LOCAL GOVERNMENT CLIMATE ACTION PLAN IMPLEMENTATION IN CALIFORNIA

A 2014 Master of Environmental Science and Management Thesis Group Project

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The Group Project is required of all students in the Master's of Environmental Science and Management (MESM) Program. It is a three-quarter activity in which small groups of students conduct focused interdisciplinary research on the scientific, management, and policy dimension of a specific environmental issue. This Final Group Project Report is authored by MESM students and has been reviewed and approved by:

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LIST OF ACRONYMS

AB 32 - Assembly Bill 32, the Global Warming Solutions Act

ACCO - Association of Climate Change Officers

CARB or ARB - California Air Resources Board

CAP - Climate Action Plan

CEQA - California Environmental Quality Act

EAP – Energy Action Plan

EECBG - Federal Energy Efficiency Conservation Block Grant

EPA – Environmental Protection Agency

ETAAC - Environmental Technical Assistance Advisory Committee

FTE - Full-Time Equivalent

GHG – Greenhouse Gas

GP - General Plan

ICLEI - International Council for Local Environmental Initiatives-Local Governments for Sustainability

ILG – California Institute for Local Government

JPAs - Joint Powers Authorities

MSA - Metropolitan Statistical Areas

NGO – Non-Governmental Organization

OPR - California Governor's Office of Planning and Research

PPIC - Public Policy Institute of California

SB 375 - Senate Bill 375

SB 97 - Senate Bill 97

SBCCOG - South Bay Cities Council of Governments

SEEC - Statewide Energy Efficiency Collaborative

SEI - Strategic Energy Innovations

VMT - Vehicle Miles Traveled

UNFCCC - United Nation Framework Convention on Climate Change

EXECUTIVE SUMMARY

Anthropogenic climate change is arguably one of the greatest challenges facing California, the nation, and the world today. Successful mitigation and adaptation to potential climate change is essential at the local, state and national levels. While leadership at the international and federal level has been weak, many cities and local jurisdictions have developed or are developing Climate Action Plans (CAPs) to attempt to address their contribution to greenhouse gas (GHG) emissions. The goals of CAPs are exemplary and are necessary as the state moves to confront climate change, however local governments face a myriad of challenges when developing and implementing these plans. There are many resources available to cities and counties on mitigation strategies and goals for CAP development, but there is a substantial gap in resources guiding jurisdictions on how to successfully implement CAPs. Our project aimed to fill this gap by identifying both successful implementation strategies and common barriers to implementation. In order to gather the data needed to identify the state of California CAPs and to develop recommendations, we conducted telephone based surveys with 40 cities that had adopted CAPs. Our survey asked city officials to characterize overall city implementation success and the degree to which certain factors contributed to success or resulted in barriers to successful implementation. We found that the most common barrier that cities faced was lack of funding and staff to carry out implementation. Following our analysis of the overall status of California CAPs, including our survey results, we developed a set of recommendations for local governments implementing CAPs in California. Our recommendations are for cities to focus on three actions: create opportunities for regulatory efficiencies by integrating the CAP into the General Plan, collaborate regionally, and emphasize co-benefits of CAPs. As every city and region in California is different, our recommendations provide a framework for local jurisdictions to identify the broad actions that could inform more specific regional or local action.

OBJECTIVES

The main objective of this project was to conduct research including a meta-analysis of completed community Climate Action Plans (CAPs) in California to determine the following: the status of CAP implementation and monitoring across the entire state, significant barriers to implementation and monitoring, and success stories from jurisdictions that have begun implementation and monitoring. The second objective of this project was to develop a set of recommendations for local jurisdictions that currently have or are still developing CAPs to enhance effective implementation and monitoring of CAPs that aim to meet California's Assembly Bill 32 (AB 32) targets.

PROJECT SIGNIFICANCE

Throughout most of the last decade, climate planning at the national and international level has been slow and often fruitless (Wheeler, 2009). Attempts at federal legislation have failed. The Waxman-Markey bill that passed the House in 2010 was the closest the federal government has come to any comprehensive climate change policy. Global agreements such as the Kyoto Protocol and Copenhagen Accords, international agreements that set "binding" GHG targets have been largely unsuccessful at curbing member country emissions (United Nation Framework Convention on Climate Change, 2014). In the United States, the current goal is to reduce emissions by 17% below 2005 levels by 2020 (UNFCCC, 2010). However, the real actions taken to reduce GHGs have not been global in scope. Instead, most concrete actions have been local efforts lead by local institutions, communities, or individuals (Lindseth, 2004). In response to federal inaction, states, regions, and local governments have taken the lead in climate planning to go beyond the policies of the federal government (Wheeler, 2009).

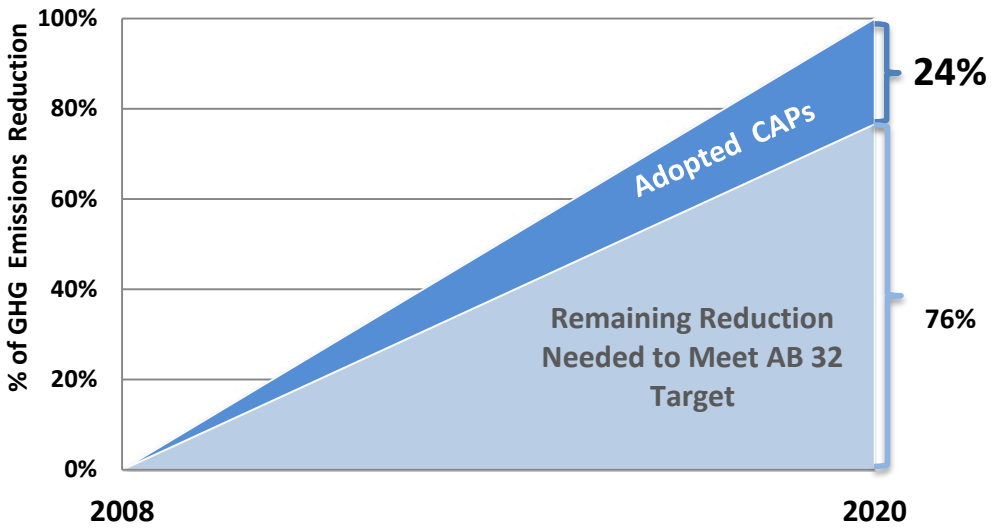

Figure 1. CAP GHG Reduction Potential in California

Policy drivers such as California Assembly Bill 32 (AB 32), as well as the California Environmental Quality Act (CEQA) and Senate Bill 375 (SB 375) encourage local jurisdictions to develop CAPs to mitigate GHG emissions. AB 32 set statewide goals that cannot be achieved without participation from local jurisdictions, however such participation is

voluntary. Implementation of CAPs at the local level has the potential to achieve significant GHG reductions. The wedge graph shows that local governments could reduce 24% of the needed reductions in California to meet state targets.

AB 32 allows the California Air Resources Board (CARB) to set regulations for any GHG emissions in California that could impede the state's ability to meet GHG reduction targets set by AB 32. As a result, city and county operations could be considered sources subject to regulation in the absence of sufficient mitigation action. The AB 32 Scoping Plan, adopted by CARB in 2008, encourages local governments to commit to a 15% GHG emissions reduction goal by 2020. CAPs are the recommended method for cities to integrate GHG emission reduction goals into community and municipal planning efforts. Therefore, evaluating CAP implementation successes and important barriers to success, can lead to a better understanding of how local jurisdictions are attempting to meet state emissions targets, and what can be done to further their efforts. Success at the local level in California can support action at the federal level.

The client for this project is DNV GL. DNV GL will share the results of this study with clients in local jurisdictions that are currently implementing, or are planning to implement CAPs. Consequently, the primary audience for our recommendations will be local jurisdictions including city, county, and regional governments.

PROJECT BACKGROUND

a) Climate Action Plan Overview

CAPs aim to reduce GHG emissions from municipal, commercial and residential sectors with specific measures focused on transportation, energy and buildings, waste management, land use, and water conservation (Millard-Ball, 2010). Until more recently, most CAPs focused on municipal operations. Now, cities are more frequently developing community CAPs that focus on reducing GHG emissions from the community. CAPs rely on well-known land use and transportation solutions to climate change such as enhanced transit, compact community design, and green building codes, to be implemented by local government and the broader community.

Cities conduct municipal and/or community GHG emission inventories to establish a baseline to track GHG reduction accomplishments and a city's progress towards meeting the established reduction goal. CAP strategies to meet reduction goals include specific policy recommendations that a locality will use to address climate change and reduce its GHG emissions (EPA, 2013). The common approach of many local governments in California to meet GHG reduction goals in climate policy is to employ "backcasting", where organizations set a goal and work backwards from there, developing the appropriate policy to reach the goal and benchmarking along the way to check whether goals are being met (Wheeler, 2009).

Early CAPs lack strong actions and commitments from political institutions to mitigate or adapt to climate change. Newer plans are more detailed with concrete goals, clear objectives, and well-reasoned methods, and some incorporate adaptation strategies that outline how the city will address heat waves or sea level rise (Bassett, 2010). CAPs usually include a combination of short, mid, and long term time horizons for the implementation of reduction measures. Many CAPs include information on the science of climate change to further illustrate the purpose and importance of CAPs, including the expected impacts of climate change on public health, temperature, precipitation, and sea level. CAPs also include information on expected reductions in GHG levels based on the recommended policy actions, the economic costs of policy action, and potential funding sources for climate-related government expenditures (Drummond, 2010).

Success in meeting CAP goals is difficult to measure, particularly in the absence of clear CAP best practices that would set benchmarks and guidance for success. The lack of best practices stems partially from the fact that many U.S. cities' CAPs have been adopted

rather recently (within the last five years). Consequently, there have been relatively few comprehensive evaluations of their contents (Archer Dolan, Borg Soule, Greaney, Morris, 2010). Also, the degree of city employee involvement in implementing CAPs varies from city to city. Some cities hire fellows or consultants to take control of program management (Millard-Ball, 2010), but in other cities planners are involved in the CAP process to ensure that the city is carrying out the goals of the CAP.

Cities have also developed Energy Action Plans (EAPs) or Sustainability Plans to reduce their emissions. The EAP often focuses on reducing energy consumption and increasing renewable energy production within City operations and the community. EAPs establish a net energy consumption reduction target and outline programs to meet the target goal. EAPs can also build upon existing programs. In addition to focusing on electricity efficiency and conservation, an EAP will also include strategies related to natural gas (City of Oxnard, 2013). Other goals of EAPs are to make the community more sustainable and reduce energy consumption and greenhouse gas emissions (City of Newport, 2013). AB 32 highlighted the connection between reducing the city's energy consumption and GHG emissions and making the community more sustainable and lessening the impact of carbon emissions on global climate change (City of Newport, 2013). A Sustainability Plan is structured like a CAP and addresses multiple sectors. It often defines a long term vision of sustainability and outlines steps to achieve the goals and serves as a guide for future work (UC Berkeley, 2014).

There are many resources available to support CAP development and implementation. The California Institute for Local Government (ILG) provides resources for local governments to interpret the requirements of state climate change laws for their communities, as well as a guide to reduce greenhouse gas emissions (Institute for Local Government, n.d.). Also, the Statewide Energy Efficiency Collaborative (SEEC) has published resources to support local communities as they develop CAPs and GHG reduction strategies through reduced energy usage (SEEC, 2010). The International Council for Local Environmental Initiatives-Local Governments for Sustainability (ICLEI) have produced a Local Government Operations Protocol, which provides a standard GHG emissions inventory methodology for municipal operations (ICLEI, 2014). The Environmental Protection Agency (EPA) offers national guidance for local governments interested in designing and implementing CAPs (EPA, 2013). The EPA recommends that CAPs include the following: regional and local vulnerabilities, baseline greenhouse gas emissions inventory, goals and

targets for greenhouse gas emissions reductions, identification and selection criteria for mitigation options, estimated mitigation action results, and strategies for implementation. The implementation options EPA identifies include regulatory policies and voluntary programs. According to the EPA, key steps for implementation programs include: defining program goals and scale; identifying rollout, delivery, and result reporting time frames; defining baselines and data collection plan definition; setting budgets in line with broader goals; and identifying evaluation and reporting approaches (EPA, 2013).

b) Legislative Landscape in California

In order to understand the main drivers of CAPs, it is essential to explore the legislative landscape in California. California has passed noteworthy legislation to encourage and effect significant reductions in state greenhouse gas emissions that contribute to climate change. Key legislation has also led to local governments' development and implementation of CAPs. Many states and cities have not developed or implemented the scope of programs needed to reduce GHG emissions (Wheeler, 2009). More legislative approval is needed for many proposed actions that will be politically difficult to obtain (Wheeler, 2009). There needs to be sustained, ongoing planning to address climate change in the long run (Wheeler, 2009). Important legislation supportive of local governments' CAPs includes the Global Warming Solutions Act of 2006, the Sustainable Communities and Climate Protection Act of 2008, the California Environmental Quality Act (CEQA), and CEQA Amendments.

i. Assembly Bill 32: Global Warming Solutions Act of 2006

In 2005, Governor Schwarzeneggar signed an Executive Order (EO S-3-05) that set a goal of emissions reductions in California to 1990 levels by 2020 and 80% below 1990 levels by 2050. As a result, a Climate Action Team was assembled and then developed the framework for the Global Warming Solutions Act (AB 32), adopted by the legislature and signed into law in 2006. The law set a state greenhouse gas emissions reduction goal of 1990 levels by the year 2020. CARB, as the promulgating agency, was required to establish regulations to meet these reduction targets. The resulting Scoping Plan adopted by CARB in 2008 outlines strategies to reduce GHG emissions throughout California in technologically feasible and cost-effective ways, including mandatory GHG emissions reporting; regulations targeting specific emissions sources such as landfills, motor vehicle fuels, and port operations; and cap-

and-trade regulations. Such sweeping state-level programs have played a role in achieving GHG reductions at the local level. When asked about how many measures are independent of state mandates, one city responded, "Of 40, 35 are independent. The 5 actions dependent on state were identified as significant. Assigned reduction emission targets on standalone basis; and expect not every action will be implemented. 2 actions collaborating with the state with the clean fuel standards and improve fuel economy, which could achieve 50% of reductions. 30% are reduction target on state "

The AB 32 Scoping Plan is comparable to the "wedges" GHG reduction approach developed by Steven Pacala and Robert Socolow in 2004, which identified numerous strategies to reduce global GHG emissions globally by the necessary amount (Wheeler, 2009). The Scoping Plan does not address several elements important to local governments such as land use, population growth, and motor vehicle use. The omission of these elements in the Scoping Plan highlights the importance of local CAPs in addressing these topics. In addition, land use factors such as the density of communities and balance of land use affect levels of driving and emissions (Ewing et al, 2007) (Wheeler, 2009). Population, a politically sensitive topic, is not discussed to a meaningful level in the Scoping Plan, even though the state is expected to grow (Wheeler, 2009). The Scoping Plan does not aim to reduce motor vehicle use, even though a previous report conducted by CARB's Environmental Technical Assistance Advisory Committee (ETAAC) found that reaching significant reductions in Vehicle Miles Traveled (VMT) is critical to meeting AB 32 GHG emission reduction goals (Wheeler, 2009).

