of the tar sands, to British Columbia's introduction of a provincial carbon tax, to the historically significant yet shrinking manufacturing sector in Ontario, provinces and the federal government have inspired little confidence in their ability to produce a coherent strategy to address climate change nationally.

Gore also points out that unlike other sample resolutions to join ICLEI-affiliated climate change mitigation programs, the model resolution for membership in PCP does not mention advocacy at the national or provincial level. Instead, as part of a conscious move by the FCM in the late 1980's to avoid divisive national issues, it sets

out a more pragmatic sector-specific approach to lowering greenhouse gas emissions.

This raises the central question of this report: how can PCP better engage municipalities who have actively expressed their desire to combat climate change, but stopped short of implementing the key policy mechanisms and behavioral changes needed to lead Canada into an era of forward thinking global citizenship? In a context where bold national action on climate change is unlikely, and provincial initiatives run the gamut from net carbon neutrality to encouraging oil and gas drilling, sustaining municipal involvement may be the best – and perhaps the only way - to involve a broad segment of Canada's population in the effort to reduce emissions. While this endeavor may take very different forms from rural Manitoba to Toronto's edge cities, it is essential in combating global climate change. The former mayor of Toronto, David Miller, is one of several municipal leaders in Canada to espouse this position: "I feel strongly that since the federal government has abdicated its responsibility on climate change, it's up to cities to lead. If the federal government is not going to act on climate change, it has an obligation at the very least to enable cities to do so" (City of Toronto, 2007).

2. *Background*

2.1 Why Participate in Voluntary Programs?

According to classic economic theory, the rising membership in voluntary municipal climate change mitigation programs contradicts the economic principle of free-ridership, wherein one would expect local administrations not to act because the benefits of reducing emissions do not accrue to them directly, while costs are specific and bounded (Kouskey and Schneider 2003). Kouskey and Schneider put forth four reasons that might motivate participation in voluntary programs. First, some mitigation activities might not require additional resources, and might generate additional financial or social advantages that make the cost/benefit analysis break even. Second, there are specific local benefits to action on climate change mitigation, which can include improved air quality, economic efficiencies, and land use patterns that facilitate active transport. Third, some municipalities may be altruistic, and take action on climate change even when it is not economically rational to do so. And last, some governments may be responding to pressure from citizens when they join the program, and thus realizing a political benefit through participation.

In a survey of 23 municipalities participating in the CCP program under ICLEI in the United States, Kouskey and Schneider (2003) examined member motivations for joining the program. Did participants expect to get something out of the program that ultimately proved to be too difficult to achieve? The responses indicate a high expectation of cost savings, and the existence of co-benefits. Co-benefits are defined in this sense as results that satisfy climate-related and other goals simultaneously – for instance, improving water quality or quality of life. From the interviews that they conducted, however, Kouskey and Schneider (2003) found that local governments never attempted to quantify cost-savings or local co-benefits. In this case, the perception of co-benefits being present was as important as actually realizing them.

There are very real areas, however, where local government action is constrained by a lack of buy-in at the national or regional level. Wheeler (2008) describes the situation of energy utilities, which are usually managed at the provincial level, limiting municipalities who want to generate their own renewable energy. Transportation issues are regional in scale (Betsill 2001, Wilbanks and Kate 1999) and thus require coordination between

multiple municipalities who may or may not have jurisdiction over roads or other relevant infrastructure. . A lack of funding – which could be better supported through federal grants, incentives, or tax breaks – also severely limits localities who cannot afford up-front investments, even for long-term savings. According to Kouskey and Schneider (2003), "Municipalities are taking a powerful first steps, but due to their constraints, they must be mirrored in their efforts by top–down incentives from higher scales for larger reductions to occur" (12).

2.2 Challenges to Implementation

Drawing from the broader literature of policy implementation, Sabatier and Mazmanian (1980) identify three main variables affecting the success of environmental programs: the tractability of the problem, the ability of the policy to guide implementation, and broader contextual factors that limit or support uptake.

Tractability includes factors such as a clear understanding of the changes necessary to solve the problem, the range of actors involved, and the extent of the behavioral change required. Under this framework, local climate mitigation is a highly intractable problem, as its complexity necessitates multiple levels of intervention to change both individual behavior and municipal decision-making. The more steps involved in successful completion of a policy, the more opportunities there are for the policy to fail (Pressman and Wildavsky 1973). Scholars Montjoy and O'Toole (2003) address the dangers of agenda drift, noting, "a vague mandate gives the dominant coalition the opportunity to focus those activities in accordance with its own goals and worldview" (468). This type of mandate could explain why municipalities joining a voluntary climate mitigation program might ultimately continue with business as usual rather than challenge the fundamental drivers of local emissions.

To successfully facilitate implementation, a policy must establish a clear chain of causality, hierarchical integration between implementing institutions, and dedicated funding. These structural features are present to varying degrees in voluntary municipal greenhouse gas mitigation programs. Demonstrating a clear chain of causality between actions taken to address the problem and program objectives is particularly challenging in the case of climate change, which is global in scale, spatially diffuse, and operates with a temporal lag (Wilbanks and Kates 1999, Kouskey and Schneider 2003). The PCP program has addressed this challenge, under CCP's direction, by emphasizing the local benefits of climate change mitigation efforts, such as reduced congestion, air pollution, and increased economic efficiencies (Betsill 2001). Scholars such as Lindseth (2004), however, argue that the local framing of a global issue ultimately diminishes the effectiveness of the program by allowing it to be subsumed into a pre-existing local agenda (9).

Hierarchical integration of implementing institutions is difficult in the case of municipal climate change, which involves "collaboration between officials working in the areas of waste management, transportation, public works, utilities, health, land-use planning and air quality management who rarely sit at the same table" (Betsill 2001, 400). Montjoy and O'Toole (1979) underline the importance of dedicated funding as a means to shift entrenched routines (474). In a study of U.S. and Canadian cities involved in the international CCP program, Ravine (2004) notes that in earlier stages of implementation, grants played a big role, while later on, internal allocation of resources (city budgets and staff) were critical to success. According to Betsill (2001), "Cost-effectiveness is the ultimate criterion on which city councils make budget decisions" (401), though they may use discretionary funds to develop small-scale demonstration projects. These studies indicate that cities are risk-adverse when it comes to the financing of climate change projects, and that shifting the status quo requires

financial incentives rather than just good-faith efforts.

Broader contextual factors that limit or support program objectives include public opinion, leadership within the implementing agency, broader socioeconomic conditions, and existing technologies. These factors vary widely among participating municipalities, which are located in different geographic areas, and have a variety of political affiliations and internal capacities. In a study focused on selected US members of CCP, Wheeler (2008) notes that the processes through which climate change plans were prepared varied greatly; some were managed through a single department, others through an outside consultant, and still others through an extensive stakeholder process. Ravine (2004) comments, "the process of creating the action plan was seen by many interviewees as primarily an education and awareness process to help create support for implementation" (73). This research supports investing in a process of community outreach and education in order to encourage long-term behavior change and community backing of municipal efforts on climate change.

Challenges to implementation differ widely depending on municipal context. Much of the literature focuses on cities that were early adopters of climate change mitigation policies. Kron and Randolph (1983) reported on the experiences of eleven of these "pioneer" municipalities that developed comprehensive energy plans in the early 1980's. They found that who was doing the planning mattered – the plans that were produced in the energy office or by the city manager tended to be more successful than those originating from a planning agency. Formal implementation processes that included codified steps involving work programs, consultant studies, progress reports, and public hearings were also found to increase implementation success. It is important to note, however, that this study focused on large, well-funded programs. In contrast, Pitt and Randolph's (2008) study examined twelve smaller cities in the United States that had recently initiated the process of climate change planning. In most of the cases they examined, local elected officials initiated the planning process. Obstacles to achieving climate objectives were primarily organizational and institutional. Across the board, cities had difficulty obtaining data, or ran into methodological issues about how to calculate the greenhouse gas inventory. Other process related obstacles included a lack of funding or staff availability. Contextual conditions – including economic, demographic, or energy supply conditions – were another determinant of local success.

2. 3 Gaps in the literature

While there is a section of literature focused on motivations for participating in voluntary municipal climate change programs, as well as a body of work on barriers to implementation, no scholars deal with the specific issue of municipalities that have taken the initiative to join a climate change program, but have not yet completed the greenhouse gas inventory. What makes these municipalities different from their colleagues who have advanced further within the five-milestone framework defined by ICLEI – Local Governments for Sustainability? What are the specific barriers and opportunities that they face? The remainder of this report will address this issue in an effort to increase the impact of voluntary municipal climate change programs in Canada.

3. *Research Design*

3.1 Research Questions and Hypothesis

The research focused on the population of 102 municipalities which had not yet completed the municipal and community greenhouse gas inventory, in order to assess: 1) what were their major barriers to moving forward on the milestone framework; 2) what actions had they taken to reduce greenhouse gas emissions that were not captured by the milestone framework; and 3) how might they be better supported moving forward. These research questions formed the basis for a telephone survey that was developed and administered from July-September of 2011. The rationale for focusing on this group was their potential for increased involvement in the program, as indicated by the initiative they took initially by joining. In order to get a sense of what characteristics may have corresponded with a greater likelihood of completing the greenhouse gas inventory, the study also compared the 102 municipalities with other program member who had completed Milestone One, based on municipal size, geographic area, and date that they joined the program.

Based on the literature review and input from PCP program staff, we hypothesized that barriers to progress within the five-milestone framework stemmed primarily from a lack of funding (Montjoy and O'Toole 1979) and human resources (Pitt and Randolph 2008). We also believed that a lack of available data and the variability in methodological approaches, as discussed by Pitt and Randolph (2008), would be identified as a significant challenge in completing the greenhouse gas inventory. We expected larger municipalities to identify the integration of departments (Betsill 2001, Wheeler 2008) as a major obstacle to their progress within the milestone framework, while smaller municipalities would have less problems interfacing between departments. We also expected the degree of cost-saving for implementing climate mitigation measures would be a motivation for all members (Montjoy and O'Toole 1979, Betsill 2001, Wheeler 2008).

Comparing those who had completed Milestone One (the active group) with those who had not (the inactive group), we expected that smaller cities and those who had joined the program most recently would be disproportionately represented in the inactive group – those who had not yet completed a greenhouse gas inventory.

3.2 Methodology

Telephone surveys were chosen as the primary instrument of data collection. Conducting the surveys by phone offered several advantages over electronic surveys, which typically require less time investment from both researchers and interviewees. First, many of the program members had joined PCP before 2000, and the climate change contact PCP had on file was no longer current. A telephone inquiry provided the opportunity to update the municipal contact as well as scheduling the interview. Secondly, program staff anticipated that a telephone survey might generate a greater response rate than a written survey, since the less active municipalities tended not to respond as readily to email. Lastly, the interaction inherent within the phone survey made it possible to probe respondents answers which were unclear, and generated program feedback on issues which were not covered in the scripted questions.

The survey was developed corroboratively with input from the PCP steering committee and FCM member staff. Questions were classified into four framework categories focused 1) on the status of the inventory; 2) the degree to which municipalities were tracking energy and emissions data and cost; 3) capacity building, includ-

ing staff resources, partnerships, and involvement of council; and 4) strategies for moving forward. It spanned 15 questions, with response options ranging from multiple-choice to open ended answers. The questions were intended to capture both a breadth of quantitative information that could be analyzed with simple descriptive statistical techniques, as well as a more nuanced qualitative understanding of the individualized circumstances of each municipality. The survey was pilot tested for question clarity (for the interviewee) and ease of transcription (for the interviewer) during several mock survey sessions prior to the start of actual interviews.

Copies of the questionnaire were sent to the target population, and each municipal contact was telephoned up to three times to arrange for an interview date. The survey took an average of 30-45 minutes to complete by telephone, and all responses were entered into an Excel spreadsheet at the time of the interview. In the few instances when interviewees were not sure of their response to a question, the cells was left blank and filled in after the interviewee had verified the information with the appropriate person. In instances when the answer was not available, cells were simply left blank. All multiple-choice responses were coded quantitatively, while we used the open-ended responses to get a "flavor" for the specific barriers, concerns, and actions undertaken by individual municipalities. The correlation analysis was performed using cross-tabulation.

A comparison of municipalities that had or had not completed Milestone One within the ICLEI framework provided an additional context for the survey results. In order to compare the two subgroups, we relied on pre-existing information from PCP including municipal size, the date the municipality had joined the program, and the province to which they belonged. This data was useful in that it provided insight into whether or not preconditions between the two groups differed, and if so, whether these differences had impacted the main challenges and opportunities identified by member municipalities.

The definitions of small, medium, and large municipalities were loosely based on the designation from Statistics Canada defining a large population center as containing more than 100,000 people, a medium population center as containing from 99,999-30,000 people, and a small population center as containing from 29,999-1000 people (2011). However, we chose to define a small municipality as fewer than 10,000 people, and a medium size municipality as between 10,000-100,000, based on feedback from program members who indicated that the issues confronting the smallest municipalities differed greatly from those that a larger municipality would face.

3.3 Limitations to Study

There are several significant limitations to the survey data. Only 49 of the 102 municipalities who belonged to PCP but had not completed a community and corporate greenhouse gas inventory ultimately tool the survey. The lack of responses from the remaining 54 municipalities introduces considerable sampling bias to the results; those municipalities with contacts who ultimately agreed to take the survey are likely to exhibit different characteristics than those municipalities with contacts who did not take it. Given the lack of interaction with non-responding municipalities, we were unable to investigate in depth how the characteristics of the 49 responding municipalities compared to the 54 non-responding municipalities. Because of our concern about survey bias, we decided to analyze our results descriptively rather than projecting responses across the total group of 102. While this limits the scope of our analysis, it increases the accuracy of the results.