Through the AB 32 Scoping Plan, CARB recommended community emissions reduction targets for local governments of 15% below 2005 to 2008 levels by 2020 in an effort to align local targets with the state target (Scoping Plan, 2008). But because these state-level policies and guidelines do not specifically instruct local jurisdictions on how to successfully implement and monitor GHG reduction strategies, the local government must rely on other information sources to develop effective GHG mitigation measures. In response to the lack of specific instructions, one city commented that there is a "Unique plan menu of items to apply to the city, but statewide rules would be helpful to make everything equal and not have to reinvent the wheel...a statewide climate action plan that everyone did equally would be fair".

Even though there is not a standard plan for each locality, local governments are in a unique position to tackle greenhouse gas emissions associated with building energy use through the enforcement of state building codes for new and remodeled buildings (UCLA Luskin Center, 2014). Local governments have significant authority over land use planning, building codes, transportation systems, recycling, water systems and other areas of activity important to reducing GHG emissions, which gives them an important role in advancing climate-related policy (Wheeler, 2009).

Additionally, according to CARB, while the Scoping Plan encouraged localities to adopt GHG emission reduction goals, many governments had already begun climate efforts through other venues.

- 27% of California's cities (50% of the state population) signed the U.S. Conference of Mayors Climate Protection Agreement
- By September 2013, 76 local governments had joined the International Council for Local Environmental Initiatives' Climate Protection Campaign (57% of the state population)

  (Scoping Plan, 2008, p. 124)

ii. Senate Bill 375: Sustainable Communities and Climate Protection Act of 2008

Senate Bill 375 for the Sustainable Communities and Climate Protection Act of 2008 requires metropolitan planning organizations (local governments) to develop a sustainable community strategy and to plan transportation policies in accordance with the requirements of AB 32. SB 375 states that the "largest contributor to GHG emissions is the transportation sector. Local governments can help reduce transportation-related GHG emissions through integrated land-use, housing and transportation planning" (Air Resources Board, 2014). Additionally, if regions do develop this integrated land-use, and both housing and transportation plans meet SB 375 targets, then CARB can relieve these projects of certain CEQA requirements (Air Resources Board, 2014).

iii. California Environmental Quality Act (CEQA)

CEQA, which originally passed in 1970, was amended to address greenhouse gas emissions. Currently CEQA requires local governments to avoid approving projects leading to significant greenhouse gas emissions unless mitigation measures can be

taken or lower-emissions alternatives are available. In response to this legislation, local governments have developed CAPs to guide in the development and implementation of policies and actions that address the threats of climate change. CAPs are considered a "project" subject to compliance with CEQA because they are activities and sub-projects undertaken by a public agency that are subject to discretionary approval and may cause direct or indirect effects on the environment.

iv. CEQA Amendments: Senate Bill 97

Senate Bill (SB 97), passed in 2007, led to amendments of the CEQA Guidelines with direction on how GHG emissions should be analyzed. Importantly, the amendments clarified how agencies can streamline project-level GHG emissions analysis through a GHG reduction plan that meets specified CEQA criteria subject to § 15183.5(b). In this case, a GHG reduction plan can be used in a cumulative impacts analysis under CEQA, and a project consistent with the plan may be deemed to have cumulative impacts that are less than significant due to plan consistency per § 15064(h)(3) (CNRA, 2009).

In order for a GHG reduction plan (or CAP) to be relied upon in a cumulative impact analysis, the plan must a) be legally binding through legal specification or approval by a public agency with appropriate jurisdictional purview, b) have been previously approved, and c) specify requirements for mitigation or reduction of the cumulative GHG emissions problem within its defined geographical jurisdiction (CNRA, 2009). Plans must have enforceable goals with mandatory reduction measures to ensure that jurisdictional emissions will address the cumulative problem. Also, the plan must address the cumulative effect of concern for a given project for that project's GHG impacts to be considered less than significant cumulative impacts.

c) California CAPs

CAPs in California are highly variable and in order to get a sense of implementation, it is important to explore the general status of CAPs throughout the state. The Governor's Office of Planning and Research (OPR) published 2012 Annual Survey results indicating the status of CAPs, general plan policy and implementation, greenhouse gas plans, and sustainability plans of California jurisdictions (California Governor's Office for Planning and Research,

2012). Of the jurisdictions surveyed, 62% indicated that they had adopted or are the process of developing policies or plans to mitigate climate change and/or greenhouse gas emissions. More specifically 20% of all jurisdictions surveyed indicated they had adopted an actual CAP (OPR, 2012). The survey source ultimately identified 88 cities with adopted CAPs. We decided to contact the entire population to request participation in our survey.

As we began contacting cities, we discovered that our initial list was not accurate. The OPR document listed CAPs that were adopted for municipal and/or community applications, as well as other city planning documents that included energy or climate measures but were not as comprehensive as a typical CAP. In many cases, the CAP was actually a component of the general plan, was an Energy Action Plan, or some cities had not fully adopted or approved their CAP document an only had a draft CAP. Energy Action Plans were not relevant to our analysis, because the comparison is unequal where on average a CAP has measures from 5 different sectors to implement, an Energy Action Plan has one sector, energy. The OPR list was a helpful starting point for capturing the status of California CAPs, but through further research we found it was not completely accurate and did not capture CAPs adopted after the summer of 2012.

For the purposes of our research, we established an adoption cut off of June 2013 for CAPs to include in our analysis. In addition to the cut-off date, we also determined that city CAPs in our population must include a GHG reduction target with a baseline and target year for community emissions. Without these components, a city's responses regarding political or community influences may not be comparable to those of a city with the appropriate GHG targets. Without targets the GHG measures could be justified through waste management or energy efficiency, which are less politically sensitive reasons in some cases than climate change mitigation. Ultimately, 72 CAPs were identified through research to meet this criterion.

The Public Policy Institute of California (PPIC) conducted a survey of local governments in California, which sought to document the climate-related policies and programs that local governments have adopted or are considering, to solicit information about successful actions, as well as barriers to adoption, and to gauge the support that local governments may need to implement local actions. Completed surveys were received from respondents in 280 cities and 30 counties, for a 58 %overall response rate (Hanak, 2008). In addition, 75% of local governments indicate that they have some general activity underway on climate change issues. Of the 300 city sample size, 7% said their city/county developed a

CAP, 45% had not yet developed a CAP, but plan to, 45% have not developed a CAP, and 2% don't know (Hanak, 2008). In addition, the survey found that larger jurisdictions tend to be more active in climate-related activities and stand out in particular for renewable energy, energy efficiency, green building, land use and waste reduction, and carbon emissions offsets (Hanak, 2008). Another survey report published in November 2013 and conducted by DNV GL found that almost 80% of the local government survey respondents indicated they had developed a baseline GHG inventory or developed and updated their GHG inventory (DNV Kema, 2013). Thirty-four percent of the respondents indicated they had adopted or had begun implementing their CAP (DNV Kema, 2013).

d) Identifying Barriers to CAP Implementation

Adopting a CAP is a significant milestone in the process of addressing climate change, but successful implementation and monitoring of those plans is also a major challenge. Several studies have explored the difficulties faced by governments and organizations during implementation of climate change mitigation or adaptation strategies. While our project focused on climate mitigation strategies contained in CAPs, the local government implementation processes for mitigation and adaptation measures are similar because both types of measures fall within the same CAP and are managed by the same government departments. The challenges identified by these sources provided a basis for our project's hypotheses about barriers that may also be encountered by local governments in California during CAP implementation.

An article published in the Proceedings of the National Academy of Sciences (PNAS) in 2010 examined barriers to climate change adaptation (Moser & Ekstrom, 2010). The report provided a framework for identifying important barriers for local government officials to anticipate and plan for sufficiently in order to overcome the barriers. Regarding implementation, the authors identified a number of common barriers including issues relating to resource availability, accountability, scope definition, and feasibility (Moser & Ekstrom, 2010). Cities have also identified challenges with technological, economic, and human capital resources. The authors concluded that a prescriptive "one-size-fits-all" approach to conquering barriers will not be as effective as a diagnostic framework similar to the one laid out in the article that local governments can systematically use to make decisions (Moser & Ekstrom, 2010). A diagnostic framework is intended to assist local governments in identifying and addressing CAP implementation barriers through a

systematic process that can be adapted to the unique characteristics of local government structures and processes.

The authors of the PNAS article also addressed barriers for monitoring implementation outcomes and environmental impacts. A key issue is the need for a monitoring plan (Moser & Ekstrom, 2010). Millard and Ball supported this finding, indicating the need for more quantification and analysis to ensure goals are monitored and city officials are informed of whether they are successfully meeting targets (Millard-Ball, 2010). Additionally, many actions outlined to address GHG reductions are voluntary and few resources have been allocated, which can further impede implementation goals (Millard-Ball, 2010).

The Association of Climate Change Offices (ACCO) conducted a survey in 2011 of organizations in the U.S. and abroad across a variety of sectors (private, government, NGO, academic) of climate adaptation practices, including an assessment of implementation barriers faced by the organizations (Cote, 2011). ACCO identified lack of staff training and financial resources as barriers to implementation, which appears to be a common theme. Additionally, lack of leadership support, inadequate access to high-quality tools, lack of quality in simplified climate models, and uncertain return on investment were other sources of implementation difficulty (Cote, 2011). In reporting the results of the survey, ACCO stated that the climate change adaptation decision makers in organizations need access to best management practices and tools. Another study specifically noted that many cities were expecting to realize GHG reductions as a result of actions taken by higher levels of government, such as the state-level renewable portfolio standard or an increase in federal fuel economy standards (Bailey, 2007). Consequently, cities were not investing significant amounts of their own money to reduce GHG emissions.

PROJECT APPROACH

Due to the lack of research to date on CAP implementation in California, this project sought to answer the following remaining research questions to fulfill the objectives of this project: 1) how successful has CAP implementation by California cities been to date, 2) what implementation barriers and successes have these specific cities experienced, and 3) is there a relationship between CAP characteristics or implementation barriers and implementation progress? To answer these questions, we used two primary data sources. The first source consisted of publicly available data on city and CAP characteristics obtained from online resources, (such as city population and CAP page length). The second source consisted of data that was not publicly available and collected through a survey that we designed and administered, in which city staff provided quantitative and qualitative feedback on CAP implementation progress, barriers, and successes. In the following sections, we address how we approached answering the research questions identified above using our data sources, provide an overview of the publicly available data collected, describe how we designed our survey tool to answer the research questions, provide an overview of the survey data collected and our findings on barriers and successes, and discuss our findings for correlations between city and CAP characteristics, barriers, and implementation progress.

a) Research Question Approach

To answer the first research question regarding how successful CAP implementation by California cities has been to date, we defined implementation success using three different success metrics included in our survey. Because the primary purpose of community CAPs is to provide strategies for reducing a specific quantity of GHG emissions from the community by a given date (and to address adaptation which is outside of this project's scope), one measure of implementation success is the quantity of carbon dioxide equivalent that has been abated by CAP measures to date as a percentage of the total CAP goal. Cities were asked to estimate this quantity in the survey. This metric, however, does capture the whole picture of success because most measures achieve greenhouse gas reductions incrementally over time through public participation (as in the case of voluntary energy efficiency product rebates, vehicle fuel transitions, and staggered public transit solutions), and the incremental reductions are not temporally linear. All of the cities that responded to the survey are still working towards their GHG target year and most did not establish clear interim GHG emissions milestones to which actual progress could be compared, which brings up issues of

monitoring and reporting on implementation progress that were also addressed in our survey. Additionally, very few cities could provide a number or percentage for this metric in the first place.

A second metric of success evaluated in our survey was the percentage of CAP measures that have been fully implemented by each city to date. By measuring a percentage of fully implemented measures, we could compare the implementation progress between CAPs with different numbers of total measures. Enough cities were able to provide an estimate of this percentage to enable us to perform statistical analyses to evaluate relationships between implementation progress and city and CAP characteristics, barriers, and successes. A third way we measured success in our survey was by asking cities directly to what degree they feel CAP implementation has been successful in their city, resulting in responses that are subject to bias and perception but still useful for comparison with other success indicators.

Based on these metrics of implementation success, and the fact that all cities are still working towards their CAP GHG reduction target date, there is no absolute definition of what amount of GHG emissions abated or what percentage of measures fully implemented constitutes total success or lack of success; rather, success is relative based on CAP and city characteristics, unique barriers encountered, time between baseline, adoption, and target years, aggressiveness of the GHG goal, quality of the CAP, and other factors. While fully implementing 100% of CAP measures is a piece of implementation success, it does not reflect the amount of GHG reductions achieved at any point in time given the variability of public participation and behavior. Failing to fully implement any measures does not indicate complete lack of success, because the city may have partially implemented a significant portion of measures that could be garnering some GHG reductions. The concept of implementation success as a relative measure led us to consider factors influencing implementation "progress" in our third research question instead of factors influencing absolute success.

The second research question regarding what CAP implementation barriers and successes California cities have experienced was answered through our survey tool. We identified several factors that could be barriers to implementation or contributors to implementation success depending on a city's experience. These factors were identified through conversations and informal interviews with local city representatives involved with their city's CAP implementation, as well as through our literature review which revealed

some general barriers to CAP implementation in the U.S. The survey design is discussed in more detail in the next section.

The third research question about whether or not a relationship exists between city characteristics or implementation barriers and implementation progress was addressed through a statistical correlation analysis between CAP and city characteristics and implementation progress, as well as between individual barriers and implementation progress. Data for the CAP and city characteristics came from publicly available data while the remaining data came from survey results. For our analysis, implementation progress was defined as the percentage of CAP measures fully implemented, one of the implementation success metrics evaluated in the survey. We did not have enough data to use the other implementation success metric, quantity of GHG emissions abated as a percentage of the GHG goal, to perform a meaningful statistical analysis. We chose not to use perceived success in our statistical analysis due to response bias and subjectivity.

CITY AND CAP CHARACTERISTICS

We compiled a matrix of information for all adopted CAPs consisting of city characteristics and CAP characteristics collected from publicly available online resources. The catalog of characteristics for each CAP built a framework for our statistical and qualitative analysis of CAP implementation, intended to assist with answering our third research question about correlations between city and CAP characteristics and implementation progress. CAP characteristics included in the matrix were age of CAP, city population size, average and medium income, number of pages in the CAP, political demographics, metropolitan area, county, and GHG reduction target as it compared to the goal set out by AB 32. The matrix directly informed our deliverable, the "Status of Climate Action Planning in California." The matrix also supported a GIS analysis to visually depict CAPs in California.

a) Population of Adopted CAPs

The catalog of CAP adoption dates allowed us to graphically represent the number of CAPs adopted in a particular year from 2000 to 2013. Figure 1 shows the majority of CAPs being adopted after 2008. The median CAP adoption date was November 2010, which is relatively recent in terms of allowing enough time for policy implementation.

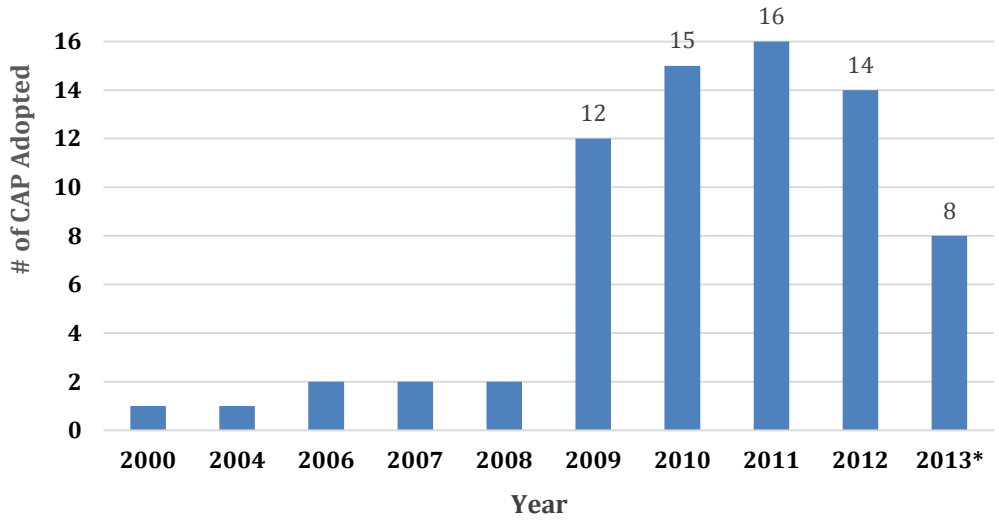

Figure 2. Number of CAPs Adopted by Year

Compared to the state average, cities with adopted CAPs in California tend to have slightly larger populations and a majority of democratic voters based on statistical tests for differences. There was not statistically significant difference in income levels. What we observed from voter demographics proved our assumption that cities with higher democratic support have better performance on CAP.

Table 1. Survey Population Demography Compared to the State of California

Characteristic	Cities Adopted CAP Average (67 cities)	California State Average	Statistically Significant Difference?	Statistical Significance (P-value*)
Population (2010)	158,838	157,844	Yes	0.024
Average Individual Income (2011)	$32,822	$29,600	No	0.57
Median Household Income (2011)	$64,026	$64,076	No	0.86
% of Democratic (2013)	51.20%	43.90%	Yes	< 2.2E-16
% of Republican (2013)	19.70%	28.90%	Yes	< 2.2E-16

*P-values are reported for Student's t-test performed to evaluate whether or not the difference in the CAP population value and California average value were statistically significant. P-values greater than 0.05 indicate a lack of a statistical significance difference in compared values, while p-values less than 0.05 indicate statistically significance difference for a 95% confidence level.

b) Survey Sample

We received survey data from 40 (out of 67) different cities with CAPs that met our criteria for evaluation, which comprised about 59% of the population. The average CAP adoption date of our sample is similar as the population. There is not a statistically significant difference in these values, and they are only one month different.

Table 2. CAP Adoption Year

	Sample (40 CAPs)	Population (67 CAPs)	Statistically Significant Difference?	Statistical Significance (P-value*)
Average CAP Adoption Year	June 2010	July 2010	No	0.93

*P-values are reported for Student's t-test performed to evaluate whether or not the difference in the CAP population value and California average value were statistically significant. P-values greater than 0.05 indicate a lack of a statistical significance difference in compared values, while p-values less than 0.05 indicate statistically significance difference for a 95% confidence level.

The level of detail, comprehensiveness and ambition of a CAP can be reflected in its total page number. The total page number of CAPs varies from 20 to 278 pages, with an average document size of 119 pages for all adopted CAPs. One city reported that a lot of CAPs are high level and lack specificity in reduction measures and have few tangible actions. The cities that responded to our survey have a higher average document size than the population. This implies that the cities who voluntarily participated in our survey have more ambitious, detailed CAPs. If such variables are potential indicators of staff resources, time or motivation, it is possible that our participant cities are more active or resource-rich with regards to CAP implementation.

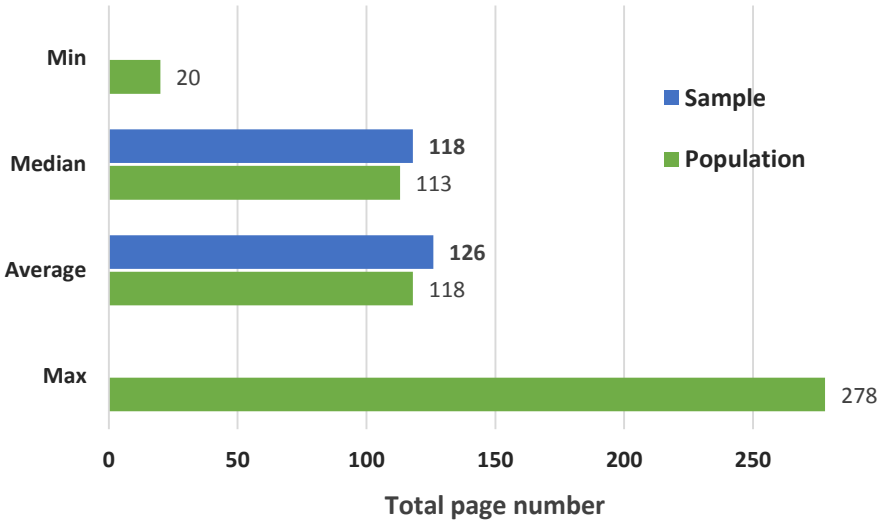

Figure 3. Document Length of CAPs

Among the cities that set specific GHG emissions reduction targets, most refer to AB 32 guidelines and set their target at a 15% reduction from a baseline year, which is usually 2005 to 2008 and to be achieved by 2020. CARB has indicated that this target is equal to achieving the over AB 32 goal of reaching 1990 emissions levels by 2020 (Scoping Plan, 2008). This goal is equivalent to cutting approximately 30% of emissions from business-as-usual projections by 2020 (Scoping Plan, 2008). To explore the ambitiousness of CAPs compared to CARB guidance, we coded every CAP in our population as reaching for a "greater", "equal to" or "weaker" target compared to AB 32. Our results show that 95% of CAPs have equal or greater reduction goals than AB 32. This is likely because AB 32 is the most important policy trigger for cities to adopt CAPs. Our results also show that the pattern of emission reduction goals in our sample is similar to the population of CAPs.

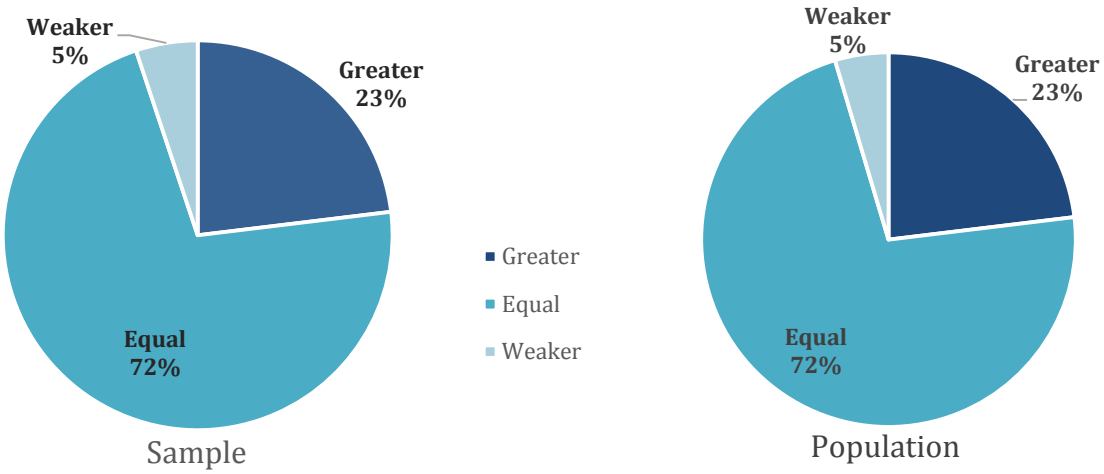

Figure 4. CAPs GHG Reduction Targets Compared to AB 32 Target

Certain city characteristics of respondents, such as average individual income, median household income, percent of democratic voters, and percent of republican voters, were close to the population's statistics. There was no statistically significant difference in average population sizes between the sample and the population of cities with CAPs. There was a statistically significant difference between the average income, median income, and percentages of democrats and republicans. However, the difference is not particularly large. The sample average and median incomes were slightly lower than the population, and there were slightly higher percentages of republicans and democrats. Still, this project did not

seek to make predictions about implementation success based on these factors. Rather, we explored potential relationships between these characteristics and implementation progress, and the while the nature of the relationship may be slightly different between the sample and the population, it is important to recognize significant relationships within the sample for consideration of cities in the population that have adopted CAPs. Furthermore, lessons learned for successful CAP implementation can also be of benefit to all cities in California.

Table 3. Comparison of City Characteristics between Survey Sample and Population of Cities with Adopted CAPs

Characteristic	Sample (40 Cities)	Population (67 Cities)	Statistically Significant Difference?	Statistical Significance (P-value*)
Population (2010)	177,832	158,838	No	0.87
Average Individual Income (2011)	$31,237	$32,822	No	0.94
Median Household Income (2011)	$61,396	$64,026	No	0.67
% of Democratic (2013)	51.30%	51.10%	No	0.80
% of Republican (2013)	20.60%	19.60%	No	0.66

*P-values are reported for Student's t-test performed to evaluate whether or not the difference in the CAP population value and California average value were statistically significant. P-values greater than 0.05 indicate a lack of a statistical significance difference in compared values, while p-values less than 0.05 indicate statistically significance difference for a 95% confidence level.

We also looked at the geographic region of our sample and summed the number of survey respondents for major metropolitan statistical areas (MSAs) in California. These results demonstrate that certain metropolitan regions are leaders in the CAP development process. For MSAs with few adopted CAPs, we grouped them into an "Other" region in the following table. Although there are a limited number of sources that explore CAP geographic distribution throughout California, we were able to collect information through our survey and interviews in different metropolitan regions. While our respondents may not be entirely representative of California regions as a whole, the lessons learned from cities implementing CAPs within our sample are relevant to all cities in California to varying degrees. The San Jose-San Francisco-Oakland Combined Statistical Area has the highest number of cities with

adopted CAPs and the highest number of interview participants, which is shown in Table 4. The San Francisco Bay Area has made substantial regional and local efforts to tackle climate change (Hanek, et. al, 2008), therefore our results demonstrate CAP leadership in this region.

Table 4. Number of Survey Responses by Region (Metropolitan Statistical Area in California)

Metropolitan Statistical Area	**Number of Adopted CAPs**	**Number of Responses**
San Jose-San Francisco-Oakland, CA CSA	38	25
Los Angeles-Long Beach-Riverside, CA CSA	17	9
Other	12	6
Total	67	40

SURVEY DESIGN

We developed a custom survey that would fill the gap in the information available on the current status of CAPs in California that is not publicly available. The survey designed was informed by informal interviews with local governments who have begun implementing CAPs or were in the process of developing their CAP. We contacted government staff from local cities (Goleta, Santa Barbara) and larger cities with expansive CAPs (Santa Monica, Berkeley). We gathered several names and contacts for these cities through our client DNV GL. In order to develop recommendations for CAP implementation that will be current and relevant, we needed information directly from the city staff who are working on the ground, attempting to wrangle CAP implementation. For our purpose, a survey, including interviews, with a focus on California's CAP implementation was the best way to gain information on the current status of implementation and feedback from government staff on perceived successes and barriers.

After speaking with these cities and conducting a literature review, we developed a series of hypotheses regarding factors that influence CAP implementation success. We hypothesized that the following factors influenced CAP implementation success:

Table 5. Hypothesized Factors Influencing CAP Success

Hypothesis	Justification
Funding	Literature review
Staff training	Literature review
Elected city official engagement	Literature review
Community participation	Informal Interviews
Community understanding of climate science	Informal Interviews
Environmental NGO participation	Informal Interviews
Local business participation	Informal Interviews
Access to data	Informal Interviews
Monitoring	Informal Interviews
Reporting	Informal Interviews

Voter demographics/city politics	Literature review
Diffusion of regional politics	Literature review
Extreme events linked to climate change	Literature review
Public workshops	Informal Interviews
City task force or committee	Informal Interviews
Collaboration of city government agencies	Informal Interviews
Staff time devoted to CAP implementation	Informal Interviews

For many of these factors, we hypothesized that their presence or absence would lead to either a positive or negative influence, respectively, on CAP implementation.

Regarding voter demographics and politics, we found many sources cite political opposition as an important barrier to CAP processes. In particular, the Republican Party and business allies are skeptical of climate change and frequently act to block policies that add regulatory requirements and tax increases. As a result, enacting new climate policies is a challenge and prevents essential allocation of funding at the legislative level, even if climate policies are officially adopted (Wheeler, 2009). One source emphasizes that "agencies should recognize that climate action planning is an ongoing process of adjustment between the demands of an ever-shifting political landscape and the constraints and opportunities presented by an organization's resources and strategic objectives" (APTA 2011, p.24). Additionally, both political support and an engaged community were found to be two important components to the CAP process, including implementation (Basset, 2010). Therefore, we hypothesized that cities with a Democratic majority would have more successful CAP implementation.

We also hypothesized that diffusion of policy adoption around a major metropolitan city would influence CAP implementation. Studies from other policy areas indicate that learning, competition, imitation and other mechanisms can lead to an increased likelihood of policy adoption within a region (Shipan, 2008). Smaller cities, in particular are more likely to engage in imitation, rather than more comprehensive policy formation (Shipan, 2008).

Finally, a study performed in December 2012, demonstrates that increasing numbers of Americans are connecting climate change to extreme weather events. The report, emphasizes the following results:

- 74% of Americans say that "global warming is affecting weather in the United States, an increase of 5 points since March 2012
- Half of American recall unusual weather events in their local areas over the past year
- Americans increasingly say weather in the U.S. has been getting worse over the past several years

Although this national survey shows that a growing number of Americans are connecting climate change to extreme weather, very little is known about local or regional perceptions of climate change affecting local communities (Yale School of Forestry & Environmental Studies, 2014). To explore this further, we hypothesized that if an extreme event, potentially linked to climate change, had occurred in a city, it would influence CAP implementation success. We included this question with the caveat that if an extreme event linked to climate change had not occurred, we would not collect data on that city.

Based on our hypotheses, we developed a formal survey of local governments. The survey was implemented to support telephone-based interviews with a combination of open-ended and closed-ended questions. Compared to a web-based survey instrument, a telephone-based interview is advantageous because it provides assurance that instructions are followed and questions are well-understood (Fricker et al, 2005). Compared to in-person interviews, telephone based interviews also provide anonymity for the respondent and less time commitment and investment from busy city officials.

In addition to survey questions about significant barriers to implementation, monitoring and reporting, community and city politics, stakeholder involvement, funding, and internal organization, we asked the respondents to comment directly on CAP implementation success overall. These questions stemmed from our approach to answering our overarching research question about how successful CAP implementation has been in California. Our sequence of questions began with a broad question regarding implementation success and proceeding through the categories listed above. The overall survey asked respondents specific questions within the following themes:

- Has CAP implementation been successful in the city?
- What monitoring has already occurred and has it been successful?
- What % of measure implementation has occurred in the city?
- What are the significant barriers to implementation and monitoring?
- What are significant factors contributing to success?