The complexity of the survey questions also limited the degree to which we could declare our results statisti-

cally significant. Many of our questions contained multi-part answers that separated the 49 responses into much smaller categories. For this reason, the data analysis section focuses more on illustrative patterns than statistically significant results.

The timing of the survey may have also impacted the response rate. We conducted the interviews from the period of late July 2011 to mid-September 2011, when many municipal staff were away on vacation. While not ideal, this was the only point at which the PCP team was able to obtain an additional researcher for the project. In addition, during that time period two similar surveys were being conducted (one through ICLEI, quantifying the amount of greenhouse gas emissions reduced through participation in the PCP program, and one by an independent researcher, examining municipal leadership in greenhouse gas reduction). It is possible that due to the unfortunate confluence of these three surveys over the summer, interviewees experienced some degree of survey fatigue that limited their willingness to participate. Lastly, while there is a wide range of factors we might have potentially considered in performing the correlation analysis, we were limited by the type of information that PCP had readily available (size, geographic range, and the date a municipality joined the program). In future studies, it would be useful to consider how characteristics such as political affiliation or racial and economic demographics affect member participation.

4. *Data Analysis and Findings*

4.1 General Framework

We use a multi-tiered approach to the data analysis, first placing the group of inactive municipalities within the wider context of PCP membership, then examining frequencies in survey responses to discern general patterns, and lastly examining any correlations between responses and characteristics such as municipal size, date of joining the program, geographic location, and staff capacity. It is important to note that correlations between certain factors do not indicate a causal relationship, but merely signal an association between variables (for example, when we find A to be true, B is more likely to be true as well). In some areas, we call out a pattern of responses that is not statistically significant, but shows a tendency that could provide useful information.

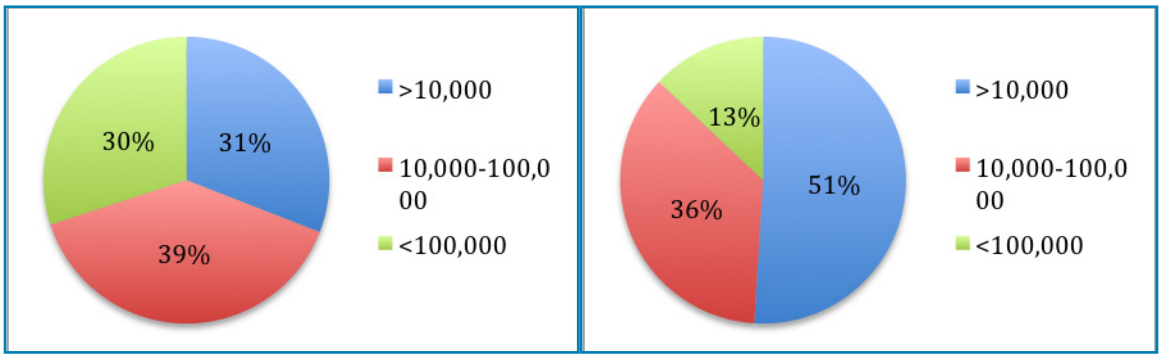
As described in the background section of the report, PCP member municipalities contain 85 percent of the Canadian population, but represent only 220 of the approximately 3700 municipalities in the nation. These figures indicate that membership is disproportionately drawn from Canada's larger cities. The majority of members (over three-fourths of participants) come either from Ontario, the seat of national government, and a historical manufacturing hub, or British Columbia, which has a progressive environmental track record and a goal of carbon neutrality by 2010. Ontario and British Columbia are respectively the most populous and third most populous of all ten provinces, so it would follow that PCP membership would be higher in these areas. Nonetheless, the extent of participation is greater than population size alone would predict.

4.2 Sample characteristics

We found clear differences between the group of PCP members that had officially completed both municipal and community greenhouse gas inventories, (population size of 115) and the group that had not (population size of 102). This initial comparison between these two cohorts within the PCP program suggests that municipal size is a major factor in determining likelihood of progressing within the five-milestone framework. As

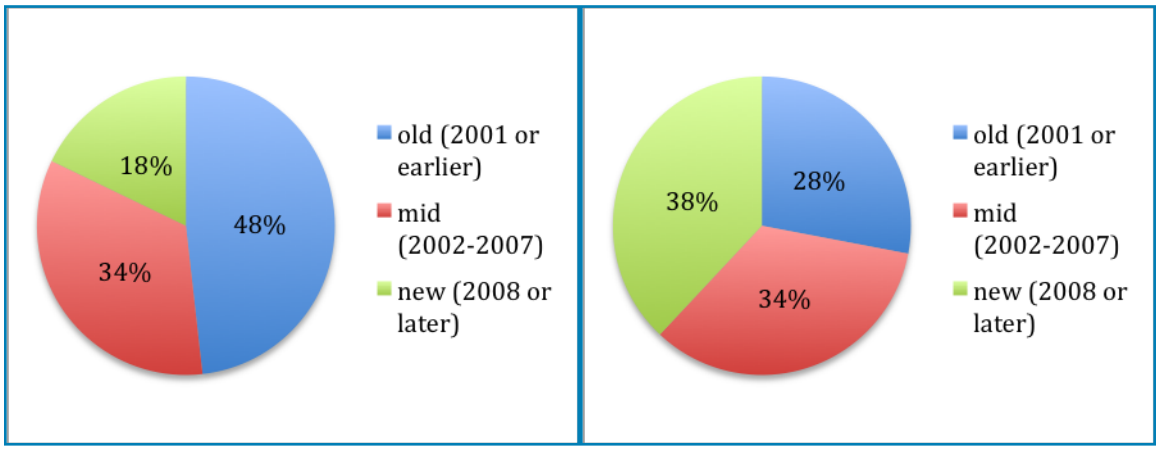
shown in Figure 4, municipalities with populations below 10,000 had a higher proportion of less active members while municipalities with populations over 100,000 had a higher proportion of more active members. The number of municipalities in a mid-level population range (10,000-100,000) stayed roughly consistent between both groups.

Figure 3: Municipal size in the more active group (left) and less active group (right)



While there is a clear relationship between municipal size and likelihood of progressing within the five milestone framework, this association could be due to any number of factors including staff capacity, funding, exposure to greenhouse gas mitigation projects, political buy-in, or some combination of the above. An analysis of the survey results provides a more nuanced picture of the specific challenges confronting smaller municipalities in achieving the first milestone. As well as being affected by the size of the municipality, the likelihood of completing the greenhouse gas inventory appears to be related to how long a municipality has been a part of the program. As shown in Figure 5, 20 percent more of those in the more active group had joined the program before 2001, while in the inactive group a proportional percentage had joined in 2008 or later.

Figure 4: Date joined in the active group (left) and the inactive group (right)



At a very basic level, this finding suggests that the process of completing Milestone One takes time. It also raises some important questions. What is happening within the segment of inactive municipalities who joined the program before 2001? Are they more likely or less likely to complete Milestone One than their counterparts who have joined the program more recently?