Within each category we used a Likert scale to allow for variation in response. Likert scale questions allow the respondent to indicate the degree to which they agree or disagree with a particular statement. Our scale used 5 options: Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree.

The survey questions focused on significant barriers to implementation and significant factors contributing to success. In addition to the close-ended Likert scale questions, we also included open-ended venting questions at the end of each category to allow the respondents to elaborate on a particular sector or important barrier. Additionally, we included three questions that asked the respondents to quantitatively characterize implementation measures completed, actions that the city was already undertaking pre-CAP adoption and what GHG targets are met by measures that are linked to state/regional programs. Because these questions could have required additional preparation, we sent these questions to our interviewees before the actual interview, or allowed them to follow up after the interview with answers.

The qualitative and open-ended venting questions allowed they survey respondents to elaborate on potential barriers that we did not identify in our survey. Also, we collected detailed information on success stories and specific examples of how barriers were overcome by cities.

We provided an electronic copy of the survey in fillable form for the respondent to follow along with during the interview. At the end of our data collection, we developed a truncated version of our survey that included only closed-ended, scaled question with a select number of open-ended questions that we deemed most important for our analysis, focusing on community and political engagement, monitoring, stakeholders, and implementation success.

SURVEY FINDINGS: IMPLEMENTATION SUCCESS AND BARRIERS

a) City Participation in Interviews

We reached out to every city in the population of cities with adopted CAPs whose CAP was adopted prior to June 2013; ideally we would have conducted an interview with every city that had adopted a CAP. However, we were not able to interview every city with an adopted CAP due to lack of city responses coupled with time constraints. One limitation of this type of survey is that cities with more successful implementation will be more likely to participate in a survey. For example, one city who chose not to participate indicated that they did not want to participate in the survey because they had not begun implementation of their CAP. Other common reasons for non-participation were that the city employee we contacted was "too busy" or "did not have enough time." One of our hypotheses, that lack of resources and staff time is a barrier to implementation, is illuminated in this common response of non-participants. Therefore, we recognize that our sample might be biased toward cities with more successful implementation. From this sample, however, we were able to tease out successful strategies and develop recommendations for implementation.

After two months of interviews with city staff and one additional month of follow-up with cities that did not participate in the survey, we conducted 33 full surveys by telephone and collected 7 truncated survey responses through email. The interviews revealed new information about CAP implementation in California.

b) General Measures of Implementation Success

The three measures of implementation success discussed in the "Research Questions Approach" were included in our survey with varying results. For the quantity of GHG emissions reduced as a percentage of the CAP goal, only four of the cities (12%) we interviewed provided specific numbers of CO_2e for GHG reductions, and eight cities (24%) provided a specific percentage for the GHG reductions based on their monitored results. These responses ranged from 0% to 100% of the GHG reduction target, the latter occurring in only one instance ahead of the target year.

The second indicator of implementation success was the percentage of CAP measures that have been fully implemented. 31 out of 40 cities responded to the survey question asking for this percentage, with answers ranging from 0% to 100%. The average and median

responses were both around 40%. This metric was used to perform statistical analyses to determine correlations between CAP characteristics and implementation progress, as well as between CAP barriers and implementation progress. The responses to this question are shown below.

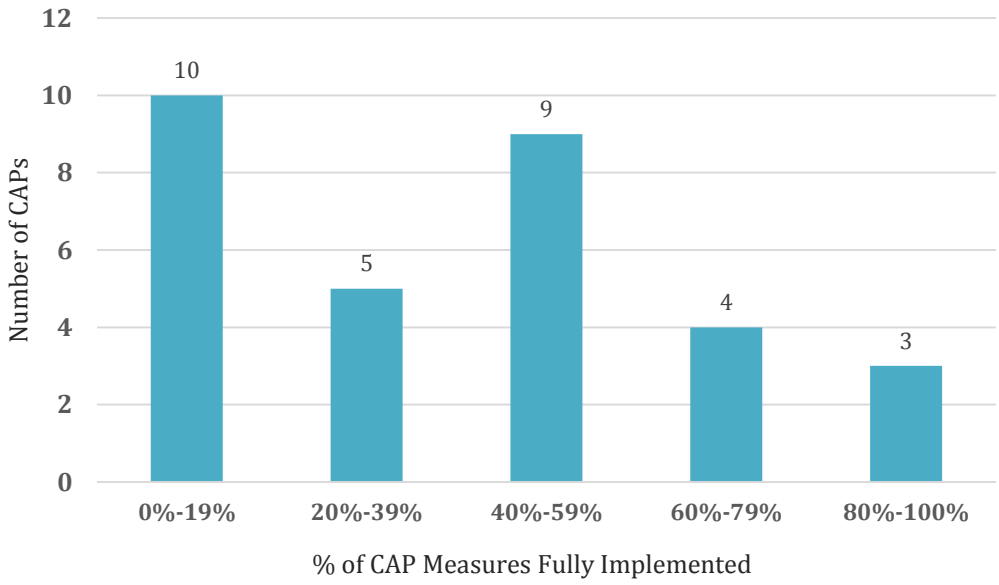

Figure 5. CAP Measure Implementation Progress

The final indicator of implementation success was whether or not city staff perceived that CAP implementation in their city has been successful, for which they were asked the degree to which they agreed or disagreed that CAP implementation had been successful. 60% of respondents either "Strongly Agreed" or "Agreed" that CAP implementation had been successful. The responses to this question were strongly correlated with the percentage of measures that had been fully implemented, meaning cities that tended to agree implementation had been successful had managed to fully implement a higher percentage of measures than cities that disagreed implementation had been successful. This correlation was determined using Spearman's rank order coefficient test which is appropriate for rank-ordered data such as ordinal Likert-scale responses ("Strongly Agree", "Agree", etc.) that does not fit parametric assumptions. The resulting rho coefficient of 0.6 for this test indicated a strong positive correlation, with a p-value of 0.00038 supporting the conclusion that the result was statistically significant for a 95% confidence level.

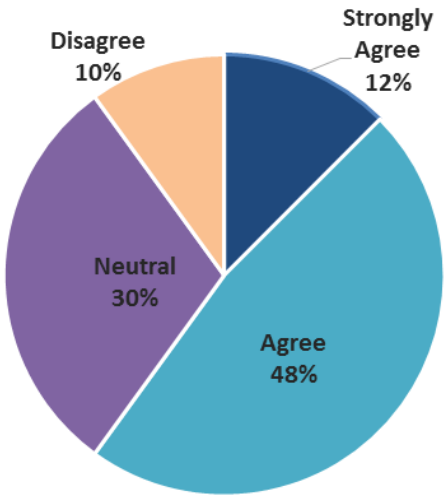

Figure 6. Summary of Responses: "CAP implementation has been successful in my city"

c) Barriers and Factors Contributing to Success

Our survey assessed several barriers that may affect CAP implementation in a given city. We created Likert-scale questions for 14 different factors in which respondents were asked to indicate the degree to which they agreed or disagreed that those factors were barriers to implementation. We were able to gain a general understanding of the barriers and successes cities have encountered through the implementation process.

According to our survey responses, nearly 80% of cities agree or "Strongly Agree" or "Agree" that insufficient funding is a significant barrier to CAP implementation. Insufficiently trained staff (58% answered "Strongly Agree" or "Agree") is the second most significant barrier. This is reasonable, as the two barriers are related-- often insufficient funding will lead to limitations in the number of staff and resources to train staff. Other important barriers supported by our survey results include insufficient monitoring of CAP GHG mitigation measures, insufficient reporting of CAP performance, insufficient community participation, insufficient local business participation, and insufficient data on community GHG emissions. Our respondents indicated that opposition from elected officials and opposition from environmental groups have the least impact on CAP implementation.

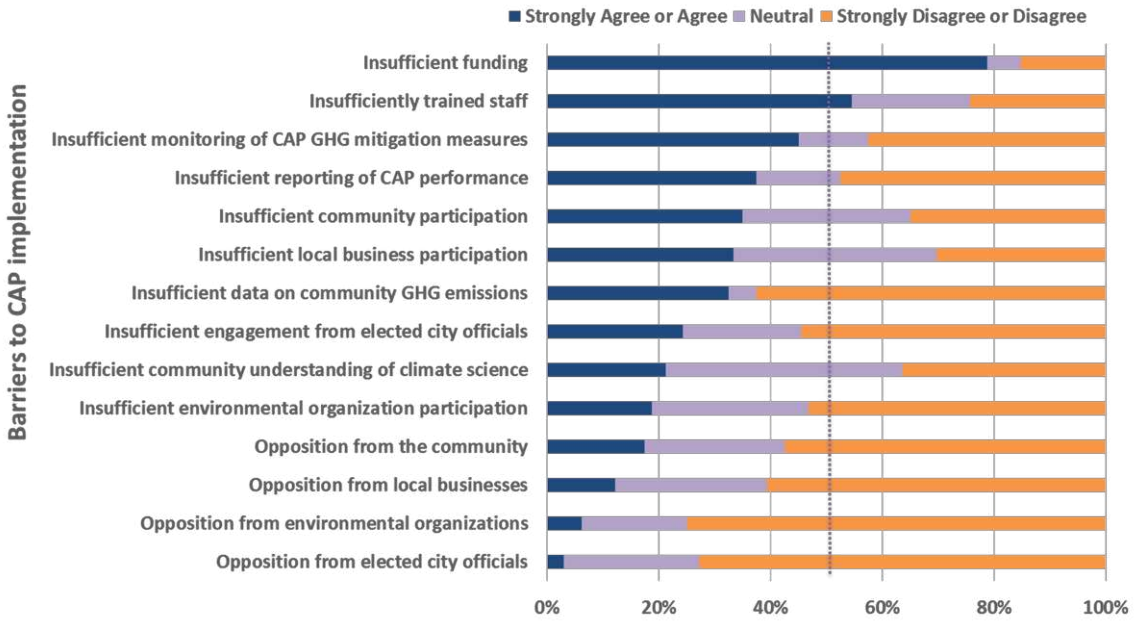

Figure 7. Summary of Responses: Agreement or Disagreement that the Listed Factors are Barriers to CAP Implementation

i. Monitoring/Reporting

Monitoring of a community's GHG emissions and subsequent reporting over time is essential to successful CAP implementation. Monitoring allows a city to track progress in achieving GHG reduction targets and other climate action goals. Reporting provides transparency to city officials and the community on the progress of the CAP. As the third major barrier next to funding and staffing in our Survey Results section above, monitoring is an important issue for CAP implementation. Many cities do not regularly monitor their CAP implementation or GHG emissions reductions for implemented CAP measures. Often, cities do not conduct GHG emission measurements for 5 year intervals. Most of the CAPs in California outline a monitoring strategy in their CAP, but only half of the cities we interviewed said they regularly track CAP implementation progress. 55% of cities responded that they "Strongly Agree" or "Agree" that the city has regularly tracked progress of CAP implementation. Among those cities that tracked CAP progress, only 25% of cities said they regularly tracked specific GHG emission reductions of CAP measures.

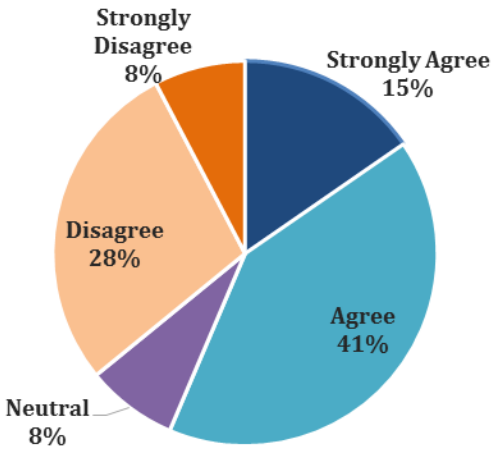

Figure 8. Summary of Responses: "The city has regularly tracked progress of CAP implementation"

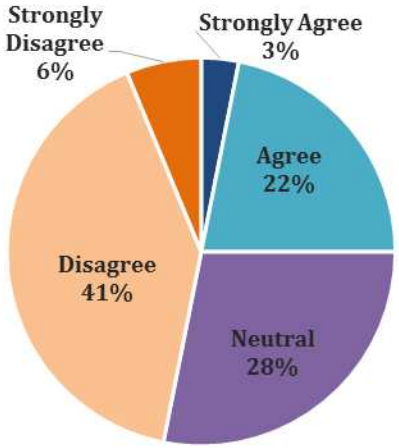

Figure 9. Summary of Responses: "The city has regularly tracked progress of CAP implementation"

The broad responses to the questions above highlight an area in CAP implementation where local governments are struggling, particularly those associated with monitoring and reporting as multiple interviewees commented about the difficulties they have encountered with accurately accounting for city GHG emissions.

ICLEI developed a Community Protocol in response to local governments in the United States calling for a standardized methodology for accounting and reporting on GHG emissions (ICLEI FAQ, 2014). The Community Protocol was released in 2012 and includes innovations that were not included in the previously

established inventory process. Many baseline inventories were conducted using the older, general inventory process, so cities need to be cautious in comparing emissions from inventories conducted with the older method with those from an inventory conducted using the Community Protocol (ICLEI, 2014). The change in the GHG accounting protocol has made it difficult for some cities to know what percent of their GHG reduction target they have met. Elaborating on this reporting challenge associated with the change in the inventory protocol, one city said, "Part of the problem is that the carbon accounting for measuring emissions is not an apples to apples approach. ICLEI protocols changed from 2007 in the software. 2005 was different…[we] haven't been able to separate the new information and how it varies with the information in the report."

A change in the manner in which the new inventory protocol was conducted involved a change in the methodology for calculating Vehicle Miles Traveled (VMT). Another city discussed how the change in calculating the VMT resulted in an increase in GHG emissions and a gap in the reduction measures in place to meet the reduction goals.

Our results show that both funding and number of well-trained staff available are significant barriers to cities as they implement CAPs. Since both monetary resources and staff resources are essential to accurately calculating GHG emissions and performing GHG inventories, it makes sense that GHG emissions monitoring and reporting are underperforming. One city commented that it would be helpful if an easy-to-use tool existed. Even if it did not generate a precise or comprehensive inventory of GHG emissions, it would provide basic guidance and a loose evaluation of implementation success at more regular intervals. The inventory processes in place are costly, time-intensive, and complex. A system that captures emissions over shorter time-intervals and is easy to use could support improved monitoring and reporting.

There are numerous tools for reporting GHG emissions reductions. As mentioned, ICLEI's GHG inventory methodology changed since the year most cities conducted baseline inventories, making it challenging for cities to reconcile older baseline inventory results with updated results. One cited that there are "[v]arious reporting tool and all are a little different. The Air District and EPA all have skewed numbers." When asked about the most important barrier to monitoring, a city

responded that "[a]ccess to adequate modeling tactics and ease of reduction measures. We track overall, but not by measure." This reveals the amount of time and effort required to monitor and report on each individual mitigation measure. Tracking overall implementation does not highlight whether individual measures are effectively reducing emissions.

Another city mentioned that it is relatively difficult to obtain data from utility companies on energy use data and that proprietary rules pose a significant barrier to obtaining data. The same respondent said that all emissions data on VMT is developed through traffic models, and therefore it is difficult to know the actual emissions reductions.

When asked about how many tons of CO_2e their CAP abated, a city said, "Emissions factors change from year to year with electricity. In a dry year, electricity has more emissions associated with it. That's why it is difficult to compare emissions from year to year."

While monitoring and reporting has proved to be challenging for some cities, a small number of cities have had successes. One city said that when they were able to monitor their CAP they were able to see where the CAP was falling short, target where they need to focus, and change pieces of the CAP to set the city and the CAP up to meet the reduction goals.

ii. Community and City Politics

a. Community participation in the political process

Numerous survey respondents indicated that a lack of engagement with community members was a barrier to CAP implementation. One city respondent commented that when they were first developing the CAP, and it was in the infancy stages, there was a lot of attention and excitement around the CAP. As time went on, there was less conversation surrounding the CAP and the loss of attention has negatively affected implementation progress. In addition, five cities shared that they were underwhelmed by community participation at CAP workshops hosted by the city.

Despite the frequency of response that lack of community participation was a barrier to implementation, it also appears that even when the community participated in the political process, it did not always result in more successful implementation. One city described a group of community members who were

against climate change policy who attended every Council meeting on the city's CAP. Another city, when asked if opposition from the community was a significant barrier to CAP implementation, said they were not able to implement a residential conservation ordinance directly due to community pressure. The ordinance would have required property owners to make energy efficiency improvements. The respondent indicated that many community members were reticent to act on direct requirements by the government.

According to the majority of survey respondents, support from city officials and community is critical to successful CAP implementation. Our survey results indicate, as illustrated in the figure below, that 73% of cities agree that the political climate in their cities supported CAP implementation. In addition, more than 60% of cities said diffusion of regional politics, elected officials and the community supported their CAP implementation.

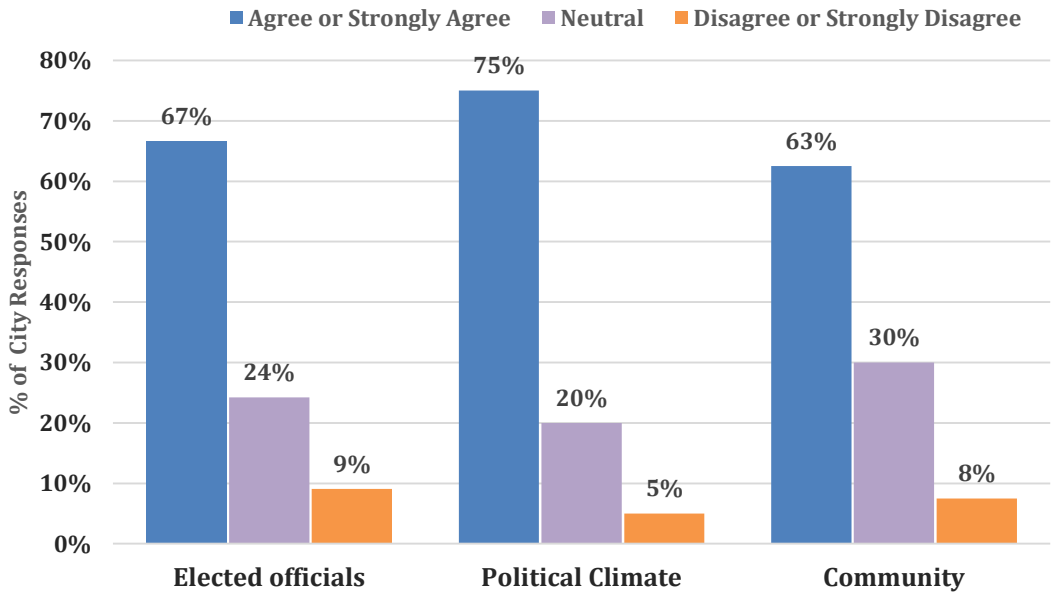

Figure 10. Summary of Responses: Agreement or Disagreement that Politics and the Community Supported CAP Implementation

b. Community Participation in the Programs

Cities have numerous programs that support the community's GHG reduction targets. The programs, often sector-based, range from expanded bike and walking paths to education and outreach on energy efficiency and water conservation actions. However, survey respondents consistently referenced the inability to change the community's behavior as an important barrier to CAP implementation.

For example, one city indicated that it has been very challenging to change the community's reliance on personal vehicles for travel. "People love their cars and love to drive. Habits are hard to change. Some of the strategies [we employ in our CAP] rely on behavior change assumptions, which are difficult to change." Another city commented that they have many different environmental programs, but community members are not participating at expected levels.

Many cities commented that "lack of behavior change" or "lack of participation" of the community were significant barriers to implementation. Behavior change is difficult to achieve, but there are strategies to employ to encourage behavior change. One method is to use competition as a tool to encourage behavior change. One city lauded the Cool California Challenge as an effective platform to implement and achieve reduction goals outlined in their CAP. The Cool California Challenge is a statewide competition engaging thousands of households in the cities across California to save energy, reduce their carbon footprint (Cool California Overview, 2014). Cities that participate in the Challenge encourage residents to sign up for the program and track their household energy and motor vehicle emissions. (Cool California, 2014). One city commented, "Habits are hard to change so target younger generation". The Cool California Challenge is an opportunity to get involvement from both adults and the youth.

Behavior is a distinct construct from knowledge, awareness, and concern such that people may express concern about environmental issues, but they often continue to behave in ways that are harmful to the environment (The Environmental Motivation Project, 2014). Behavior change is complex and there are many motivators and barriers to behavior that vary based on the individual and the particular behavior, therefore, it is important to use multiple behavior change strategies to target different motives. Try to understand your audience and what

motivates and discourages them from exhibiting some behavior change related to the environment (The Environmental Motivation Project, 2014).

Another city, along the same lines of competition, commented that they use friendly competition "in a positive way" between themselves and neighboring cities to advance components of their CAP.

iii. External Stakeholders

a. Building and Real Estate

The building and real estate stakeholders have an important role in cities as they provide job creation and economic benefits, such as revenue through sales taxes. The building industry and real estate have great potential to reduce GHG emissions through energy and water conservation and other efficiencies. Some cities have tried to adopt policies that guide developers to make homes more energy efficient, but according to one city, the building industry and rental housing industry didn't want to see major changes and didn't want to retrofit existing buildings. Cities said the cost of retrofits on existing buildings is expensive, and they have not implemented much on existing buildings. One city commented that they "[r]ely on sales tax [from development] to do projects" and they "don't want to scare development away." The same city said they "[o]nly have control over new development."

b. Other External Stakeholders

Collaboration of governments was revealed by many survey respondents as contributing to CAP implementation.

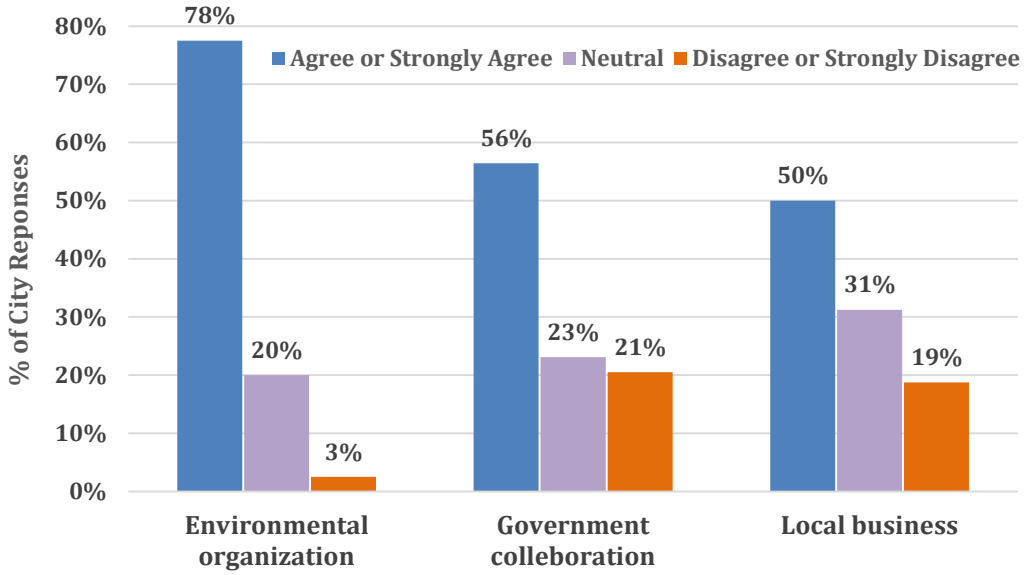

Figure 11. Summary of Responses: Agreement or Disagreement that Internal/External Stakeholders Contributed to Successful CAP Implementation

Many cities mentioned local utility companies and their funds play important roles in cities' CAP implementation. This might be due to the fact that energy sector is usually the largest contributor to GHG emissions. The funds for energy efficiency or upgrade programs by utility companies provides incentives for business and residents to participate in community-wide climate actions.

In addition to local utilities, regional government stakeholder groups were identified as contributing to implementation success. Several smaller cities mentioned being part of a regional collaboration in which the cities pooled together limited funding in order to hire a consultant to perform GHG inventories and write grant applications for the participating cities. Environmental organizations played a similar role for some cities. In one case, an NGO partnered with a few local cities to pursue grant applications on behalf of the cities.

iv. Internal Organization

Of the 39 cities that provided responses to the question, how many city employees in terms of full-time equivalent (FTE) are assigned for CAP implementation, on average 0.8 FTE of city employees are in charge of CAP implementation, and 16 cities have at least one FTE staff works on CAP implementation.

A few cities highlighted that CAP implementation is more successful if the CAP is authored by in-house staff, compared to outside consultants because city staff better understand the intricacies of the city planning process. The same city hypothesized that CAPs authored by consultants are plans that stay on the shelf.

Another city cited that their CAP implementation success was directly related to the involvement and support by the City Council. With said support, the city was able to maintain and re-elevate environmental priorities even when the city reorganized its staff.

v. Funding

According to our survey results, funding is a significant barrier to CAP implementation success. A majority of respondents indicated they "Strongly Disagree" or "Disagree" significant funding sources to support CAP implementation have fallen through, despite the fact that a majority of respondents also indicated they "Strongly Agree" or "Agree" that their city applies for CAP-related grants and seeks outside funding guidance.

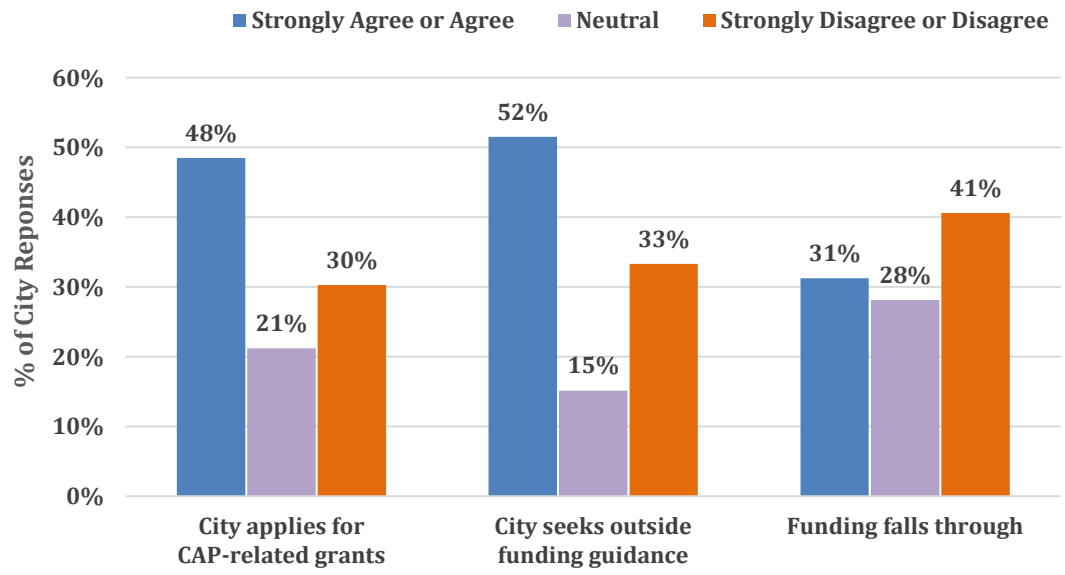

Figure 12. Summary of Responses: Agreement or Disagreement with Statements Related to Funding Issues

Many cities said that the Federal Energy Efficiency Conservation Block grant (EECBG) was a contributor to CAP implementation success. The EECBG funds various CAP activities: conducting a GHG inventory, hiring a consultant to develop the initial CAP document, or hire an additional staff person to focus exclusively on CAP implementation.

When asked about successes one city suggested that funding directly from utilities was one way to aid implementation success. One city reported an innovative funding mechanism called "Pay-As-You-Save" that will be targeted at making energy efficiency improvements more affordable. Program participants pay a surcharge on their utility bill, which can go toward the installation of efficiency measures such as clothes washers, shower heads, toilets, compact florescent light bulbs and dry-summer, drought resistant landscaping (Energy Upgrade California Sonoma County, 2014).

vi. Other

a. The Economy

The economic downturn that began in 2008 has impacted local governments and their ability to prioritize CAP implementation actions. Our survey respondents cited that the economic conditions of the state and the country as a whole, have negatively impacted CAP implementation. In several cases, city governments' focus shifted away from long-term climate mitigation efforts toward short-term economic issues. This meant fewer financial and staffing resources were available to devote to CAP measures.

One city said the economy led to reduced staff numbers which in turn led to both CAP measure neglect and even a lack of resources for core municipal services. Another city said they are struggling overall with the depressed economy and there are more urgent "fish to fry" compared to CAP implementation priorities. The community response and concern with climate change is now at the bottom of the priority list. The city cited that "[p]rior to the downturn, the city put $50,000 into climate work, but cut it to $10,000 to put more cops on the streets and tend to city infrastructure.

The downturn in the economy has also lead to overall reduced emissions from the community due to homes and businesses looking to save money through

reduced energy usage and vehicle miles traveled. While emissions may have decreased as a result of conservation, energy efficient equipment has been slower to enter homes and businesses because of the upfront costs required for efficiency upgrades, even with publicly available rebates that from local electric and gas utilities. Despite this reduced energy use, it is difficult for cities to attribute the GHG emissions decline to CAP measures or to the influence of the depressed economy.

b. Lack of Jurisdiction

Seven respondents shared that confusion around or lack of city government jurisdiction is a significant barrier to CAP implementation. Most frequently the lack of jurisdiction appeared as it related to transportation, while some mentioned lack of jurisdiction serving as a barrier to CAP implementation with regards to water utilities. Many cities citied that lack of jurisdiction in transportation is a barrier because they do not have direct control over public transportation operations in the city. Some cities do not have the jurisdictional authority to change the infrastructure or force people to buy cars or ride bikes. One respondent suggested that more authority be passed on from the state level to the local level.