The active and inactive subgroups exhibit roughly proportionate distribution across all ten provinces and three territories. Quebec is the only province where there are appreciably more inactive members than active members. This could be due to Quebec's reliance on hydropower, which might act as a disincentive to decrease energy use because of its relatively low cost and emissions profile. Unfortunately, we were not able to complete the surveys in French, Quebec's official language, and so do not have data to elucidate this particular phenomenon.

4.3 Survey Data

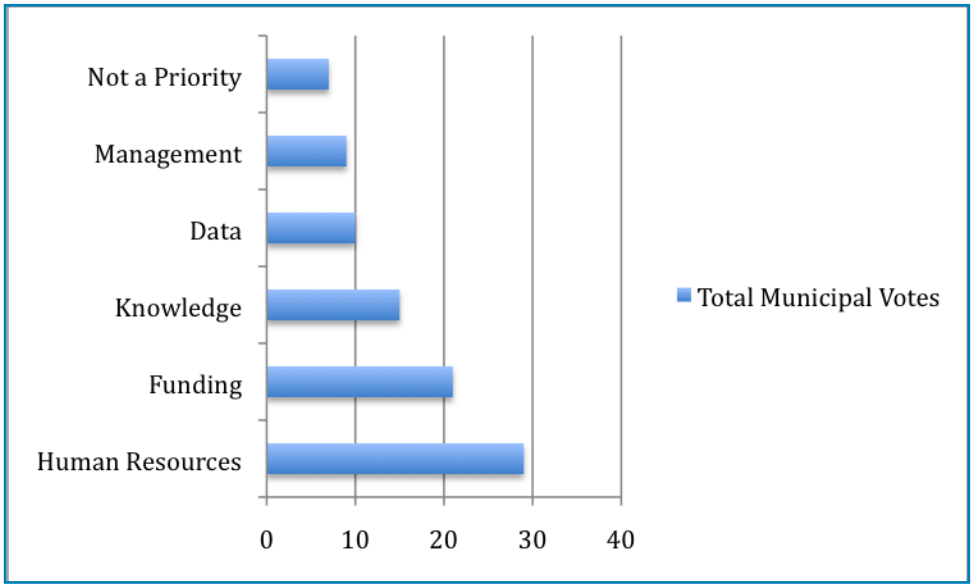
This section outlines responses to the 15-question telephone survey completed by 49 contacts from municipalities in the PCP program who had not yet completed both their municipal and community greenhouse gas inventories. It focuses in particular on results pertinent to the central research questions: 1) what were the major barriers to moving forward on the milestone framework; 2) what actions participants may have taken in reducing greenhouse gas emissions that were not captured by the milestone framework; and 3) how they might be better supported moving forward.

4.3.1 Barriers to Completing the Greenhouse Gas Inventory

Open-ended comments from program participants regarding the greenhouse gas inventory stressed the time intensive nature of data collection and conversion to greenhouse gas equivalent. Municipal contacts reported that data was often held by different departments, managed at a regional level, and produced in formats that were difficult to understand. Others doubted the accuracy of the greenhouse gas inventory, because they were unable to include key factors such as industrial emissions, vehicle miles traveled, and for participants in British Columbia, emissions from landfills. Nonetheless, approximately three-fourths of respondents believed that creating a greenhouse gas inventory was a necessary part of reducing emissions, supporting PCP's focus on data collection and reporting.

Human resources and funding ranked as the top barriers to completing the greenhouse gas inventory, in a question where respondents were ask to rate the two top barriers out of the six options. Note in that a lack of human resources was selected as a barrier more frequently (29 times) than funding (21 times), though the two are clearly related.

Figure 5: Barriers to creating a greenhouse gas inventory

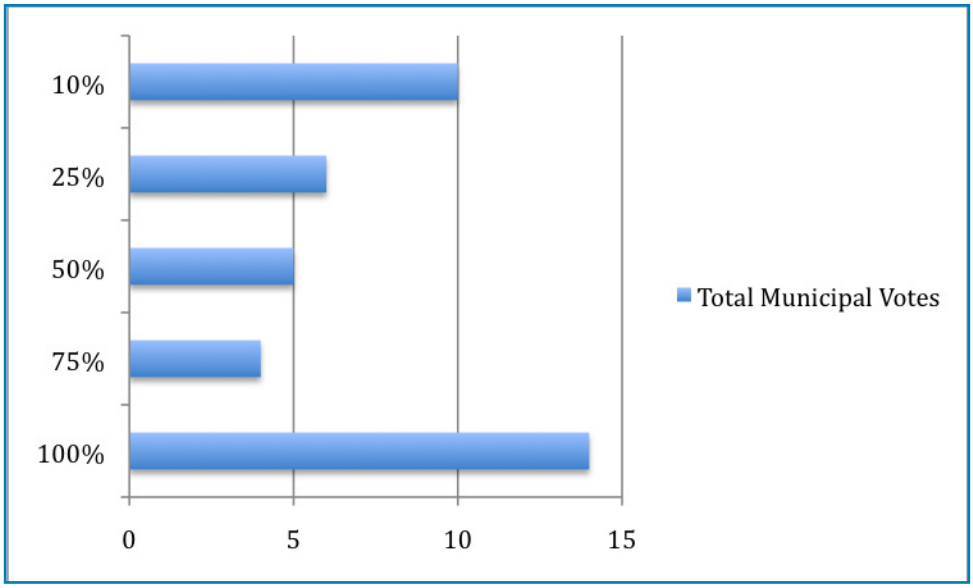


The fact that human resources was chosen more frequently than funding may reflect the degree to which institutional knowledge is needed to complete the inventory, whereas funding can be channeled toward technical aids or consulting fees. The smaller municipalities were statistically more likely than large ones to select human resources as a main barrier, at the .10 significance level. Municipalities with under 10 percent staff time also completed their inventories at lower rates than those with more staff capacity, a trend that ground-truths the initial responses regarding barriers to completing the greenhouse gas inventory.

Knowledge, which 15 municipal contacts selected as among the top two barriers to completing the inventory, was identified at much higher rates by medium-size municipalities than by large or small ones. We suspect this is because large municipalities have specialized staff to complete the inventory, while small municipalities may be more likely to contract out climate change specialists because of their limited staff capacity. In contrast, medium-size municipalities may be more likely to perform calculations in house, and so be more conscious of their limitations. Larger municipalities have different issues: those with populations over 100,000 selected senior management as a barrier at much greater rates than small and medium size cities, indicating the challenges of departmental silos.

Staff capacity on greenhouse gas mitigation efforts varied widely among municipalities, with a split emerging between those who had a full time equivalent person dedicated to climate change efforts, and those who had someone working at less than 10 percent annual time (see Figure 6). There was also a wide degree of variation in where this person/s was housed, though it tended to be within the Departments of Sustainability, Planning, Public Works, Energy, or the Environment. While three-fourths of municipalities rated their council as either supportive or very supportive on climate change mitigation efforts, comments indicated that ultimately council cared most about the financial breakdown of projects, which makes it challenging to justify research-based milestones like the greenhouse gas inventory.

Figure 6: Proportion of annual full-time equivalent staff time spent on climate change or energy efficiency efforts

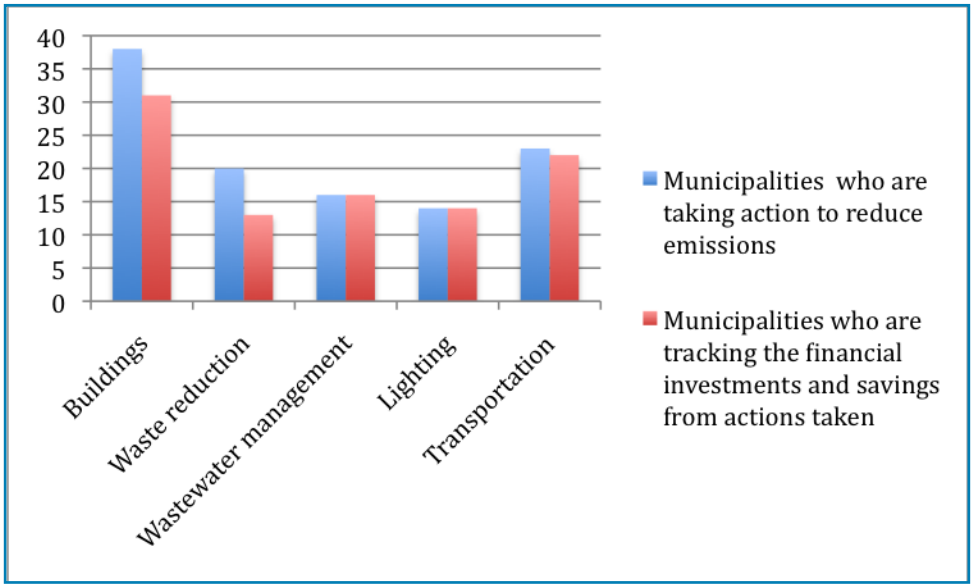


4.3.2 Actions Taken to Reduce Emissions and Tracking

Though PCP had defined the inactive survey group as those who had not yet officially completed a greenhouse gas inventory for both municipal and community emissions, 63 percent of respondents had completed some type of greenhouse gas inventory. This inventory may not have counted for Milestone One because it was either for the community or the municipal government, but not both, or it may not yet have been submitted to or verified by ICLE.

As depicted in figure 7, below, we found that survey respondents were taking a wide range of actions to reduce greenhouse gas emissions in different sectors. The buildings sector was the area with the most activity, with 39 municipalities reducing emissions, and 31 tracking both the investments and savings of those actions. Strategies for reducing emissions included constructing LEED certified municipal buildings, installing solar panels and performing energy efficiency retrofits. The transportation sector was another area with a significant amount of activity to reduce emissions, with 23 municipalities reducing their transportation emissions, and the majority of those tracking both the financial investments and savings. It is important to note, however, that the majority of the actions in the transportation sector actions dealt with municipal vehicles, which generally comprise a small portion of community emissions. The definition of what constituted an action was also quite broad in that it encompassed policy changes such as bicycle and pedestrian plans, which have a long-term term impacts rather than an immediate affect on emissions. In the sectors of waste management, wastewater treatment, and street lighting, participants noted that in many cases incentives discouraged taking actions to reduce emissions because the services were contracted out, managed regionally, or billed at a base rate rather than in terms of total energy usage.

Figure 7: Sector-specific actions on climate change mitigation and financial tracking of those actions



Municipalities with a greater percentage of staff time tended to track financial investments and savings on greenhouse gas reducing actions to a greater degree than municipalities with less staff, but appeared to be no more likely to take actions to reduce emissions in these sectors. There was no association between how long a municipality had been in the program, and whether they were tracking emissions or financial investments and savings in greenhouse gas mitigation. These finding suggests that while financial savings are a motivation for taking action, there are many other reasons why municipalities large and small ultimately decide to move ahead with projects.

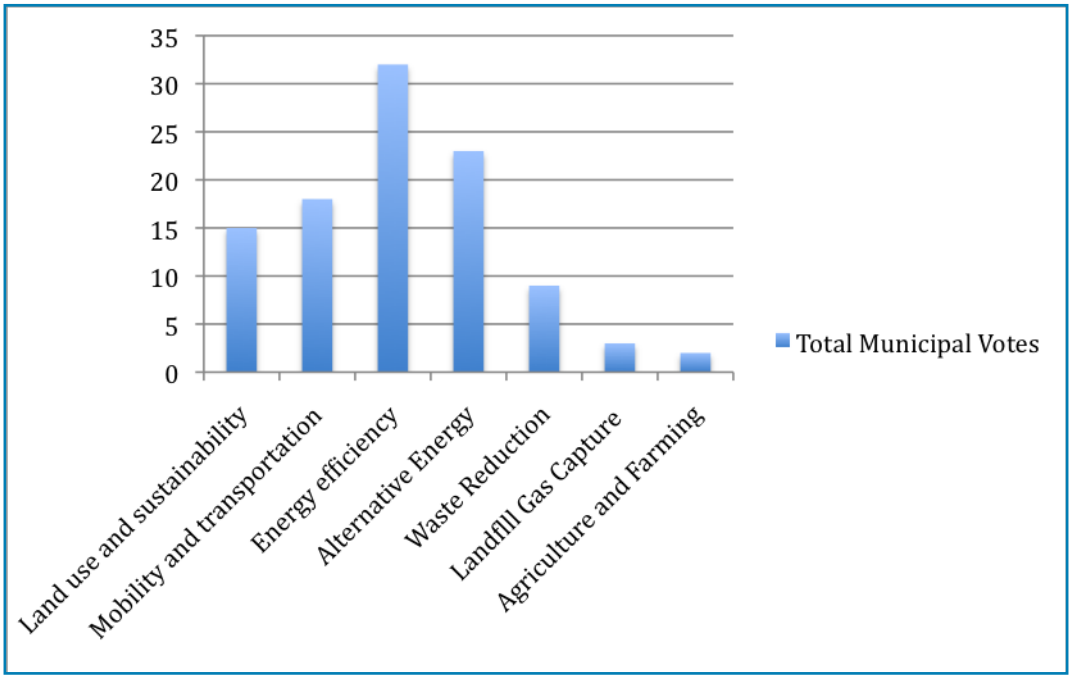
Table 1: Sector-specific actions and challenges on climate change mitigation