Another city stated that there are insufficient options to meet the public's needs. There are often regional multi-county transportation networks and agencies. While another issue connected to lack of jurisdiction lies with highways that pass through city boundaries. Two cities mentioned that major highways/freeways pass through their city limits. Therefore, many vehicles contribute to the city's GHG emissions, and this is out of the control of local jurisdictions.

ANALYSIS OF CHARACTERISTICS AND BARRIERS INFLUENCING IMPLEMENTATION SUCCESS

The last research question was whether or not a relationship exists between implementation progress and city/CAP characteristics or between implementation progress and implementation barriers identified through the survey. A multiple regression analysis was used to predict the influence of city and CAP characteristics on the percentage of fully implemented CAP measures. The multiple regression analysis requires parametric data, so ordinal, non-parametric Likert-scale data on perceived barriers was not included in the multiple regression analysis. The potential influence of individual perceived barriers on the percentage of fully implemented CAP measures was also evaluated using the Spearman Rank-Order Coefficient test. While 40 cities responded to our survey, only the responses from the 31 cities that indicated a percentage of measures fully implemented were used for this analysis, since percentage of measures implemented was the dependent variable used in each analysis. A significance level of $\alpha = 0.05$ was used for a 95% confidence level, and *R* v2.15.0 was used to run analyses.

a) Background Information: Multiple Regression and Spearman Rank Order Correlation

The relationship between city and CAP characteristics and the percentage of CAP measures fully implemented was explored using a multiple regression analysis. Multiple regression is useful in estimating how multiple parametric independent variables can predict a single dependent variable. While these characteristics did not appear to be individually correlated with CAP measures implemented in some cases, a multiple regression analysis was chosen to account for the effect of the city and CAP characteristics in combination. The multiple regression equation for dependent variable Y and independent variables X is described by the following

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_n X_n + \varepsilon \qquad \text{(Equation 1)}$$

where beta (β) represents the regression coefficient for each variable X, and n is the total independent variables. The resulting coefficients for the multiple regression analysis can be tested for significance using p-values. If the p-value for a given coefficient is smaller than the

designated significance level ($\alpha = 0.5$), then we can reject the null hypothesis that $\beta = 0$ and conclude that the alternative hypothesis, $\beta \neq 0$, is true with 95% confidence.

The relationship between city staff's perception of implementation barriers and the percentage of CAP measures fully implemented was explored using the Spearman rank-order coefficient analysis. This test explores a possible correlation between two variables. Because the Spearman test uses ranking methods, it can be used for non-parametric data and is an appropriate test to use for ordinal data based on Likert-scale responses for implementation barriers. Ordinal data can be ranked from highest to lowest, but the relative difference between ranks is not the same for all respondents.

Spearman's rank-order coefficient test yields a coefficient rho (ρ) that indicates the strength of correlation between the two variables being tested.

$$\rho = \frac{(6 \sum d^2)}{n(n^2-1)} \qquad \text{(Equation 2)}$$

In this equation, *d* is the difference in ranks between each observation of the two variables while *n* is the sample size.

b) Multiple Regression in R

To determine the coefficients of the multiple regression in *R*, the data was organized to include each city's characteristic variables (population, income, % of democrats, % of republicans, FTE leading CAP implementation, number of CAP pages, and age of CAP).

Table 6. Sample Data for Multiple Regression*

Sample No.	Population (pop)	Median Household Income	% of Registered Democrats	% of Registered Republicans	# of FTE	# of CAP Pages	Age of CAP, Months	% of Measures Fully Implemented
1	10,503	$93,231	52%	42%	0.4	103	52	15%
2	16,239	$82,902	44%	47%	1	65	47	40%
30	78,474	$68,103	49%	42%	0.8	79	38	65%
31	201,196	$75,902	56%	40%	1.2	132	45	50%

*Sample data, used for multiple regression in R. Here, only 4 samples are shown with dummy data to protect the confidentiality of actual city data used. In this analysis, 31 real data sets were used for cities that have adopted CAPs prior to May 2013.

Model parameters were evaluated in *R* based on the following multiple regression model:

$$\% \text{ Measures Implemented} = \beta_0 + \beta_1 * \text{population} + \beta_2 * \text{inocome} + \beta_3 * \%\text{democrats} + \beta_4 * \%\text{republicans} + \beta_5 * \text{FTE} + \beta_6 * \text{pages} + \beta_7 * \text{age}$$

This was the initial model used, however the best-fit model did not include each independent variable listed. This best-fit model was selected using the AIC step-wise removals function, in which independent variables that do not contribute to a statistically significant model with statistically significant coefficients are removed in steps until a significant model remains.

The best-fit model was further evaluated to ensure no multicollinearity among independent variables. The null hypothesis for each potential multiple regression model is that the coefficient(s) $\beta = 0$, while the alternative hypothesis is that the coefficient(s) $\beta \neq 0$. The residuals for the best-fit model were normally distributed, ensuring that this model is meets the requirements for a valid multiple regression.

c) Spearman Rank-Order Coefficient Test in R

To perform the Spearman rank-order coefficient test in *R* and determine the correlation coefficients between the perceived implementation barriers and the percentage of CAP measures implemented, the data for the Likert-scale responses for each barrier were coded numerically to represent response order. The response options were coded between 1 and 5, with Strongly Agree = 5, Agree = 4, Neutral = 3, Disagree = 2, and Strongly Disagree = 1.

Table 7. Sample dataset, showing data used for Spearman rank-order coefficient in R*

Sample No.	Insufficient Funding is a Significant Implementation Barrier	Insufficiently Trained Staff is a Significant Implementation Barrier	Opposition from the Community is a Significant Implementation Barrier	% of Measures Fully Implemented
1	3	2	4	15%
2	4	2	5	40%
30	5	3	1	65%
31	2	1	3	50%

*Here, only 3 barriers are shown for demonstrative purposes and only 4 samples are shown with dummy data to protect the confidentiality of actual city data used. In this analysis, 31 real city data sets were used for cities that have adopted CAPs prior to May 2013. Likert responses have been converted to numeric representation (1 = "Strongly Agree" to 5 = "Strongly Disagree").

The Spearman rank-order coefficient test was performed in *R* to evaluate correlations between the dependent variable, percentage of measures fully implemented, and the following independent variables with data collected through our survey as discussed in the preceding sections. The list of barriers evaluated was limited to those covered in the short version of the survey which excluded some barrier questions for the sake of brevity. It was necessary to include responses from short surveys in this analysis, thereby reducing the number of barriers evaluated, in order to maximize the sample size of cities that indicated the percentage of measure implemented from their CAP.

- Insufficient funding
- Insufficiently trained staff
- Insufficient community participation
- Opposition from the community
- Insufficient data on community GHG emissions
- Insufficient monitoring of CAP GHG mitigation measures
- Insufficient reporting of CAP performance

For these tests, the null hypothesis was that there is no correlation between the two variables tested. The alternative hypothesis was that there is a correlation between the two variables.

d) Results

The results of the multiple regression analysis yielded significant coefficients for the following independent variables: median household income, CAP age (in months since adoption), and number of CAP pages in the report. The stepwise AIC analysis resulted in the removal of all independent variables that did not produce significant coefficients, leading to a retention of the null hypothesis that $\beta = 0$ for the removed variables. The p-value for these removed variables was >0.05.

Multiple regression yielded the following best-fit model, where X_1 is the age of the CAP in months, X_2 is the city's median household income, and X_3 is the number of pages of the city's CAP. The model predicts 31% of the variance in the percentage of CAP measures that are implemented by a city (p-value <0.5, Table 1). In order to achieve a higher adjusted R^2 value, more relevant independent variables would have to be included based on parametric,

continuous data. The independent variables did not exhibit mulitcollinearity upon visual inspection.

$$\%MeasuresImplemented = -0.326 + (4.48 \times 10^{-3}) * CAPAge(months) + (3.89 \times 10^{-6}) * Median\ Household\ Income(\$) + (1.47 \times 10^{-3}) * NumberofCAPPages$$

(Equation 3)

The coefficients for β_1, β_2, and β_3 differed significantly from zero (p-value < 0.05; Table 2) while the coefficient for β_0 differed significantly from zero for a significance level of 0.1 (p-value < 0.1; Table 2) or a 90% confidence level. The model indicates that when holding constant CAP age and city median household income, a city whose CAP has more pages is more likely to have a higher percentage of measures implemented than a city whose CAP has fewer pages. Similarly, holding income and pages constant, an older CAP is more likely to have a higher percentage of measures implemented than a younger CAP, and holding age and pages constant, a city with a higher median income is more likely to have a higher percentage of measures implemented than a city with a lower median income.

Table 8. Model Parameters for Multiple Regression Analysis for Influencing Factors on % of CAP Measures Fully Implemented.

Independent Variables	Residual SE	Adusted R^2	F Statistic	p-value
Median Household Income, CAP Age, CAP Pages	0.2453	0.3104	5.501 on 3 and 27 DF	0.0044

Table 9. Coefficients of Multiple Regression Output for Influencing Factors on % of CAP Measures Fully Implemented, Best Fit Model

Coefficient	Estimate	SE	t-value	p-value
β_0	-3.26E-01	1.84E-01	-1.775	0.0872
β_1 (age)	4.48E-03	1.66E-03	2.697	0.0119
β_2 (household income)	3.89E-06	1.29E-06	3.029	0.0054
β_3 (number of pages)	1.47E-03	7.16E-04	2.054	0.0498

The Spearman's rank-order coefficient tests all resulted in a retention of the null hypothesis (p-value > 0.05, Table 3) that there is no correlation between variables. Due to the lack of significance, the rho values calculated with these tests should not be used as indicators of correlation.

Table 10. Coefficients of Spearman Rank Order Coefficient Output for Correlation between Perceived Barriers and % of Measures Fully Implemented

Perceived Barrier Independent Variable	Dependent Variable	rho	p-value
Insufficient funding	% of measures implemented	-0.2112	0.254
Insufficiently trained staff	% of measures implemented	-0.1707	0.3583
Insufficient community participation	% of measures implemented	-0.2223	0.2293
Community Opposition	% of measures implemented	0.2386	0.1961
Insufficient community GHG emissions data	% of measures implemented	0.053	0.7768
insufficient monitoring of CAP GHG mitigation measures	% of measures implemented	-0.1621	0.3836
Insufficient reporting of CAP performance	% of measures implemented	-0.0317	0.8656

e) Discussion of Statistical Results

Multiple regression analysis was used to evaluate influencing factors on the percentage of CAP measures that are implemented. The major finding is that CAP age, city median household income, and number of pages in a CAP report are positively correlated with the percentage of CAP measures that a city implements. This means that holding other factors constant, a city with either an older CAP, a higher median income, or a longer CAP is more likely to implement a higher percentage of CAP measures than a city with a younger CAP, a lower median income, or a shorter CAP report.

These results are not particularly surprising considering that a city with an older CAP has had more time to implement measures, a city with higher median incomes may have more resources with which to implement, and a city with a longer CAP may have more detailed measures and supporting information in order to effectively guide implementation.

While the independent variables in this model only explained 31% of the variance in the dependent variables, a higher variance could be obtained if more relevant independent variables were included for which continuous data was not available in this project. The remaining questions in this case is, what other independent variables influence CAP implementation? Potential relevant variables would include quality of the CAP measures themselves, number of community sectors addressed, or quality of implementation progress metrics. The lack of significant influence of voter demographics on percentage of measures implemented is likely due to the fact that the cities with CAPs already adopted have a political environment supportive of the development and adoption of a CAP in the first place, so the implementation of the adopted CAP measures in these cases would not be politically controversial.

It does not makes sense to use this multiple regression analysis to predict the percentage of measures a city will implement based on its median income, CAP age, and CAP length. However, the analysis results are useful in showing the relationship of city and CAP characteristics with a city's ability to successfully implement its CAP measures. The results show higher income cities with longer CAPs are more likely to implement more CAP measures.

Several Spearman rank-order correlation tests were used to evaluate a correlation between perceived implementation barriers and the percentage of CAP measures implemented. The major finding was there is no significant correlation between any of the perceived barriers evaluated and percentage of CAP measures implemented.

The lack of significant results for these tests does not indicate there is absolutely no relationship between the variables tested. The non-parametric rank-order test is not as powerful as a parametric correlation test which could result in a Type II error. Additionally, there is no obvious equivalent of a multiple regression test for ordinal data, so it is difficult to detect a small contribution from ordinal data on perceived implementation barriers to the percentage of measures implemented. The small sample size (n=31) also makes trends more difficult to detect than a larger sample size would. The challenge remaining is how to evaluate implementation barriers using continuous data to enable more powerful statistical tests than ordinal data.

DISCUSSION

a) Internal Organization

Cities face barriers to implementation both externally and internally. Based on literature and our survey results, we found several important internal barriers. The implementation barriers include: insufficient staff education and training, lack of staff accountability, poor internal coordination, and insufficient staff time available. The survey results also highlighted internal organization efficiencies and how cities could use guiding city documents, such as the General Plan (GP) and CAP to minimize staffing implementation barriers, instead of being spread thin in the implementation process.

The qualitative results of our survey show that many cities face staffing issues during CAP implementation. Three cities indicated that internal operations and organization was an overall significant barrier to CAP implementation. Throughout sectors, cities cited that limited or untrained staff was a barrier to making progress on implementation of the city's CAP. Four cities specifically called out lack of staff time as the most important barrier to implementation of water measures. Three cities cited lack of staff time as the most important barrier to measures related to open space, land use and energy. And interestingly, fifteen cities cited staff time as the most important barrier to implementation of monitoring and reporting.

Some scholars argue that city planners, while often the co-authors of CAP documents, are not driving forces moving implementation activity forward because their training often does not encompass environmental goals (Bassett and Shandas, 2010). It appears through our results that gaps in staff education around climate change and the benefits of CAP implementation are a barrier to successful implementation. One city employee commented that if she had more time, she would seek out additional training on aspects of implementation. Referencing monitoring, one city cited that its small size and small number of staff available, leads to limited expertise available in-house. The city simply does not have the expertise to tackle GHG inventories and monitoring. The same city claimed the only way to bring in expertise would be to hire an outside consultant. Another city, discussing the barrier to monitoring, said there were three challenges: cost, complicated models, and lack of in-house expertise to monitor. Another city reiterated these three challenges and described how they received the Federal Energy Conservation Block grant, and with that money they

were able to hire a consultant to perform CAP related tasks. However, without external grants, for many budget limited small cities, the prospect of hiring a consultant is unlikely.

Many cities with available staff are plagued with unclear task assignments or accountability. One city highlighted that most city departments have priority actions, such as the department that oversees building codes. Although GHG mitigation measures may be a part of their purview, their primary job is to focus on buildings safety and human health. Therefore, when time is limited, staff time will almost always be allocated to the department's primary task. Staff allocation or one full-time staff member with CAP goals integrated into their job description, would assist in CAP implementation.

One large city, an early adopter of CAP measures, emphasized that not only is staff time a problem, but staff coordination and siloing also prevents effective implementation, such as monitoring of GHG mitigation progress. Another city reiterated this point and claimed that a key barrier to effective CAP implementation was internal coordination. Because many staff members have other core job responsibilities, they may attempt to tackle one piece of a CAP measure and integrate it into their existing workload. Staff might take on a measure that already fits into their purview or relates to another non-GHG related city planning measure. Alternatively, a staff member might choose to focus on a measure that is more related to their pre-existing expertise or interest. This is not an effective or efficient way for staff to address CAP implementation. First, it does not adequately analyze the cost and benefits of a particular measure, and if it is a higher or lower priority compared to other measures. Ideally, a clearly outlined, phased approach to implementation would occur, for example, Seattle created a detailed implementation plan in its Implementation Strategy for its CAP (City of Seattle, 2013), rather than ad hoc selection of measures by individual staff members.

There are specific examples from the interviews that illuminate the domino effect in preventing implementation of specific measures. One city indicated that there was not enough staff available to implement the city sponsored bike path, a key transportation and land use mitigation measure. As a result, it took almost 10 years to complete. The lack of staff time available prevented the city from applying to grants to fund the construction of the bike path. Other city representatives indicated CAP implementation oversight was added to their job responsibilities after CAP adoption, but only a fraction of their time is available to devote to the CAP. In these cases, requests for more staff resources were not an option due to

funding limitations. Thus, funding restrictions lead to reduced staff, then preventing additional funds from flowing to the city for CAP measure implementation.

While there are many internal organizational issues that pose challenges for cities to implement CAPs, there are strategies cities can capitalize upon to address staff shortcomings. One city shared a series of strategies to address internal organization issues.

Case Study: Internal Organization

To overcome the barrier of internal silos, City X employed an arsenal of strategies. City X made a point to integrate environmental sustainability throughout the organization with a multi-departmental working group. High-level staff in public works, housing, IT, and planning departments focused on specific actions to encourage everyone to make environmental considerations in department activities. In addition, every report that goes to city council has an environmental sustainability section. For example, a council report about a new homeless program that provides food includes environmental considerations for food sourcing, or a plan to install new city lights asks the question of whether the lights are LEDs. To further strengthen the environmental capacity of the organization, all new and existing employees undergo environmental sustainability training, as well as training on City X's goals and the role of staff. Such training highlights things employees can do at work and at home. The city-wide work plan provides a framework requiring all departments and divisions to consider how their work impacts environmental goals. City X also has an awards program for staff that recognizes their environmental considerations.

i. Internal Organization Challenges Addressed with Regulatory Streamlining

A broad strategy to overcome the many CAP implementation challenges associated with the internal organization of a city is to integrate regulations and guiding documents for the city. Several cities surveyed mentioned the need for greater prioritization of the CAP with city resources such as staff and funding to facilitate implementation success. At least one city said city resources were prioritized towards projects and programs that would help the city comply with state

environmental regulations. One way cities can push for more prioritization and resources is to incorporate the CAP into the General Plan. CAPs as stand-alone documents without a strong link to the GP are more likely to be given less attention or resources. The incorporation of the CAP into the GP would also provide an opportunity for CEQA streamlining for GHG mitigation.

GPs are mandatory, legally binding documents prepared by cities to outline long-term development plans. Major GP updates occur approximately every 10 to 20 years, often with minor updates in between. Because the span of CAP reduction strategies typically spans about 10 years, it makes sense for a city to incorporate its CAP into its GP or at least to reference it. The typical framework of a CAP mirrors that of a GP element, in which a there is one or more directional goals (such as reduced GHG emissions in the community), specified objectives (such as a specific GHG reduction target), policies (such as, the city shall work with local community groups to promote energy efficiency in homes), and implementation measures (such as creating local rebate programs for energy efficient equipment).

There are several benefits, in addition to extending staff resources, to incorporating the CAP into the GP. State law requires internal consistency amongst all GP policies and elements, and all elements of the GP must have equal status in which no element is legally subordinate to another should conflicts between plan elements arise (OPR, 2003). Therefore all city activities must align with the GP and the CAP if it is referenced in the GP.

Referencing the CAP in the GP also provides an opportunity to reduce duplicative efforts for a city's CEQA compliance efforts. The California Attorney General's Office indicates that cities are obligated to consider the impact of a GP update on community GHG emissions (California Department of Justice, 2014). GP updates require a plan-level Environmental Impact Report (EIR) to fulfill CEQA requirements, which includes addressing potential impacts of the GP on GHG emissions. A GHG reduction plan such as a CAP can be used in a cumulative impacts analysis under CEQA, and a project consistent with the plan may be deemed to have cumulative impacts that are less than significant due to plan consistency (CNRA, 2009).

In order for a GHG reduction plan (or CAP) to be relied upon in a cumulative impact analysis, the plan must a) be legally binding through legal specification or

approval by a public agency with appropriate jurisdictional purview, b) have been previously approved, and c) specify requirements for mitigation or reduction of the cumulative GHG emissions problem within its defined geographical jurisdiction (CNRA, 2009). Plans must have enforceable goals with mandatory reduction measures to ensure that jurisdictional emissions will address the cumulative problem. A CAP that is referenced in, or integrated into, the city's GP would provide the regulatory anchor needed for CEQA streamlining.

Case Study: Regulatory Efficiency

City X provides a good example of successful integration of its General Plan and Climate Action Plan. City X's GP update includes a reference to the CAP, but because the details of GHG mitigation measures are detailed in the CAP and not explicitly in the GP document, the city has more flexibility to update its CAP on a more regular basis than occurs with the GP. The CAP states that, "by integrating climate action into the General Plan, City X will ensure that the issue becomes an integral part of the planning process" (City X, 2009). City X was recognized by its local chapter of the American Planning Association for its CAP integration into its GP through an Innovation in Green Community Planning Award.

b) Regional Collaboration

Cities strapped for resources have an opportunity to extend staff time and funding through regional collaboration. Many cities commented that collaboration with local utilities, businesses, NGOs, universities, joint powers authorities (JPAs), and council of governments have been critical in their ability to overcome barriers to CAP implementation. In addition to alleviating funding, staffing, and other resource constraints, regional collaboration is helpful because it can support activities outlined in the CAP to reduce GHG emissions. Collaboration can aid smaller cities in their efforts to move CAP implementation forward, as reduced resources can be particularly crippling in allowing staff to accomplish tasks. One interviewee emphasized that the majority of programs in her city are partnerships with regional or neighboring cities because she is not able to manage the many programs across sectors in a 36-hour workweek. Cities that responded to a 2010 ICMA survey, said the most beneficial

collaborative actions to tackle climate change included partnering to share staff across peer cities to reduce the direct costs for climate change related staffing and implementing climate change programs cooperatively with other cities to reduce implementation costs and increase audience size (Strategic Energy Solutions, 2011). Partnerships and collaboration allow cities to leverage the limited resources available to them and pool resources together for a greater suite of services than if the resources were used individually.

i. Partner with Regional Stakeholders

a. Local Utility Partnership

To support small cities in advancing energy and climate change action, PG&E, with funding from the PG&E Innovator Pilot Program grant, expanded the "Small Cities Climate Action Partnership" to pilot an innovative model for delivering management services to small cities in California (Strategic Energy Innovations, 2014). The coordinating agency partnered with 7 local cities in the Bay Area to focus on increasing energy management activity in small city governments in California (SEI, 2014). One city commented that partnerships helped the city overcome staffing and funding barriers to CAP implementation in their city. The partnership focused on creating a collaborative, scalable, and replicable model, with the goal of establishing policies and procedures that will help to save money with energy savings, and support continued energy management practices (SEI, 2014). Small cities have struggled with engaging residents with existing programs and partnerships can also help to overcome that challenge (Strategic Energy Solutions, 2011).

b. Local Business Partnership

Partnerships with local businesses are important relationships, and can help local governments overcome barriers to CAP implementation. In particular, CAP measures that might need action from the business community benefit the most from these partnerships. Businesses and companies as members of the community need to participate in GHG emission reduction activities in order for the community at large to meet the reduction goals outlined in their CAP. Business operations in a city bring in vehicle traffic, increase energy and water consumption, and produce waste. Many CAPs outline measures for the business community to pursue to make GHG reductions, such as carpooling, providing bike racks for bicyclists, or installing energy efficient light fixtures. One interviewee emphasized that they did not regulate the

public or businesses, but worked with those groups in developing and implementing the measures. The city's collaboration with businesses was an effective strategy, because the businesses and public were be on board with the mitigation measures and were willing to fulfill the implementation goals.

c. NGO Collaboration

NGOs are non-affiliated bodies that provide services related to CAP implementation for cities. ICLEI is an internationally recognized NGO for providing guidance to local governments on tasks related to climate action planning. Cities with a membership for ICLEI services have access to helpful information to aid in calculating community GHG emissions inventory, expert staff, as well as a climate mitigation framework for cities to follow when developing, implementing, and monitoring the CAP.

The San Diego Foundation supports cities in the San Diego region in their efforts with tackling climate-related initiatives. Through the San Diego Foundation's Climate Collaborative, partnerships between local government, philanthropy, business, and nonprofits have been leveraged (The San Diego Foundation, 2013). The Climate Collaborative Initiative and the San Diego Foundation provide resources for cities calculating their inventories. As a result, all jurisdictions in San Diego County completed GHG emission inventories. One city commented that the San Diego Foundation had "a unique role and catalyzed action" for CAP implementation. The same city also mentioned that the San Diego Foundation conducted public polling on CAPs.

d. Coordinate with Universities

Local educational institutions can serve as important partners with cities. Universities can provide assistance on CAP monitoring, GHG inventories, or research. One interviewee explained that the local university worked on the annual CAP report, which provided an update on the progress of CAP implementation in their city. The report described and evaluated the current status of the city's effort to achieve the goals of the CAP. The city collaborated with the university to improve CAP implementation and address shortages in funding and technical expertise. The collaboration was successful, because there were benefits for both the city and the university. The city obtained some staff-time from the university students working on the annual report and the university students gained experience by working on real-world projects.

ii. Join/participate in a Regional Government Body

a. Joint Powers Authority (JPA)

There are different types of JPAs that offer benefits to member cities. An Energy JPA offers many benefits to cities that join, such as more effective implementation of energy initiatives on a regional basis, joint implementation of CAP measures, and increased competitiveness of grant proposals. Some JPA powers include the option to adopt countywide ordinances applicable to the city without the need to contribute payments other than staff time (Ameri, 2013). One city expressed success they have had in the waste sector due to the waste JPA. In particular they are optimistic about entering into a new franchise agreement arranged through the JPA that will focus heavily of waste diversion. Another city that joined an energy JPA with other cities in the county is benefiting from the JPA seeking out grants for energy efficiency, so they do not have to put out the work to apply, especially since they do not have the staff capacity.

b. Council of Governments or Association of Governments

Cities involved with a Council or Association of Governments can benefit from efficiencies, cost-savings, and information sharing. The South Bay Council of Governments worked with ICLEI to perform a GHG emissions inventory for 14 of its member agencies. Coordinating the municipal GHG inventories for neighboring cities is often cost-effective and allows for more meaningful results, because a group of cities can enjoy economies of scale in conducting the inventory and neighboring cities can consolidate data requests for information from shared electric and natural gas providers. Additionally, when an individual or group conducts the inventory for all cities, individual cities can avoid costs associated with learning proper inventory procedures. By sharing inventory results, neighboring cities, which likely share many characteristics including climate, can learn more about their own inventories in the context of the region (UCLA Center, 2014). One city advised "Stay in touch with cities so you don't have to reinvent the wheel." Involvement with Council of Governments is an effective means of keeping up with other cities' progress on CAP implementation as well as barriers and successes.

Case Study: Regional Collaboration

County X created an energy partnership to leverage the resources of cities and small towns in the county. Each city or town in the county contributes an annual dollar amount to the partnership that cumulatively provides enough funds to hire a consultant. The consult provides assistance to all participating communities through grant applications, CAP development and monitoring, and other climate mitigation-related activities. This partnership is an example of small communities within a region pooling their resources to hire outside assistance to assist with CAP implementation activities that otherwise would have been too expensive for an individual city or town.

c) Emphasize Co-Benefits

The reduction in GHG emissions achieved through the implementation of CAPs also provides health and economic benefits to the community. In cases where climate change has failed to create political consensus over GHG reduction measures, policy advocates have relied heavily on promoting co-benefits, such as public health and economics, to build support for relevant policies (Peterson and Rose 2006). A city struggling to get CAP implementation support from the community should consider emphasizing the direct benefits to the public, such as improved air quality or money savings associated with energy efficiency. The way the climate issue is framed can also influence how successful City Officials get "buy-in" from the community on adopting a CAP and implementing certain components (Lindseth, 2004).

i. Public Health

The measures in CAPs that directly aim to reduce GHG emissions for the benefit of the climate also improve the air quality and public health, as well as reduce traffic congestion (Lindseth, 2004). One interviewee said that the city highlights efforts to reduce GHG emissions that will also support adaptation to climate change and the associated public health impacts. The interviewee specifically said to get the fire department to say extreme heat is a problem. The focus on local problems like air quality and the health concerns can generate concern about climate change if people feel the effects (Lindseth, 2004).

iii. Money Savings

CAP implementation can also lead to lower costs of municipal operations (Lindseth, 2004). One city recommended that in response to comments from community members about the City wasting resources on CAP implementation, the city should show that the efforts are saving the city money. One city mentioned that developers are now realizing some money from building more efficient buildings. When external groups experience the benefits of energy efficiency, such as the lower utility bill, they may be more supportive of other initiatives.

Case Study: Co-benefits

A city that highlighted the co-benefits of their CAP got the public's support on both the adoption and implementation of the CAP. The framing of co-benefits was particularly advantageous in this more conservative political climate. Instead of talking about climate change and the impacts from greenhouse gases, the city pitched sustainability issues as "if you save energy, you save money"—the city was sensitive about the language they use to promote CAPs and reduction measures. The city had more success in implementation and moving a program forward by focusing on the operational benefits of energy projects. The city recognized that even though they emphasized the health benefits and energy and cost savings, it really translated into reductions in GHG emissions.

RECOMMENDATIONS TO SUPPORT CAP IMPLEMENTATION

We recommend that cities tackle internal barriers to implementation with three actions: increase internal organization efficiency, collaborate regionally, and emphasize co-benefits. The first recommendation was developed in response to the most frequently reported barriers to CAP implementation: funding and lack of staff. The second recommendation was informed by the commonly expressed viewpoint from cities that the collaboration of regional partners contributed to successful CAP implementation, as it reduced the burden on limited staff and funding. The third recommendation was developed through interviews and helps to address opposition from the community, which is an issue faced by a minority of cities.

a) Internal Organization Efficiency

- Organize working groups or internal teams with representatives from different city departments. This enables staff to share skills and leverage the knowledge of other departments without requiring a permanent time commitment from other staff. The city should then identify the skills that are available among existing staff, and determine gaps that need to be filled.
- Create a full-time or part-time position or assign CAP implementation tasks to one individual. Many cities did not have anyone leading implementation. A person assigned to CAP implementation full time would not have conflicting work priorities.
- Provide for additional staff training or education on CAP measures and implementation.
- Consider integrating the CAP into the General Plan. Doing so could enhance streamlining of city resources devoted to CEQA compliance due to the CAP's ability to address GHG emissions.

b) Regional Collaboration

- Partner with regional external stakeholders on CAP measures to extend limited staffing and funding resources further and still achieve progress on CAP implementation.
- Join and/or participate in regional governmental bodies to align climate policy goals across jurisdictional boundaries as well as knowing what other cities are doing.
- Coordinate and share information with local universities, both the cities and universities can benefit.

c) Emphasis of Co-Benefits

- Highlight the public health benefits of CAP measures to the community and city officials.
- Highlight the economic and cost savings of CAP measures to the community, city officials and external stakeholders.
- Be sensitive about the language and framing of climate change and GHG emissions in a city with a community resistant to climate change policy.

CONCLUSION

a) New CAPs on the Horizon

i. Overview of CAPs Adopted in 2013

Through our research we came across 6 CAPs that had been adopted in 2013, so the total of adopted community CAPs is 72. However, there are likely more CAPs that were adopted in 2013. The OPR's list of California Jurisdictions Addressing Climate Change included numerous cities whose CAP development was in progress as well as cities that planned on developing a CAP. We did not follow up with the cities in those categories, but could be a starting point to get a more accurate count of CAPs adopted in 2013 and planned for adoption in 2014.

ii. CAPs Being Developed in the South Bay of LA (e.g. of Regional Collaboration Pre-Implementation)

In the process of contacting cities, we came across several in the South Bay of Los Angeles that were in the process of developing a regional set of CAPs. The initiative is led by the South Bay Cities Council of Governments (SBCCOG). The SBCCOG encompasses the following member cities: Carson, El Segundo, Gardena, Hawthorne, Hermosa Beach, Inglewood, Lawndale, Lomita, Manhattan Beach, Palos Verdes Estates, Rancho Palos Verdes, Redondo Beach, Rolling Hills, Rolling Hills Estates, Torrance and the Harbor City/San Pedro communities in the City of Los Angeles (South Bay Cities Council of Governments, 2014). As of now, we are unsure what cities from this list are actively participating in CAP implementation, but we plan to continue our research. As of now we are sure that Palos Verdes Estates, Rancho Palos Verdes and Rolling Hills Estates are cooperating, in some way, with the SBCCOG around CAP development. As the SBCCOG is the author of these individual CAPs, it is likely that regional concerns will be well-synchronized and regional funding opportunities capitalized upon. There is a lot of potential for such regionally developed CAPs, especially for small cities in the region, with a small number of staff.

iii. Focus on Implementation, but There are Still Many CAPs in Development

We focused on implementation only, not development, but there is still a lot of action and opportunity in that part of the process. In a survey of local governments in

California, respondents indicated that compliance with AB 32 and energy efficiency were the two most common reasons for CAP development, which was over 90% of the sample (DNV Kema, 2013). Our project focused on CAP implementation, but in the interview cities highlighted the importance of developing an "implementable" CAP. Some cities commented that developing a CAP in-house versus hiring a consultant is key to creating a more implementable CAP, because the city employees know what their capacity is to complete projects and which employees to assign to certain tasks. Another strategy to employ with CAP development is to assign responsibilities to staff members during the development process, instead of adopting the CAP and trying to figure out who should do what after-the-fact. The lag in assigning implementation responsibilities can slow the implementation pace.

Ultimately, there is a lot to improve upon within the CAP development process, but because that was not within the scope of our project, we did not explore the pre-adoption phase thoroughly.

b) Limits to Our Study

i. Lack of Data

As mentioned, many of the CAPs we analyzed were less than 5 years old. This poses an issue when looking at implementation success because many cities have simply not had enough time to fully begin implementation or if they have, properly monitor success. Also, although we were able to obtain a sample of well-over half of all currently adopted CAPs, the overall population of adopted CAPs was only 67. There are 482 individual municipalities in the state of California. If given a few more years, there would likely be many more CAPs to evaluate, increasing the power of any statistical analysis performed.

ii. Study Limitations

The lack of significant connections between perceived influencing factors and the selected measures of implementation success reveal the limitations of this study. The small sample size used for the statistical investigation, combined with nonparametric variables, resulted in less powerful statistical tests. As more CAPs are adopted and

the number of CAPs undergoing implementation increases, more information can be tapped for implementation research.

The metrics used to define CAP implementation success also likely contributed to insignificant results. Because the primary purpose of CAP measures (excluding the few climate change adaptation measures that have been addressed) is to mitigate GHG emissions, the most effective measure of mitigation success would be to evaluate the quantity of GHG emissions reduced. In lieu of strong quantitative data on emissions reductions, the percentage of implemented measures is not a good substitute for present and future emissions reductions accomplishments. This metric does not capture temporal or relative mitigation contribution aspects of the measures that have been implemented. For example, a fully implemented measure may have been designed to achieve savings through community participation over several years' time (e.g., with a green building standard or an energy efficiency rebate program), in which case the full potential of the GHG emissions reductions has would not be realized for many years.

The lack of substantial quantitative data for emissions reductions from this study can be attributed to several factors, most importantly monitoring practices and CAP age. Most cities rely on periodic city-wide GHG inventories (typically every five years) to quantify city GHG emissions, which are then compared to a baseline inventory to measure reductions. In addition to being expensive, this method is problematic because comparisons between inventory results are sensitive to economic changes, inventory methodology changes, and city growth, all of which make it difficult to tease out what results are directly attributable to the CAP. A more effective monitoring system would define indicator metrics for each measure (or groups of measures), which can be tracked more frequently than every 5 years to give city staff a better grasp of measure performance and mitigation achievements.

It is important to note that the majority of CAPs adopted in California are between one and five years old. Consequently, there may not have been enough time for cities to undergo multiple GHG inventories to compare current and baseline emissions. Even an inventory was completed, there may not have been enough time for implemented measures to contribute substantially to reductions. It may be more effective to survey mitigation achievements and implementation success after the majority of CAPs have been in place for more than 5 years.

The statewide scope of this study likely limited the number of detailed findings. The incredible variety in complexity, scope, and quality of adopted CAPs in California, in addition to the variability in city and regional characteristics, may have contributed to insignificant findings. The need to limit the time required of a city interviewee during survey administration further prevented more detailed information from being collected on each CAP implementation factor.

iii. Focus on Specific Sector, No Opportunity to Dive Deep

The California CAP survey results from this research effort shed some light on the factors that cities have perceived as influential in the CAP implementation process. The qualitative data collected through interviews provided important insight on the successes and struggles experienced by those people working directly on CAP implementation in their respective cities. Quantitatively, the survey data highlighted common factors influencing CAP implementation among cities. The statistical analysis did not show significant relationships between barriers or city characteristics and implementation "success", as defined by perceived implementation success by city representatives as well as percentage of measures fully implemented.

c) Recommendations for Future Studies

A future study may be more effective at predicting CAP implementation success indicators by focusing on a subset of CAP implementation (such as a specific CAP sector, geographical region, or city size). Limiting the scope of CAP research would enable a deeper dive into important issues for implementation. Research on a specific subset will be more feasible in the next few years as CAP adoption continues to increase.

Finally, the varied quality of adopted CAPs merits an investigation into the CAP development process and how CAP measure design and planning impact the success of implementation. Cities may not realize that some implementation struggles may be due to poor CAP design. While it is difficult for individual cities to identify strengths and weaknesses of CAP design as it relates to implementation if there is not an obvious basis of comparison, a meta-analysis of the relationships between CAP design and implementation could lead to important best practices for cities developing or revising CAP documents.

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APPENDIX A. Survey Template

General Measures of Implementation Success

For the following statement, please indicate the degree to which you agree or disagree:

Significant Barriers to Implementation	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. CAP implementation has been successful in my city.					

2. Roughly what % of your community CAP greenhouse gas (GHG) mitigation measures have been fully implemented?
3. Roughly what % of these actions was your city already undertaking before adoption of the CAP?
4. Roughly what % of your community CAP GHG mitigation targets are met by measures that are independent of State/regional programs such as the Renewable Portfolio Standard?

For each of the following statements, please indicate the degree to which you agree or disagree that these are significant barriers to the community CAP implementation:

Significant Barriers to Implementation	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
5. Insufficient funding is a significant barrier to CAP implementation					
6. Insufficiently trained staff is a significant barrier to CAP implementation					
7. Insufficient engagement from elected city officials is a significant barrier to CAP implementation					
8. Opposition from elected city officials is a significant barrier to CAP implementation					
9. Insufficient community participation is a significant barrier to CAP implementation					
10. Opposition from the community is a significant barrier to CAP implementation					
11. Insufficient community understanding of climate science is a significant barrier to CAP implementation					
12. Insufficient environmental organization participation is a					

significant barrier to CAP implementation					
13. Opposition from environmental organizations is a significant barrier to CAP implementation					
14. Insufficient local business participation is a significant barrier to CAP implementation					
15. Opposition from local businesses is a significant barrier to CAP implementation					
16. Insufficient data on community GHG emissions is a significant barrier to CAP implementation					
17. Insufficient monitoring of CAP GHG mitigation measures is a significant barrier to CAP implementation					
18. Insufficient reporting of CAP performance is a significant barrier to CAP implementation					

19. What is the most important barrier to implementation for each of the following sectors?
    a. Transportation
    b. Energy
    c. Water
    d. Waste
    e. Open space/land use
    f. Other (please specify)
20. Can you share any success stories of overcoming barriers to implementation?

Monitoring/reporting

21. How many tons of CO_2e has your CAP abated?
22. If you do not know the exact quantity, what % of your GHG reduction target have you met? Please confirm what target year you are referring to.
23. Have you significantly revised any of your CAP measures in response to results of monitoring?

For each of the following statements, please indicate the degree to which you agree or disagree:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
24. The city has regularly tracked progress of CAP implementation					

25. The city has regularly tracked GHG emissions reductions for fully implemented CAP measures					
26. The monitoring process(es) in place has accurately captured GHG mitigation achievements					

27. What are the most important barriers to monitoring?

Community/City Politics

For each of the following statements, please indicate the degree to which you agree or disagree:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
28. Elected official participation has contributed to successful CAP implementation					
29. The political climate in my city has supported CAP implementation					
30. The community has supported CAP implementation					
31. The diffusion of regional politics has supported CAP implementation					

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Not Applicable
32. The community experienced an extreme event linked to climate change, which has led to greater support from the **City Council** for CAP implementation						
33. The community experienced an extreme event linked to climate change, which has led to greater support from the **public** for CAP implementation						
34. The city has hosted public workshops, which have supported CAP implementation						
35. The city created a task force or committee, which has supported CAP implementation						

36. Are there other community or political issues that have influenced CAP implementation?

Stakeholders

For each of the following statements, please indicate the degree to which you agree or disagree:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
37. Environmental organization participation has contributed to successful CAP implementation					
38. Local business participation has contributed to successful CAP implementation					
39. The collaboration of governments in my region has contributed to successful CAP implementation					

40. Are there other stakeholders that have contributed to successful CAP implementation?

Funding

For each of the following statements, please indicate the degree to which you agree or disagree:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
41. My city aggressively applies for grants related to CAP implementation					
42. My city has sought outside guidance for pursuit of funding					
43. Significant funding sources have fallen through					

Internal Organization

44. Which city department oversees CAP implementation?

45. How many city employees are assigned to lead CAP implementation (full-time equivalent)?

46. Can you think of any other CAP implementation barriers or successes that you would like to share?

APPENDIX B. Survey Results of Likert-Scale Questions

General Measures of Implementation Success

For the following statement, please indicate the degree to which you agree or disagree:

Significant Barriers to Implementation	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. CAP implementation has been successful in my city.	48%	30%	6%	12%	3%

For each of the following statements, please indicate the degree to which you agree or disagree that these are significant barriers to the community CAP implementation:

Significant Barriers to Implementation	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
2. Insufficient funding is a significant barrier to CAP implementation	48%	30%	6%	12%	3%
3. Insufficiently trained staff is a significant barrier to CAP implementation	6%	48%	21%	21%	3%
4. Insufficient engagement from elected city officials is a significant barrier to CAP implementation	6%	48%	21%	21%	3%
5. Opposition from elected city officials is a significant barrier to CAP implementation	0%	35%	30%	30%	5%
6. Insufficient community participation is a significant barrier to CAP implementation	0%	35%	30%	30%	5%
7. Opposition from the community is a significant barrier to CAP implementation	6%	48%	21%	21%	3%
8. Insufficient community understanding of climate science is a significant barrier to CAP implementation	6%	48%	21%	21%	3%
9. Insufficient environmental organization participation is a significant barrier to CAP implementation	48%	30%	6%	12%	3%
10. Opposition from environmental organizations is a significant barrier to CAP implementation	48%	30%	6%	12%	3%

11. Insufficient local business participation is a significant barrier to CAP implementation	3%	30%	36%	24%	6%
12. Opposition from local businesses is a significant barrier to CAP implementation	48%	30%	6%	12%	3%
13. Insufficient data on community GHG emissions is a significant barrier to CAP implementation	48%	30%	6%	12%	3%
14. Insufficient monitoring of CAP GHG mitigation measures is a significant barrier to CAP implementation	48%	30%	6%	12%	3%
15. Insufficient reporting of CAP performance is a significant barrier to CAP implementation	48%	30%	6%	12%	3%

Monitoring/reporting

For each of the following statements, please indicate the degree to which you agree or disagree:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
16. The city has regularly tracked progress of CAP implementation	48%	30%	6%	12%	3%
17. The city has regularly tracked GHG emissions reductions for fully implemented CAP measures	48%	30%	6%	12%	3%
18. The monitoring process(es) in place has accurately captured GHG mitigation achievements	48%	30%	6%	12%	3%

Community/City Politics

For each of the following statements, please indicate the degree to which you agree or disagree:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
19. Elected official participation has contributed to successful CAP implementation	48%	30%	6%	12%	3%
20. The political climate in my city has supported CAP implementation	48%	30%	6%	12%	3%
21. The community has supported CAP implementation	48%	30%	6%	12%	3%
22. The diffusion of regional politics has supported CAP implementation	48%	30%	6%	12%	3%

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Not Applicable
23. The community experienced an extreme event linked to climate change, which has led to greater support from the **City Council** for CAP implementation	3%	0%	13%	23%	0%	61%
24. The community experienced an extreme event linked to climate change, which has led to greater support from the **public** for CAP implementation	0%	0%	13%	26%	0%	61%
25. The city has hosted public workshops, which have supported CAP implementation	26%	42%	6%	13%	0%	13%
26. The city created a task force or committee, which has supported CAP implementation	23%	29%	16%	13%	0%	19%

Stakeholders

For each of the following statements, please indicate the degree to which you agree or disagree:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
27. Environmental organization participation has contributed to successful CAP implementation	48%	30%	6%	12%	3%
28. Local business participation has contributed to successful CAP implementation	48%	30%	6%	12%	3%
29. The collaboration of governments in my region has contributed to successful CAP implementation	48%	30%	6%	12%	3%

Funding

For each of the following statements, please indicate the degree to which you agree or disagree:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
30. My city aggressively applies for grants related to CAP implementation	48%	30%	6%	12%	3%
31. My city has sought outside guidance for pursuit of funding	48%	30%	6%	12%	3%
32. Significant funding sources have fallen through	48%	30%	6%	12%	3%