Sector	Buildings	Waste Reduction	Wastewater Management	Lighting	Transportation
Actions taken	Energy efficiency retrofits, LEED certification, alternative energy generation	Organics diversion, recycling programs, automated garbage collection, landfill gas capture	Updated pump systems, heat recovery, home water meters, high tech system that adjusts to water flow	Many pilot projects- LED traffic lights, streetlight dimming programs, dark skies policy	Right sizing municipal fleet, tracking fuel use, purchasing hybrids, using biodiesel fuel
Issues highlighted	Data is located in different departments, and appears in various formats	Services are often contracted out, which reduces municipal control and data access	Services are often managed on a regional level, which reduces municipal control and data access	In areas with hydropower, putting in LEDS is not cost effective. Some pay base rate, rather than having energy metered	Generally deal with municipal transport rather than community transport, which forms bulk of emissions

4.3.3 Opportunities and Support for Mitigation Efforts

In terms of opportunities for municipal climate change mitigation, survey respondents saw the most opportunity to lower emissions through energy efficiency efforts, followed by changes in mobility and transportation, and then by alternative energy. This may be because energy use is closely associated with greenhouse gas emissions, though methane from landfills also comprises a significant portion of emissions (FCM 2007). There is also a financial incentive for energy efficiency efforts and the generation of alternative energy. Reducing energy use directly lowers energy bill payments, while the local production of alternative energy encourages resilience in the face of volatile price increases. The large number of respondents who selected mobility and transportation as one of their top two choices for climate change mitigation reflects the fact that this sector generally comprises one of the dominant sources of greenhouse gas emissions in a community emissions profile. It is importation to note that unlike energy efficiency and alternative energy, changing infrastructure and behavior around transportation is a long-term goal requiring sustained investment.

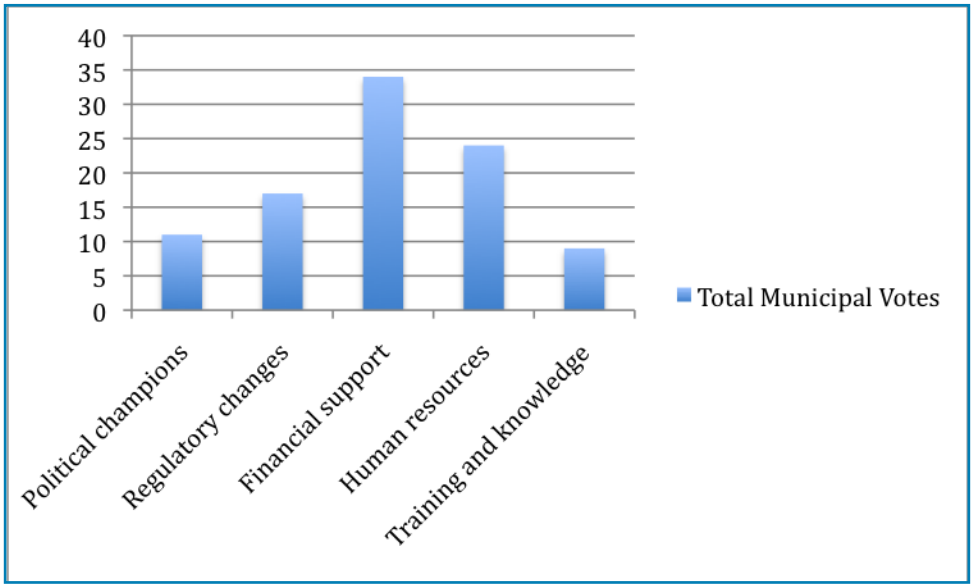
Figure 8: Opportunities for municipal climate change mitigation



Patterns of response indicate how context shapes priorities. Municipalities who had been members of the program since before 2002 tended to rank energy efficiency as one of the top opportunities for climate change mitigation, perhaps because it has been well supported by policy. In contrast, the most recent members of the program, and cities that were smaller than 10,000 people selected alternative energy as an opportunity for climate change mitigation at greater rates than other respondents. The largest municipalities picked land use and sustainability planning and mobility and transport as opportunities for climate change efforts at twice the rate as did small and medium sized municipalities, indicating the advantages density affords in terms of public transit and active transportation.

Program contacts indicated that financial support and human resources would be the most useful factors in implementing climate change mitigation measures. These findings mirrored the main challenges they had initially selected in terms of completing their greenhouse gas inventory. While many program contacts indicated that regulatory changes might be an effective way to mandate action, comments reflected the view that regulation without funding would be ineffective.

Figure 9: Desired support for climate change mitigation efforts



Over two-thirds of respondents have considered partnering with a neighboring municipality to take action on climate change mitigation. Barriers to collaboration include differing priorities between municipalities, distance, and the added burden of coordination. There are, however, many examples of successful partnerships. Gibsons, British Columbia, a community of 4,200 people, has jointly hired a community outreach person and community energy manager in conjunction with neighboring municipalities, and collaborated to complete an energy and emissions plan. The Carbon Neutral Kootenies is another example of a much larger partnership initiative including 29 municipalities, five First Nation communities, and three regional districts, with a joint goal of carbon neutrality by 2012 .

5. *Recommendations*

Findings from the survey indicate the need to 1) simplify and standardize the process of creating the greenhouse gas inventory 2) build internal capacity in municipalities and 3) incentivize long-term efforts to reduce emissions. Generally, recommendations in the first section are targeted toward PCP in conjunction with ICLEI-Canada, recommendations in the second section address actions municipalities can undertake on their own, and recommendations in the third section broaden the focus to consider the impact of provincial and federal policies regarding climate change mitigation. While these recommendations emerge from the Canadian context, they are more broadly applicable to international voluntary municipal programs for climate change mitigation, particularly when dealing with a variety of municipal sizes and conditions.

5.1 Simplify and Standardize the Process of Creating a Greenhouse Gas Inventory

The large number of program participants who have begun the process of completing a greenhouse gas inventory, but not yet finished it indicates the challenging nature of the process. Barriers identified through the survey include a lack of human resources and funding, problems accessing primary data, and a lack of method-

ological clarity. The following guidelines focus on specific steps to ease the burden on municipal staff, streamline the technical aspects of the survey, and institutionalize efforts to track data over time.

a) Create a clear, actionable guide on what to include in the greenhouse gas inventory, and how to estimate emissions in cases where the data is not available.

While many municipalities are tracking emissions in some form, they have stopped short of submitting an official community and municipal greenhouse gas inventory. The Inventory Quantification Spreadsheet that PCP currently provides to municipalities is based on the International Emissions Analysis Protocol (IEAP) developed by ICLEI. While scientifically rigorous, IEAP is extremely complex, and offers few procedural guidelines on what to include within community greenhouse gas inventory. The issue of classifying direct and indirect emissions has been particularly confusing for member municipalities. A streamlined how-to guide to the greenhouse gas inventory would improve comparisons across provinces, and function as a point of entry for municipal staff who are not trained in energy management and data collection. To increase the visibility of this tool, PCP should highlight it in one of their annual webinars, and conduct an orientation session for new members when they join the program. {Target Actor: PCP}

b) Develop an online tool to track emissions.

Survey participants noted that the process of compiling energy data to include in the greenhouse gas inventory was extremely time-intensive, both in terms of locating the raw numbers and converting it to greenhouse gas equivalent. While it may be possible to hire a part-time staff member or intern to complete a baseline survey, participants noted that it is also prohibitively difficult to keep the inventory updated. We recommend that PCP, in conjunction with ICLEI, develop an affordable greenhouse gas tracking software that will save energy utility data from year to year for each member municipality, and update emissions projections with information derived from energy bills. This recommendation has precedent: in 2007, British Columbia developed the SMARTTool software, which was designed for municipal government use but is now being used to track community emissions, and is available to municipalities at a 50 percent cost-share from the provincial government. PCP, ICLEI, and member municipalities could follow a similar cost-sharing model to make a similar tool accessible for local governments in all Canadian provinces. {Target Actor: PCP/ICLEI}

c) Identify best practices in data accessibility.

Detailed questions regarding data collection indicate that access to energy data can be problematic, particularly in the case of utilities that are contracted out or managed on a regional level such as wastewater and waste and recycling. PCP can assist municipalities by providing best practice examples of others who have negotiated “open book” contracts with utility companies. One such example is the City of Kelowna, British Columbia, which has arranged a transparent contract with its waste management system that provides access to disaggregated data on energy use. Legal concerns about data sharing generally limit the degree to which utilities are willing to provide accurate estimates of energy use. While some utilities are willing to provide aggregate level regional data, this format masks any changes at a local level that may be relevant to municipalities seeking to reduce emissions. By providing examples of open book contracts between municipalities and utility companies, PCP can help normalize this type of agreement and assuage legal concerns. {Target Actor: PCP}

d) Coordinate inventory with benchmarks.

Lastly, municipalities need to coordinate initial efforts to complete the greenhouse gas inventory with a long-term plan outlining what benchmarks they will measure over time to monitor emissions, in what units of measurement, and how often. Coordinating the indicators for climate change mitigation with the greenhouse gas inventory and the implementation plan is essential, as data from the inventory can provide a base-line assessment for indicators. Institutionalizing the indicators in a long-range planning process will also help provide a consistent dataset over time and through municipal staff turnover. Developing a municipal focus group on climate change mitigation can be an effective way to gather data from different departments for both the inventory and indicators. Focus groups such as these encourage cross-departmental knowledge sharing and buy-in. Within this type of arrangement, it is essential to designate one main point person who will bear the primary responsibility for coordinating the process, and ultimately entering the indicators into official records. {Target Actor: Member Municipalities}.

5.2 Build Internal Municipal Capacity

Human resources and funding emerged as major barriers to pursuing climate change mitigation strategies, particularly in the case of the smallest municipalities involved in PCP. In resource poor situations, strategies for achieving municipal climate mitigation goals include leveraging capacity by partnering with universities, the community, and local organizations, as well as scaling up successes through professional training and knowledge sharing programs.

a) Foster partnerships with universities and local organizations.

Municipalities can partner with local universities to complete a baseline survey of emissions as a cost-effective way to complete the milestones while increasing community buy-in. Local partnerships also offer the potential of ongoing support in terms of monitoring and evaluation of emission reductions, as opposed to time limited contracts with consultants. Whether working with local partners or consultants, it is important that a permanent municipal staff member be familiar with the location of source data and any assumptions made in developing the inventory and subsequent monitoring of emissions. This will guarantee a consistent, comparable dataset over time. {Target Actor: Member Municipalities}

b) Scale up successful solutions through training and community knowledge sharing programs.

PCP can leverage their value as a network by facilitating opportunities for municipal staff working on climate change to develop technical skills and learn from other innovators. Based on the survey data, we believe that the greatest need for professional training exists in mid-sized municipalities who may have capacity to complete the milestone process in house. Trainings such as these could potentially be funded through grants from private foundations, and run by staff experts from ICLEI-Canada. As well as accessing formal professional development networks, municipalities can learn much from one another. One successful example of municipal mentorship is the Local Government Management Association of British Columbia Teamwork Program, which provides a forum for municipal staff to solicit and provide information regarding a wide range of municipal services. A similar network geared toward climate change mitigation objectives and hosted by PCP could facilitate information sharing, build regional support systems, and connect like-minded members. {Target Actor: Member Municipalities}.

c) Involve the community from the outset.

Municipal governments can foster community involvement early in the milestone process by offering workshops, design charrettes, and educational materials addressing climate change mitigation. In fact, over half of municipal staff members who took the survey indicated that they were actively outreaching to the community regarding general awareness or action on energy reduction or greenhouse gas mitigation. Connecting this type of publicity with existing local efforts is a powerful way to mobilize local constituencies and increase community buy-in. Community involvement in the creation of the community greenhouse gas inventory sets the stage for later efforts at reduction, including individual behavior changes such as decreasing auto use and increasing residential energy efficiency. {Target Actor: Member Municipalities}

d) Partner with neighbors to leverage resources.

Over two thirds of the 49 municipalities surveyed have considered partnering with their neighbors on some aspect of climate change mitigation. Pooling funding to hire a regional climate officer to work jointly on climate change plans is one effective way for smaller communities to leverage their capacity, as well as offering the benefits of coordinating transportation, waste, and water management plans. Collaboration can also be a successful strategy in applying for foundation funding, where municipal efforts to align goals at a regional level indicate a sophisticated degree of community forethought and coordination. Lastly, smaller municipalities have indicated on the survey that it would be useful to learn from projects that others have done on a similar scale. While PCP has completed one webinar to date focusing on the challenges smaller communities face, a formal community knowledge-sharing program could allow small-scale innovators to "pair up" with partners to share climate change mitigation solutions. {Target actor: PCPC and Member Municipalities}

5.3 Incentivize Long-Term Efforts to Reduce Emissions

Funding has emerged as a major barrier for municipalities in our survey sample. To some degree, this may reflect the fact that at the time the survey was completed, the GMF was not funding milestones one or two. However, the ratio of applications funded through the GMF in regard to milestones 3-5 is quite high – PCP program staff report that of 48 applications submitted in 2011, only three were not successful. The fact that municipalities continue to cite funding as a major need indicates that the resources offered through FCM need to be matched by provincial and federal policy incentives to guide long-term action.

a) Fund innovative long-term solutions.

Seriously investing in climate change mitigation will require national and provincial governments to develop targeted policies that encourage efficient use of fossil fuels, promote green energy, and foster innovative research and development. Currently, securing funding to pursue initiatives is one of the most challenging aspects of participation in the PCP program for member municipalities. While government initiatives including the federal EcoENERGY retrofit program and Ontario Go Green Fund have been effective at increasing energy efficiency, clean technology, and sustainable transport, their limited funding cycle contributes to a somewhat piecemeal strategy for reducing emissions. Mandating the federal procurement of green energy would spur private investment by guaranteeing a reliable long-term market, and ultimately would expand municipal options for affordable, sustainable energy sources. Lastly, expanding carbon-trading schemes such as the Western Climate Initiative, which currently involves California and four Canadian provinces (British Columbia, Manitoba,

Ontario, and Quebec) would encourage private sector innovation while reducing emissions. {Target Actor: Municipal and Provincial Government}

b) Fold negative externalities into cost.

As well as guiding behavior through positive incentives, local governments and provinces can discourage emission-generating behavior by folding negative externalities into cost. An example of this phenomenon would be charging households for garbage bags past a certain limit, or instituting tiered water pricing in residential homes. While politically challenging, policies such as these can provide additional revenue for local government to pursue climate change mitigation objectives. On a federal level, the government could jump-start energy efficiency and renewable energy efforts by removing subsidies for fossil fuels and thus providing a more accurate picture of true costs. One successful example of this strategy is the carbon tax in British Columbia. Instituted in 2008, it prices carbon at $25/ton and has reduced emissions by 3 percent (Mitchelmore et al. 2011). If initiated on a national level, funds from a similarly structured carbon tax could be funneled into research and development of clean technology and alternative energies, as well as community based education and long-term land use planning projects. {Target Actor: Municipal and Provincial Government}

c) Develop a coherent nation framework around climate change.

The lack of national direction on climate change impedes municipal efforts at greenhouse gas reduction and private sector investment into potential solutions. Under the current business-as-usual scenario, Canada is not on target to meet the Copenhagen 2020 targets for greenhouse gas emissions (Mitchelmore et al. 2011). Pursuing a coherent national strategy to reduce emissions and guide provincial and municipal efforts on climate change mitigation will require restructuring the current national department framework. Currently, Environment Canada is designated as the lead agency on federal climate change efforts, but functional responsibility is spread out through various through departments including Natural Resources Canada, Transport, Infrastructure, and Communities, and Health Canada. To facilitate greater coordination between federal policy and municipal efforts at climate change mitigation, FCM has suggested the establishment of a joint FCM-Environment Canada task force. This body would facilitate the entry of municipalities into an emerging carbon market, and coordinate short, mid-range, and long-term strategies for municipal climate change mitigation (FCM 2007). This innovative organizational structure would also be useful outside of the Canadian context, where non-governmental body could link fractured policy directives with diverse municipal needs. {Target Actor: Municipal and Provincial Government}.

Table 2: Target actors for recommendations

Stakeholder	Recommendations
PCP	• Create a clear, actionable guide on what to include in the greenhouse gas inventory, and how to estimate emissions in cases where the data is not available • Develop an online tool to track emissions • Identify best practices in data accessibility • Scale up successful solutions through training programs and community knowledge sharing
Member Municipalities	• Coordinate inventories with benchmarks • Foster partnerships with universities and local organizations • Involve the community from the get-go • Partner with neighbors to leverage resources
Federal and Provincial Government	• Fund innovative long-term solutions • Fold negative externalities into cost • Develop a coherent nation framework around climate change

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Appendix

Municipal Questionnaire

PCP Member Phone Survey

Summer 2011

Section 1: Status

Question 1: Which of the following have you used or developed to address climate change in your municipality?

Instruction: select all that apply

Options:

- Greenhouse gas Inventory
- Reduction Targets
- energy plan / climate action plan
- Implementation Strategy
- Monitoring and Reporting strategy
- Communication and Outreach (such as web site, public education campaigns and materials, social media tools)
- Established regulations or bylaws
- Other *(please describe)*

Question 2: Please rate how useful each of the previous items you identified is in helping you achieve greenhouse gas reductions, on a scale of 1-3

Instruction: select one out of the following

- 1 = necessary
- 2=somewhat useful
- 3=not useful

Question 3: Are there plans to develop a greenhouse gas inventory?

Instruction: select one out of the following

- Yes
- No *(if so, explain why not)*
- Not Known

Question 4: If yes, then when is the inventory going to be developed?

Instruction: select one out of the following

- 0: Not known
- 1: Within one year
- 3: Within three years
- 5: Within five years

Question 5: What is/was the major barrier in developing your inventory?

Instructions: Pick the top two

- Funding
- HR to do the work
- Knowledge on how to proceed
- Data availability
- Lack of Sr. management commitment
- Not a priority
- Other (please describe)

Section 2: Measurement

Question 6: Focusing on municipal operations only, how available is energy consumption data in each of the following sectors?

Options:

- Buildings / Facilities
- Wastewater treatment
- Waste Management
- Street lighting
- Municipal Fleet/transport
- Land use
- Other

Instruction: select one out of the following

- 0: not applicable
- 1: easily available
- 2: difficult to collect

Question 7: Has your municipality taken any measures to reduce greenhouse gas emissions in the previous sectors in the last 3 years?

Instruction: Select one out of the following (have a few examples in each sector available as a prompt if required)

- 0: Not Applicable
- 1: Yes
- 2: No
- 3: Planned

Question 8: Are you tracking the monetary impact of your efforts to reduce greenhouse gas emissions in the following sectors? (Repeat sector list above)

Instructions: Select one out of the following. (Applies only to those options where you answered yes in the previous question)

- 1: Tracking investments
- 2: Tracking savings
- 3: Tracking both

- 4: Tracking neither

Section 3: Capacity Building

Question 9 (a): How supportive is council on issues of climate change and energy efficiency?

Instruction: select one out of the following

- 1=Not supportive
- 2=Somewhat supportive
- 3=neutral
- 4=supportive
- 5=very supportive

Question 9 (b): Does council have expectations for reporting on progress?

Instructions: specify Yes or No

Question 10 (a): Does your municipality have a staff member whose job description or duties include climate change and / or energy conservation?

Instructions: specify Yes or No. If yes, continue to question 10 (b)

Question 10 (b): what percentage of this person's time is dedicated to climate change/energy conservation work annually? What department are they in?

Instructions: Open Ended

Question 11: Has your municipality thought of partnering with another municipality to share resources to complete plans or projects related to climate change and energy efficiency?

Instruction: select one out of the following

- 1=yes
- 2=no
- 3=uncertain

Question 12: What would be of most help to your municipality in implementing projects for climate change action?

Instructions: select the top two out of the following options

Options:

- Political champion at council
- Regulatory changes (municipal provincial or Federal level)
- Financial support
- Human resources
- Training, knowledge sharing
- Other

Section 4: Strategy

Question 13: In which area do you see the most opportunity for your municipality to make headway on climate change efforts?

Instruction: Select the top two out of the following options

Options:

- Land Use and Sustainability Planning – help with updating municipal plans (Master Plan, Hazard Mitigation Plans, Conservation and Development, Transportation), and zoning
- Mobility and Transportation – alternative fuels and vehicles, reducing vehicle miles traveled, transit oriented development options, increasing alternative modes of transportation
- Energy: Efficiency and Conservation
- Energy: Alternative Renewable Energy Systems
- Waste Reduction/Management and Recycling and Waste Reduction – recycling programs, outreach and education on waste reduction, environmental purchasing
- Landfill Gas Capture programs
- Agriculture and farming
- Other

Question 14: Do you see overlap in your municipality between economic development and greenhouse gas reduction actions or potential? Please explain.

Instructions: Yes/No

Details: