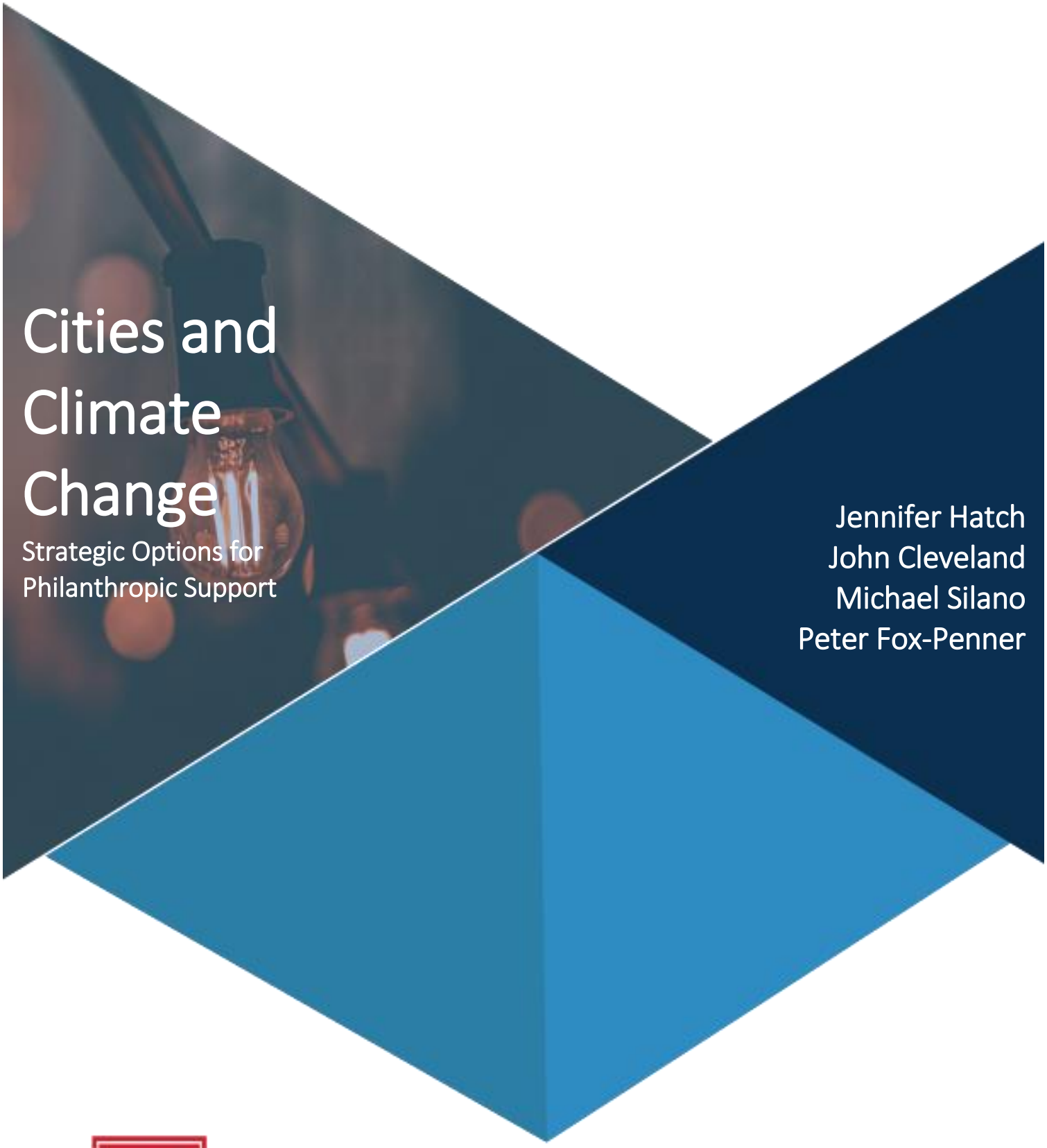

Cities and Climate Change

Strategic Options for Philanthropic Support

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Contents

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1. Introduction and Purpose

Now, more than ever, cities are at the front lines of U.S. climate action. As national action stalls, there is still a daunting amount to be done in reducing human-generated climate emissions. Fortunately, this report comes in the wake of a groundswell of initiatives to engage on climate change by cities, countries, and states across the U.S. Several important and thorough reports on the types of mitigation actions cities can take have recently been released. We already have examples of cities taking significant leadership roles in reducing their own climate emissions, from New York and Boston to Austin, Boulder, and Los Angeles - yet U.S. climate emissions continue to rise, and cities have an outsized role to play.

The purpose of this project is to review current U.S. city climate activities in order to identify areas where additional investment by foundations could help accelerate city action to reduce urban greenhouse gas emissions. The focus of the inquiry is on aggressive actions cities can take that significantly increase their "level of ambition" to achieve emissions reductions on an accelerated timetable. City strategies on climate adaptation are not encompassed in this project. With this investigation we seek to address the following questions show in the box below:

Our Three Objective Questions

- Under the increasing number of city networks, climate plans, NGO actions, and funder initiatives, where are the strategic areas that could most benefit from additional funding?
- What are the levers that will most rapidly and significantly catalyze emissions reductions?
- What are the methods of engagement that hold the most promise for widespread adoption and action?

We explored these questions primarily by depending on expert interviews with professionals well-versed in city actions on climate change, in addition to our expert interviews, we conducted a multi-tool analysis including desk research and GIS and spatial analysis.

The starting point for our analysis included the following key observations:

- **Cities are critical players in climate mitigation** because the majority of emissions are generated in cities.
- **Cities face important limitations on actions they can take**, both because of legal limitations in authority for the core emitting sectors (energy supply, buildings, transportation and waste), and because there are many emissions sources that are not part of their GHG reduction scope (e.g. consumption-based emissions). Progressive state and federal policies continue to be an essential part of deep urban de-carbonization.
- **The practice of city-based mitigation is getting more sophisticated.** Many useful reference documents have been created; best practice networks have been developed; and ambitious city-specific initiatives have been launched.

- **The list of high impact urban de-carbonization strategies is well-developed.** The challenge is not knowing what needs to be done, but rather how to do it.
- **There are still a large number of cities that have taken little or no action to control emissions** and even those with more sophisticate plans often fail to accomplish vigorous implementation.
- **In specific, work on thermal de-carbonization and transportation de-carbonization lags** the work on de-carbonization of electricity supply.
- **There are many funders engaged in city climate mitigation grant-making.**

From our interviews and research, we reached the following conclusions and recommendations:

1) There are many good options for engaging cities on aggressive climate mitigation strategies. These include:
    - Engaging cities in state-level policy change
    - Engaging cities in supporting climate mitigation at the metro-region scale
    - Supporting city innovation development
    - City capacity building
    - Developing city engagement with utilities

2) We recommend prioritizing two of these options:
    1. Engaging cities in state-level policy change
    2. Engaging cities in supporting climate mitigation at the metro-region scale

3) We recommend targeting the work with cities on state policy change in the following states that have a combination of high levels of emissions and low levels of proactive climate mitigation action:
    - Texas
    - Pennsylvania
    - Illinois
    - Ohio
    - Florida
    - Michigan
    - Colorado
    - Nevada

This report is by no means the only attempt to identify gaps and opportunities in city climate change action, and we review several relevant reports to provide input into our recommendations. Nevertheless, there is still a knowledge gap regarding the most effective targeted funding opportunities for significant emissions reductions in U.S. cities. Our research process is aimed specifically at identifying those gaps.

2. Research Process

Our approach to answering our three objective questions was based on a combination of expert interviews and analysis that occurred in three stages. We began with a research phase that generated a set of strategic assumptions for further investigation. This research capitalized upon existing knowledge and experience with city climate action and networks, in addition to supplemental web research, to develop our strategic assumptions. The networks and reports we reviewed are elaborated below. The second stage of our work to conduct a number of interviews and synthesize their results. The final stage of our work consisted of applying our interview findings to further geographic research to generate our final recommendations.

The first stage of our research focused on determining the gaps in our knowledge and generating a template for our interviews. [1] The resulting interview template is summarized in the following questions:

- What is the actual status of funder city climate mitigation strategies, and where do funders think additional engagement would add value?
- What are some city climate mitigation strategies being pursued by the large environmental organizations?
- How will the Bloomberg American Cities Climate Challenge Initiative change the landscape?
- What is the best way to connect city work to state policy work?
- What kinds of new governance structures are needed in cities to implement deep de-carbonization strategies?
- Are there any areas where additional funders could partner with existing funder efforts?

One-on-one interviews were conducted with the following city professionals who have extensive experience helping cities develop and implement climate mitigation strategies:

- Michael Armstrong and Ariella Maron, City Scale
- Johanna Partin, Carbon Neutral Cities Alliance
- Nils Moe and Garrett Fitzgerald, Urban Sustainability Directors Network
- Darryl Young, Summit Foundation
- Jenna Tatum, (formerly with NYC sustainability office, now running the Building Electrification Initiative)
- Patty Fong, European Climate Foundation

Our interviews revealed several common threads among those working in city climate policy. Common concerns centered around institutional support, both to ensure leading cities succeed

[1] Our Interview Document can be found in Appendix 1.

in following through with their action plans and to easily inspire action in less active cities; grassroots and media outreach to support policies once they are enacted; city-state collaboration, regional collaboration, and city-utility collaboration; and that the new funding or projects be additive and collaborative, rather than distinct from prior activities.

The results of these interviews led to the third stage of our analysis, further exploring the geographic and political context within which potential strategies could be executed. The aim of our geographic and political analysis was by no means a comprehensive review of the political and geographic nuances of states and cities in the U.S. – rather, the aim was to provide high-level analysis that would serve as a heuristic by which funders could prioritize and further explore promising regions for deeper examination.

To do so, we examined key summary data, such as city population size, greenhouse gas emissions, and participation in key climate networks. We combined this information with insight into state political environments and priorities identified by the experts with whom we consulted. Further detail on the networks and criteria for evaluation can be found in Section 3.

Once we gathered insights from our interviews and analysis, we developed five potential engagement strategies, elaborated in Section 4. Given the abundance of city programs already in existence, from these five engagement strategies we narrowed our priorities to two based on the following criteria:

- Likely spillover effects in emissions (i.e. can influence an entire state)
- Ability to address limitations of city boundary problems
- Alignment with various targeted strategies and agendas on State climate mitigation policy and the desire to collaborate but not compete with other major funding initiatives

As a final check of the relevance of our proposed strategies, we returned to a subset of our interviewees for feedback on whether our approach was sound.

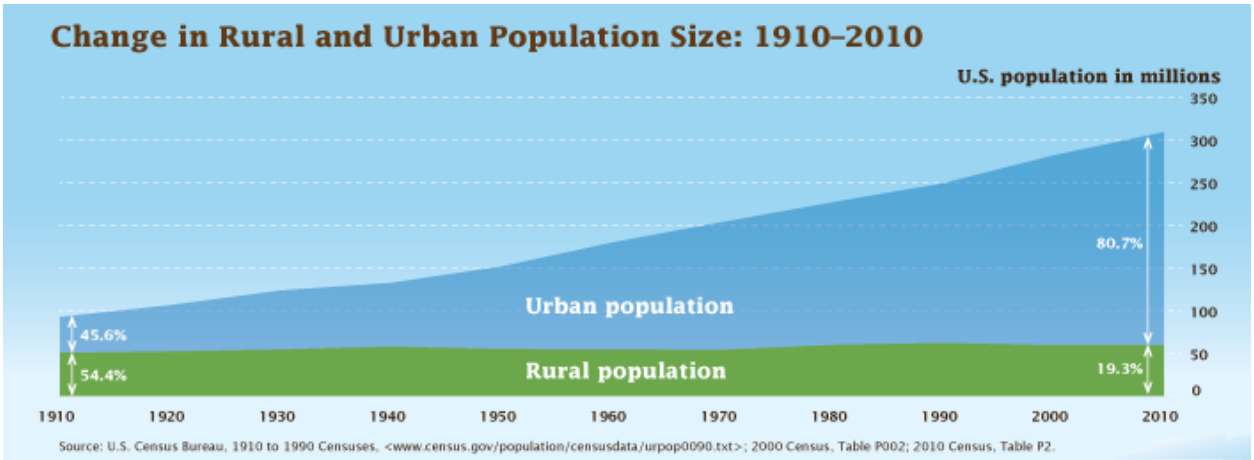
3. Background and Strategic Hypothesis

There is a broad range of activities already taking place that are designed to support cities in taking aggressive climate mitigation actions. It is important to acknowledge these efforts and not duplicate them. Our review has brought to light the following key summary points and hypothesis.

Cities are Key to Emissions Reductions

Urban areas account for an increasingly large percentage of GHG emissions. As noted by the Carbon Disclosure Project, "the transition to a sustainable economy will be won or lost in our cities". Worldwide, cities account for 75% of global greenhouse gas emissions.[2] This is certainly true in the United States as well, where the U.S. urban landscape is changing. Starting a century ago, the U.S. population has steadily shifted from rural areas top urban population centers. In the most recent census in 2010, more than 80% of the US population was located in urban areas.

Figure 3-1: Change in Rural and Urban Population Size 1910-2010



As U.S. city populations have grown, it is no surprise that the top 5 emitting cities account for 2 percent of total U.S. emissions, and 7 percent of building energy emissions. This increasing urbanization presents an unprecedented opportunity for city governments to lead in reducing climate emissions as part of the world's second largest GHG emitting economy. This outsized role in reducing GHG emissions has led some cities, with the support of NGOs and intergovernmental networks, to begin tackling their emissions footprints in earnest.

In general, direct emissions from cities come from four primary GHG emissions sectors. Fortunately by now we know the broad strokes of what is required to achieve city carbon neutrality in each sector. While the details will vary by city context (political, regulatory, climate, existing assets, etc.), the broad outline of "must haves" is now relatively well

[2] Climate Disclosure Project, accessed 10/1/2019 at: https://data.cdp.net/browse

documented. Nearly all city climate mitigation strategies include action in the following sectors and subsectors:

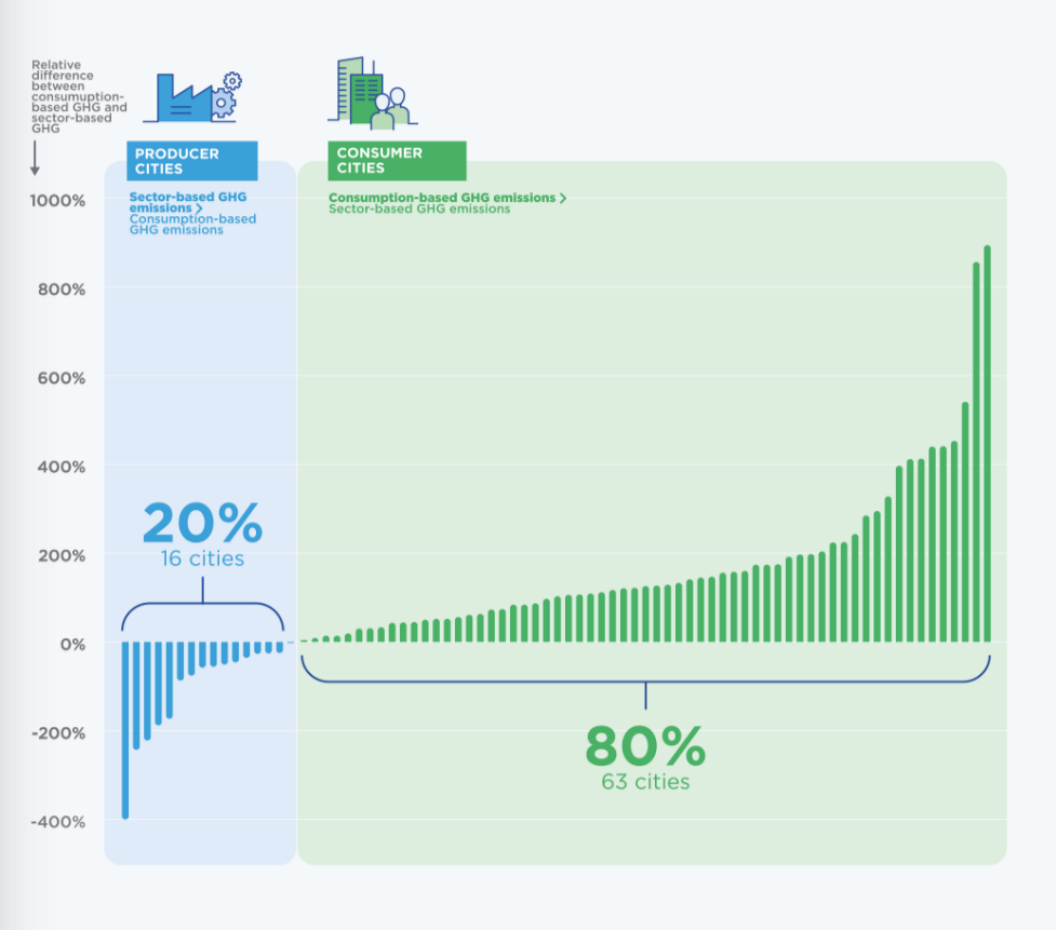
- Electricity:
  - Complete de-carbonization of the electrical grid and increased use of renewable distributed generation resources.
- Buildings:
  - Elimination of the use of fossil fuels for heating and cooling buildings, primarily through conversion to thermal electric technologies.
  - Deep improvements in building energy efficiency, in both new and existing buildings.
  - Zero Net Carbon requirements for all new construction.
- Transportation:
  - Significant mode shifts away from personal vehicles to mass transit and active transportation (walking & biking).
  - More compact settlement patterns organized around Transit-Oriented Development.
  - Elimination of the use of fossil fuels for transportation, primarily through vehicle electrification.
- Waste:
  - Achievement of 100% waste diversion
  - Minimization/utilization of GHG emissions from waste processing.

There are also important emissions that are often not included in city climate strategies. These include agriculture, air transport, consumption-based emissions, and industrial emissions. A C40 cities report found that that the GHG emissions associated with the supply chain are significant - over 70% of consumption-based emissions come from utilities, housing, capital, transportation, food supply, and government services.[3]

Consumption-based emissions of the 79 C40 cities included in the study represents a 60% gross increase over the 2.2 GtCO2e of scope 1 and 2 emissions estimated for the same cities in the same year. This calculation isn't the result of a few egregious actors – of the 79 cities studied, 80% of them have larger consumption-based GHG emissions than their sector based GHG emissions.

[3] *Consumption-based Emissions of C40 Cities*, C40 Network

Figure 3-2: Impact of Consumption-Based Emissions on City GHG Footprint



Source: *Consumption-Based Emissions of C40 Cities*, C40 Report

Consumption-based emissions can be more complicated for cities to tackle, but there is a very important role for cities to play in these areas. Nonetheless, this report focuses on traditional scope 1 and 2 emissions and how to deliver on the promise of reductions in those sectors.

Cities Face Limits on what they Control

There are significant variations in cities' level of control over key emissions sectors, and cities often do not have direct control over decisions that drive GHG reductions. Their level of control varies by type of municipal governance and state and federal laws.

- Control over electricity will vary depending on whether the city has its own utility; whether the market is regulated or deregulated, and what kinds of incentives and permissions state government has allowed for renewable energy generation. In most cases, electricity emissions reduction policy is controlled by the state, and transmission decisions made by the Independent System Operator of the regional electrical grid. Cities with municipal utilities typically will have the highest level of control over electricity-based emissions.
- Control over transportation will vary based on the complex set of transportation funding and governance structures that are in place, including whether the city does or does not control its public transit system and who controls private transportation routes into the city.
- Control over buildings will vary by the degree to which the city does or does not control its own building code, and how it regulates new development.
- Control over waste will depend on how the waste management regime in the city is regulated.

A city's ability to undertake mitigation actions is significantly influenced by state-level policy. Cities located in states that have aggressive state-level clean energy and climate strategies have a more supportive environment in which to implement aggressive actions at the city level. The key state-level policy lever that can influence city mitigation strategies include:

- Whether the state has deregulated electricity markets.
- Whether community choice aggregation is allowed.
- The type and level of incentives for on-site solar generation, such as net-metering.
- Whether community solar installations are allowed.
- The degree to which large users are allowed to purchase power from the wholesale market.
- Whether the state has implemented Renewable Portfolio Standards, and at what level.
- Utility franchise agreements and the degree to which they do or do not inhibit district energy systems.
- Whether the state has a rate payer fund or other source for providing energy efficiency incentives, and how those programs are administered (e.g. by the utilities or by a third party administrator).
- State strategies on grid modernization.
- State incentives for electric vehicles, and utility investment in charging infrastructure.
- State building codes and whether they allow local stretch codes.

City Mitigation Strategies are increasing in their Sophistication

There is an increasingly refined set of practices and analyses around city climate mitigation strategies. The discipline has evolved professionally in significant ways over the last two decades. There are now many common protocols (e.g. GPC for emissions inventories), frameworks (e.g. the Carbon Neutral Cities Alliance Framework for Long-Term Deep Carbon Reduction Planning), and analysis tools (e.g. the sophisticated policy modeling platforms

developed by NYC and Boston). This field evolution is producing increasingly sophisticated city strategies for mitigation, and this increasing sophistication in turn has produced several research reports on city climate mitigation. Examples include:

- CNCA's Framework for Long-Term Deep Carbon Reduction Planning: The framework serves as an initial template that cities can use to take a comprehensive approach to developing carbon reduction plans.

- C40's Deadline 2020 report: Released as an update and pathway detailing what actions need to be undertaken before the year 2020, if today's megacities are to deliver their part of the Paris Agreement.

- CNCA Game Changers: A report by the Carbon Neutral Cities Alliance that describes bold actions by member cities to accelerate progress toward carbon neutrality

- A set of reports by the Cadmus group on decarbonizing energy supply in cities.

Appendix 2 includes a more detailed list of documents, protocols and tools that have been developed around city climate mitigation.

There are also many promising sector-specific strategies emerging that are focused on, or include, cities. Several examples include:

- The Building Electrification Initiative, which developed out of multiple USDN and CNCA investments in thermal de-carbonization strategies and is building a network of cities and TA support to advance city strategies to convert fossil thermal sources to electrification technologies.
- The Transportation Climate Initiative organized by the Georgetown Climate Center and working with 12 New England states to drive carbon reductions from the transportation sector.
- Multi-city zero-carbon power purchase networks are underway in cities across the country.
- The Architecture 2030 Zero Cities project is working with a network of cities implement building carbon reduction regulations that can achieve an 80% reduction by 2050.

However, there are still many cities that have done little or no serious climate planning. While the larger, more sophisticated cities have tended to move forward on some version of a climate mitigation plan, the vast majority of mid-sized and smaller cities have not done much other than rudimentary planning.

Having a plan does not automatically translate into implementation success. Even for the cities with sophisticated mitigation strategies, there is often a serious gap between planning and implementation. Implementation of aggressive carbon reduction strategies requires politically difficult regulation, strong financial incentives, dedicated revenue sources, and staffing

resources. In general, we believe that these are broad areas in which philanthropy can have especially important impacts.

Commitments and progress on electricity de-carbonization are outpacing actions in transportation and thermal de-carbonization. An increasing number of cities are committing to convert municipal or community-wide electricity consumption to 100% renewable sources. Far fewer cities have made aggressive commitments or acted to de-carbonize their thermal or transportation sectors.

There is an Important Role for Funders and Other Actors

Funders can support city climate mitigation in a diverse set of ways, depending on their expertise and interests. Many funders have already supported the following types of initiatives, often to great success:

- Analysis and research to create the foundation for strategy (e.g. Carbon Free Boston; C40 Deadline 2020)
- Risk capital to help develop the feasibility of innovative strategies (e.g. the USDN and CNCA Innovation Funds)
- Support for execution and implementation (e.g. City Energy Project)
- Networks to support best practice sharing and collaboration (e.g. USDN, CNCA, C40)
- Support to help cities influence state policy
- Cross-sectors collaboration (health care, higher education, corporate, etc.)

And, in addition, many funders have put forward specific or dedicate funds to city climate mitigation in particular. Some notable examples include:

- Bloomberg Philanthropy's recently announced $70 million American City Climate Challenge.
- The Barr Foundation's ongoing support and particularly their participation in the global philanthropy partnership supporting USDN and CNCA.
- European Climate Foundation's support of energy efficiency and transportation in European cities.
- The Rockefeller Brothers Fund commitment to devote 20% of funds from their sustainable development program to city and state initiatives.
- The Children's Investment Fund's support of C40 and Industrial De-carbonization.
- Ongoing support from Kresge Foundation, Macarthur Foundation, Summit Foundation and others.

4. Strategic Recommendations for Priority Engagement

"Next-level" climate strategies could be structured in several ways. Of course, choosing the sectors and de-carbonization strategies that have the greatest potential for carbon reductions is an important start. However, ensuring these strategies are widely and rapidly adopted, and capture the greatest total emissions reductions potential, requires additional layers of analysis.

Here we provide three dimensions of analysis to present strategies with the highest mitigation potential:

- First, we review the essential technical de-carbonization measures for any city, which have largely already been assessed by top experts in the field;
- Next, we conduct a geographic and political analysis of where these measures could be implemented to greatest additional effect in cities, based on total GHG emissions, political context, and current city activity;
- Finally, we propose priority city engagement strategies to achieve the highest mitigation potential; we use the analysis of de-carbonization and geographic strategies to highlight how these engagement strategies could be best employed.

Type of De-carbonization Measure

Fortunately, several expert networks and organizations have recently completed reviews of high-impact strategies for cities. The CNCA just issues a report in California on eight "game changer" strategies for emissions reduction that have been pioneered by its members. USDN recently issued its initial report on 61 "High Impact Practices" that have been prioritized by its 200 city members. The recently released report by America's Pledge on America's Low Carbon Future is also a good resource on high impact strategies. Instead of duplicating their excellent work in this area, this report compiles the results of that analysis to focus on top near-term and stretch practices that cities should have in place in order to achieve substantive emissions reductions.

The CNCA identified seven "game changers" or what they called "next generation" practices that other cities should adopt.[4] From their research, their seven game changing practices include:

- Zero-emissions standards for new buildings
- Ubiquitous electric vehicle charging infrastructure
- Organic material recovery mandates
- Electrification of building heating and cooling
- Designation of car-free or low-emissions-vehicle zones
- Local empowerment of renewable energy purchasing
- City climate budgets

[4] CNCA, 2018. *Game Changers: Bold Actions by Cities to Accelerate Progress Towards Carbon Neutrality.* Accessed 10/1/2019 at: http://carbonneutralcities.org/wp-content/uploads/2018/09/CNCA-Game-Changers-Report-2018.pdf

The report from America's Pledge similarly spanned important emissions sectors.[5] Their top choice practices included:

- Renewable energy targets
- Retirement of coal fired power plants
- Building retrofits at key trigger points
- Electrification of building energy use
- Phasing out of HFCs
- Acceleration of electric vehicle adoption
- Prevention of wellhead methane leaks
- Reduction of city methane leaks
- Regional strategies for carbon sequestration from land use
- Region-wide carbon pricing

From these analyses of de-carbonization strategies, electric vehicle infrastructure and acceleration, building efficiency measures, building electrification, addressing the electricity supply, and implementing some sort of carbon limit are the key components of city emissions reductions. A policy or practice gap in any of these five areas ensures that cities will not meet their targets.

Successfully implementing this suite of actions requires proper support and engagement, and choices regarding the type of engagement strategy and geographic targets will significantly influence the de-carbonization strategy that is chosen. The good news is that the types of technical strategies to reach significant de-carbonization are well known. The more challenging questions are how best to engage cities and where to geographically target for maximum impact. Both of these questions are discussed in more detail below.

Geographic and Political Targeting

The geographic and political backdrop of each state is essential to determining the likely impact of any strategy. We develop a heuristic process to direct initial efforts for a further deep dive of target cities or regions, examining key state indicators (population, emissions, and political leaning), city indicators (population and carbon footprint, participation in multi-city networks, level of action taken), and regional city context (percent of total state emissions of the ten most populous cities per state).

A brief overview of state population and emissions data, along with cursory assessment of political leaning in the major states gives a measure of states that could be priorities for state and metro-region action. Because of the regional and state focus of the recommended strategies, ideal states will a) have high overall emissions, b) have high per capita emissions, and c) ideally be right-leaning or toss-up states politically.

[5]America's Pledge. *America's Low-Carbon Future.* Accessed 10/1/2019 at https://www.bbhub.io/dotorg/sites/28/2018/07/Bloomberg_AmericasPledge_OpportunityAgendaReport_Final.pdf

Data on the top 10 emitting states is summarized in the table below.

Figure 4-1 Top Emitting States by Politics, Emissions, and Population (Note: Colors of states represent political leanings.)

Rank	State	CO2 Emissions (mil metric tons)	Percent of US total Carbon Emissions	2014 Population	Percent of US Pop.	CO2 Per Capita
1	Texas	709	13.04%	26,956,958	8.45%	26.29
2	California	359	6.61%	38,802,500	12.17%	9.26
3	Pennsylvania	242	4.46%	12,787,209	4.01%	18.94
4	Illinois	233	4.29%	12,880,580	4.04%	18.12
5	Ohio	229	4.21%	11,594,163	3.64%	19.75
6	Florida	227	4.18%	19,893,297	6.24%	11.41
7	Louisiana	207	3.81%	4,649,676	1.46%	44.5
8	Indiana	203	3.74%	6,596,855	2.07%	30.81
9	New York	170	3.13%	19,746,227	6.19%	8.61
10	Michigan	162	2.97%	9,909,877	3.11%	16.31

This list led us to prioritize and analyze the following states:

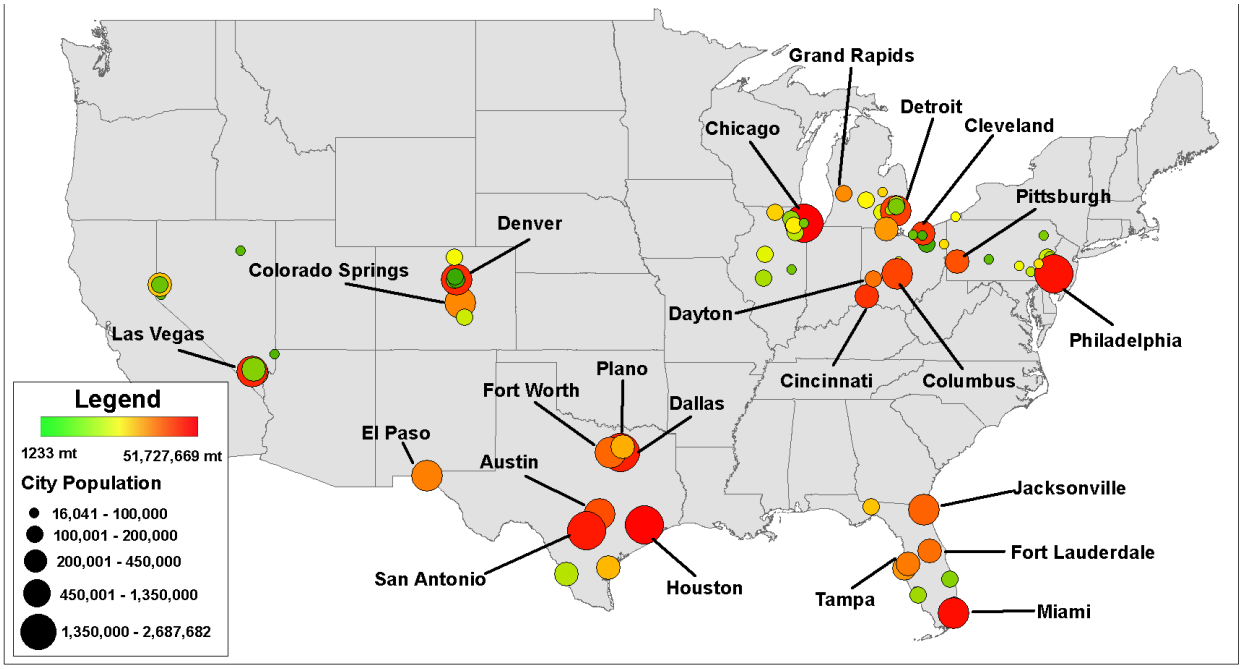
1. Texas
2. Pennsylvania
3. Illinois
4. Ohio
5. Florida
6. Michigan
7. Colorado
8. Nevada

California and New York were taken off of the top 10 list because they are already leaders in progressive state climate policy. Colorado and Nevada were added because they have been historically swing states, and were also identified as priorities by city climate experts and funders. Louisiana and Indiana were taken off the list due to their difficult political situation.

Key Cities in Target States

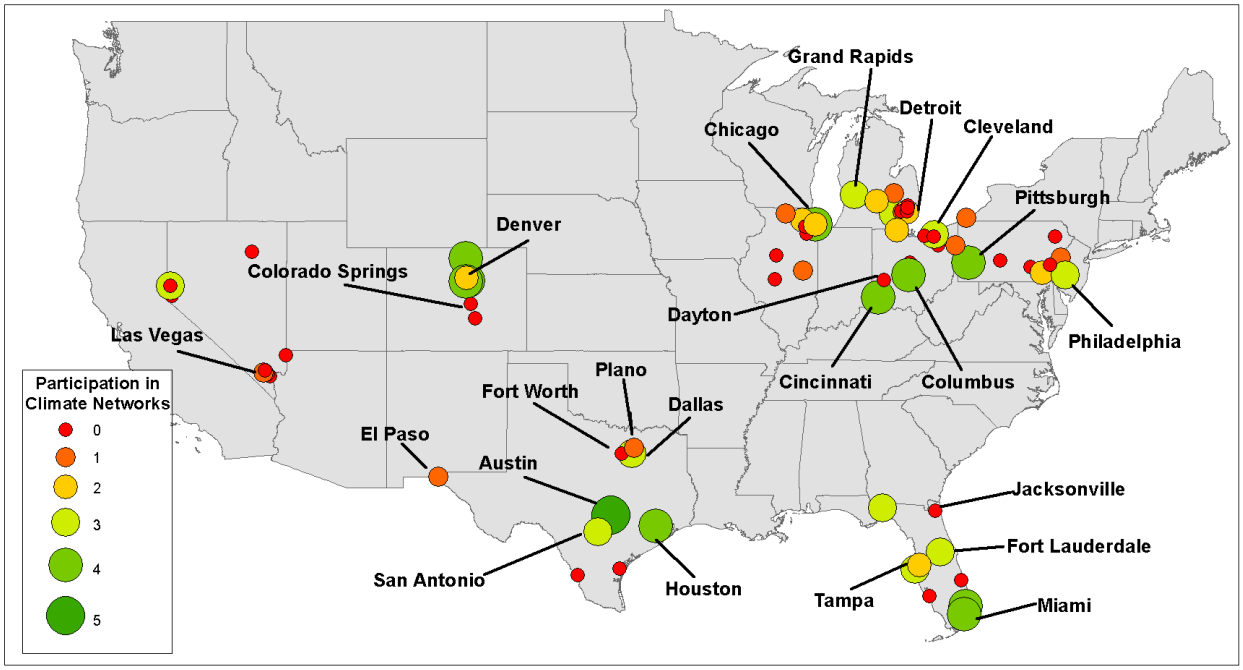
Within target states, cities can be defined by a) their contribution to absolute and relative state emissions and b) the level of action already taken by city governments. For ease of analysis, we have chosen to only examine the top ten most populous cities in each of our target states. In figure 2-2, we can see that some states have a few significant emitters (PA, MI, IL, NV) while others (TX, PA, OH) have multiple cities with significant emissions profiles.

Figure 4-2: Cities by Population and Total Emissions



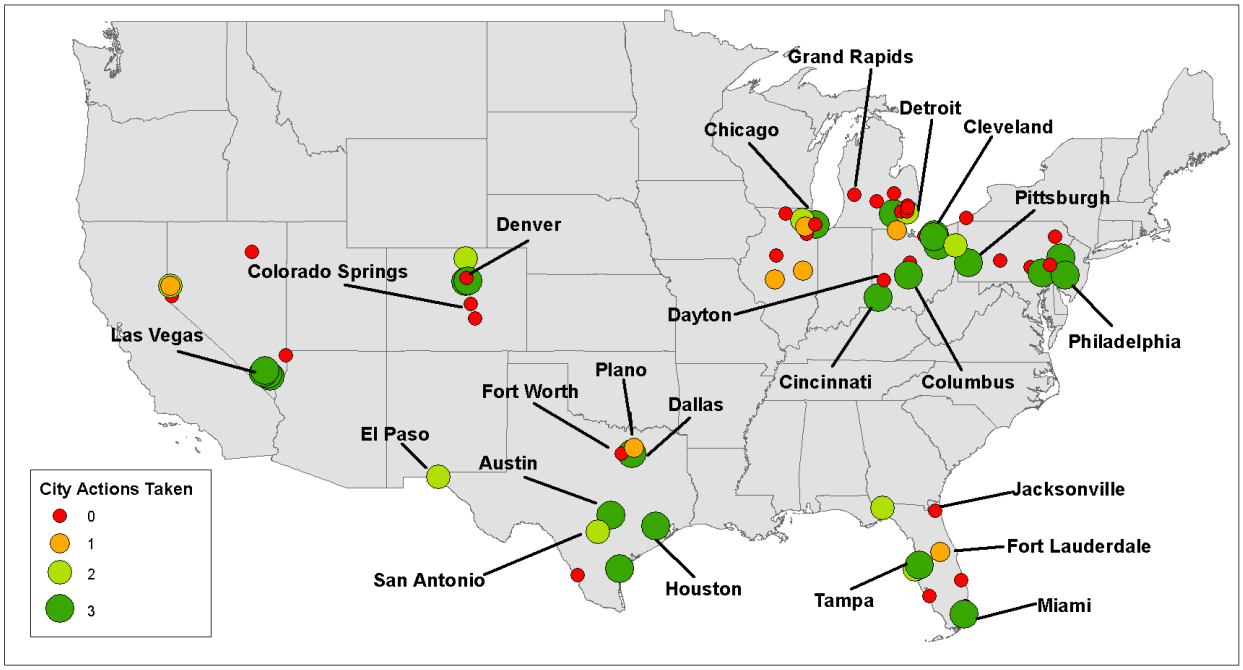
Of those cities with high emissions profiles, several of them are already making moves to participate in city climate networks. Figure 2-3 demonstrates participation in any of five city climate networks that we examined. The networks included in our analysis were: the Carbon-Neutral City Alliance, ICLEI, Climate Mayors, C40, and the Global Covenant of Mayors.

Figure 4-3: City Participation in Climate Networks



These cities appear to be playing more than lip service to the idea of taking action to address climate change; for example, many of the major emitting states in Texas and Ohio have not only joined networks but have also implemented emissions inventories, targets, and action plans for emissions reductions.

Figure 4-4: City Actions taken to date



Choosing Focus Cities in Key States

The fact that several indications of climate action do not yet indicate lower overall emissions could be a sign of several things. In the case of major leading states such as California and New York, per capita emissions are significantly lower than average and de-carbonization plans are in place. The focus in these states should be on staying the course and ensuring implementation success.

In the case of states with significant initial actions to reduce emissions and high city or state emissions, a few factors may be at play. First, while cities may be taking action, they also may not influence a significant proportion of state emissions. In the case of Texas and Pennsylvania, only about a quarter of total state emissions come from the top 10 most populous cities, indicating that irrespective of individual leadership by cities in these states, broad regional or state initiatives will need to be implemented in order to address the additional emissions of that state.

Figure 4-5 Top ten cities % of total state emissions

State	Percent of State Emissions
CO	43.99%
FL	41.99%
IL	36.07%
MI	28.05%
NV	91.86%
OH	36.16%
PA	26.49%
TX	24.01%

Significant city action, especially in high emitting and politically difficult states, also needs to be encouraged and supported to ensure success. Pilot examples of city climate action in these states - especially Florida, Texas, and Ohio with several high-emissions cities, a red to purple political backdrop, and a large overall state emissions profile – should be supported, reinforced, and multiplied for greatest emissions impact.

5. Priority City Engagement Strategies

Depending on choices foundations make about the types of cities it wants to engage with, and the range of de-carbonization strategies it has an interest in, there are several different ways in which foundation grant making can engage with cities. Given our discussions with city climate mitigation experts and our review of current programs, we feel that targeted funding in coordination with existing funders and networks could be well invested in many of these opportunities.

Our list of engagement strategies include the following:

1. Engaging cities in state-level policy change
2. Engaging cities in supporting climate mitigation at the metro-region scale
3. Supporting city innovation development
4. City capacity building
5. Developing city engagement with utilities

Given the abundance of city programs already in existence, from these five engagement strategies we narrowed our priorities to two based on the following criteria:

- Likely spillover effects in emissions (i.e. can influence an entire state)
- Ability to address limitations of city boundary problems
- Alignment with various targeted strategies and agendas on State climate mitigation policy and the desire to collaborate but not compete with other major funding initiatives

The first two engagement strategies are our recommended priorities. It is clear that city climate action cannot be decided in a vacuum. While it is true that major cities account for the vast majority of greenhouse gas emissions, the per capita emissions in cities can actually be lower than in suburban or rural areas. A city's climate impact also lies in its ability to influence state or national policy, inducing broader action and greater reductions in emissions. Appliance standards are a perfect example, where individual state policies eventually led to a national standard.[6] In addition, a report by the Boston University Initiative on Cities found that several mayors derived greater value, lobbying power, and potential impact from regional city networks, as opposed to acting alone.[7]

In the following pages, we describe these engagement strategies in depth and then suggest some de-carbonization and geographic strategies that best capture the potential of each

[6] Energy Information Agency, 2008. *Historical Perspectives on Energy Codes and Appliance Standards.* Accessed 10/1/2018 at: https://www.eia.gov/conference/2008/conf_pdfs/Tuesday/Battles_Energy_Efficiency_2008_EIA.pdf
[7] Lusk, Katharine. 2018. *Cities joining ranks: Policy networks on the rise.* Accessed 3/7/2019 at: https://open.bu.edu/bitstream/handle/2144/28865/CityNetworks_041218sing.pdf?sequence=1&isAllowed=y

strategy. Finally, we briefly outline the three additional engagement strategies that could also be employed on a city level.

Engagement Strategy #1 – Engaging Cities in State-Level Policy Change

Overview of this approach

This approach involves organizing cities and other key players (large energy users and NGOs) to influence policy at the state level. It can be narrowly focused (e.g. intervene on utility rate cases) or more broadly focused (advocate for comprehensive clean energy legislation).

To date, few cities have organized together to influence and change state-level policy specifically regarding climate, although they are increasingly aware of the need to do so. They are generally not well set up to coordinate with other cities and large energy users on priority policy changes and then engage with the legislature and governors on making those changes happen. While many states have municipal associations that advocate for the priorities of cities in state and federal government,[8] these organizations tend to focus on topics such as finance, municipal administration, and intergovernmental relations, and do not focus on policy issues such as climate change.

Green community networks in CA are a notable exception. Donor contributions could support city and large energy user coordination on state-level policy change in targeted states. States could be targeted on a combination of factors, including their level of GHG emissions, the ripeness of policy change opportunities, the readiness of cities to engage, etc.

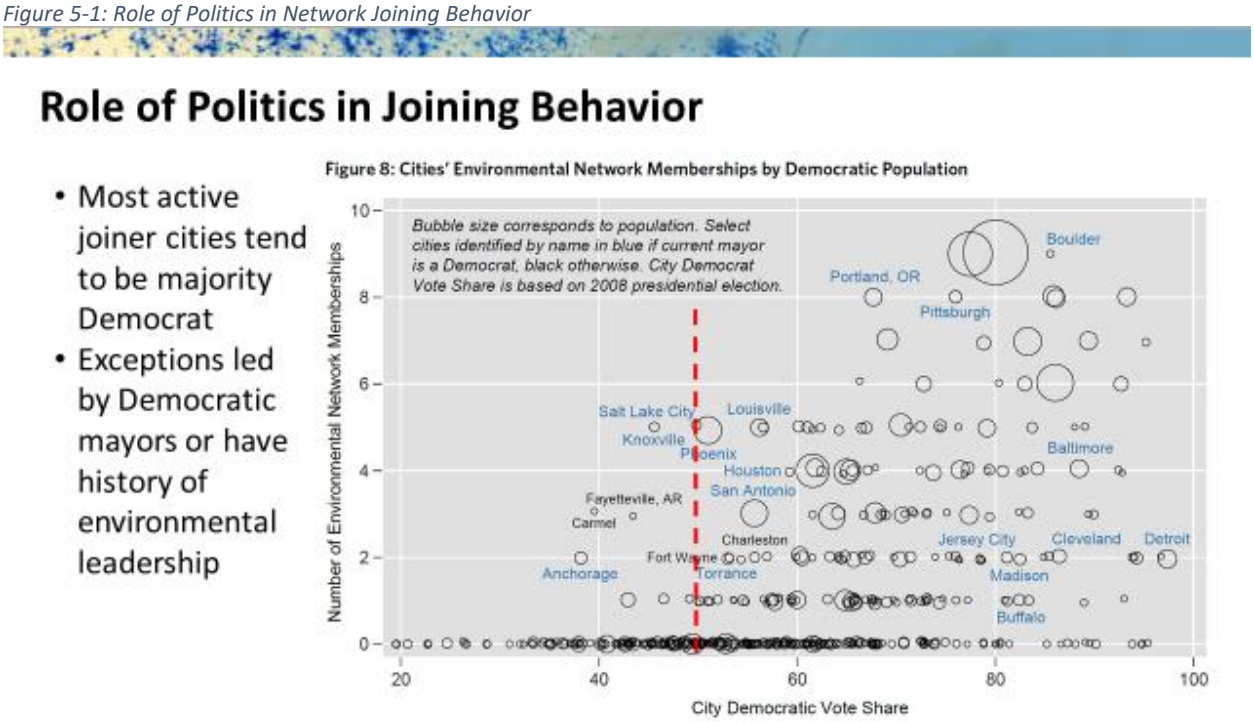
Our interviews with city climate leaders indicated that cities are increasingly aware of the need to engage more pro-actively on state policy and regulatory issues. As one of them said: "We were surprised by how much interest our members have in affecting the state context and policy around our High Impact Practices. This is new work for most cities and we don't know how to do it effectively. But we have to figure it out because the state context matters a lot." The context set by state policy deeply affects how cities can implement climate strategies within their jurisdictions. This context includes energy market regulations, renewable energy incentives, energy efficiency incentives, building codes, franchise agreements, EV charging infrastructure, etc.

This is not a strategy that has so far been broadly implemented. Cities are typically not well set up to coordinate with each other and/or with large energy users on energy policy change. Implementing this option would require creating some new capacities, new relationships and new networks in the states targeted for this work.

[8] See, for example, the national league of cities: https://www.nlc.org/state-municipal-leagues for a list of state municipal leagues.

In addition, evidence from other research on cities which prioritize climate change suggests that the most likely cities to join climate networks, and even to view climate change as a priority, are majority Democrat or led by a Democratic mayor.

Figure 5-1: Role of Politics in Network Joining Behavior



Source: "Mayors: Taking Action on Climate." Presentation. October 24, 2018. Katharine Lusk.

From a grant-making point of view, there are different approaches one could take to funding this work, including:

- Select a core partner to conduct the analysis and develop the strategies, then fund a lead organization in each state to execute the strategy.
- Use a partner organization to design an RFP that you issue, soliciting proposals from cities in specific states, and let the cities develop the details of the strategy.

At a high level, this strategy would involve several key steps:

1. Prioritizing states based on the potential impact.
2. Conducting background analysis:
    a. State and city baseline research, including political leanings and affiliations
    b. Analysis of top state energy users/employers
    c. Analysis of city climate strategies
    d. Analysis of clean energy/climate NGOs capabilities and strategies
3. Identify opportunities for cross-sector collaboration:
    a. Opportunities for best practice sharing and joint projects
    b. Opportunities to influence state-level clean energy policy
4. Develop the implementation strategy, including staff and support.

We have attached an implementation document that provides more detail on each of these steps in Appendix 3.

Great work has already been done to characterize the nature of cities that are likely to lead on climate change, and the issues that mayors are most likely to prioritize with respect to climate change. One useful starting point for examining the priorities of US mayors is the annual Menino Survey of Mayors, conducted every year by the Boston University Initiative on Cities.

Examples of City State Policy Networks

There are limited examples of city networks organized to influence climate policy at the state level. One example is the Colorado Communities for Climate Action network (CC4CA). CC4CA is a network of 20 municipalities and counties in Colorado that have pooled their resources to advocate for a common set of policy reforms at the state level. Their website has the following explanation of the purpose of the network:

> *"The state and federal actions the coalition seeks are needed to complement the local climate actions CC4CA members already have underway, which include ambitious goals to reduce local heat-trapping emissions and strong local policies to meet those goals. But local governments simply cannot meet their climate goals on their own—they also need a better framework of state and federal climate policies to enable their local actions to be more effective. That reality led to the creation of CC4CA, in which local governments have joined forces to work for state and federal actions supporting and complementing local climate-protection actions."*

CC4CA members pay dues to support a shared staff person. In addition, there are several local government staff who spend significant amounts of their time on the network. The network has a list of 21 specific policy goals they collectively work on, most of which are at the state level. Issues include building codes, access to utility data, state GHG reduction goals, carbon pricing, efficiency incentives and increases in Renewable Portfolio Standards. Their advocacy is not focused on utility regulatory proceedings.

In addition, there are some examples of cities pooling resources to support shared legal expertise to represent city interests in utility commission proceedings. This kind of cross-city collaboration has happened in California, Michigan and New York. These efforts have been narrowly focused and have not sought to address a broad climate policy agenda.

Apart from climate-focused city networks, there are other policy areas where cities have joined together to lobby states. These networks can serve as an example of city lobbying to change state level policy; some notable examples include Mayors Against Illegal Guns and Next Century Cities. There is an opportunity to learn from the strategies and success of these policy networks in building city networks focused on climate policy.

Strategy Strengths and Opportunities

The initial geographical analysis presented in this report goes far in narrowing potential target cities and states. From this initial list of targets, the list will need to be narrowed based on an understanding of the ability and potential for cities to influence state policy on a number of issues. For example, some cities may be spread across more state districts and therefore have a larger influence in state politics, pointing to the potential for a state strategy to have an even larger magnifying effect for certain cities. This will be a key additional piece of analysis in deciding where to implement this strategy.

Additional consideration should be given to the impact factor of state regulation in key states. The strategy is best suited for states with diffuse GHGs – for example, cities do not traditionally play a key role in industrial emissions, yet Texas's industrial emissions comprised over 3% of all US emissions in 2014. Thus, if Texan cities were to target a state-level policy broadly around cap-and-trade, the state level policy would impact not only cities' ability to manage their own greenhouse gasses, but also have an outsized impact on state- and country-wide emissions. Similarly, a state strategy in Pennsylvania has the potential for significantly changing the energy supply to cleaner generation sources.

Engagement Strategy #2 – Supporting Climate Mitigation Implementation at the Metro-Region Scale

Overview of this approach

Almost all city climate strategies are focused on action at the municipal scale. There are very few, if any, examples of sophisticated mitigation strategies being developed and implemented at the scale of the metropolitan region.[9] This is problematic for two reasons. First, central cities are often a small percentage of overall metro region emissions, and second, many of the systems that cities need to influence are controlled at the regional, not municipal scale.

This strategy would focus on bringing clusters of cities from the same metro region together to do coordinated climate mitigation planning and implementation. Currently, almost all climate strategies are focused on action at the municipal scale. This strategy would seek to connect climate planning to other regional planning efforts, including regional planning organizations who typically have the responsibility to develop a regional land use and transportation plan. Another option is to support innovative approaches to climate action planning and implementation at the metro regional scale as a way of accelerating urban mitigation actions.

Metro region climate strategies could include a combination of municipalities committing to:

- Common climate targets
- Collaborative analysis and development of de-carbonization pathways for energy supply, buildings, transportation and waste
- Coordinated efforts on implementation, including efforts to communize regulatory approaches, utilize common service providers, issue joint procurements, etc.

There are several potential advantages to doing this work at a regional scale, including:

- Many of the core systems that need to be transformed to achieve de-carbonization are managed at the regional scale (e.g. MPO who develop regional transportation strategies).
- Smaller municipalities who do not have the resources of more sophisticated urban core cities could benefit from a collaborative approach.
- Large energy users who have operations in multiple locations in the same region (e.g. hospital systems and commercial real estate) could benefit from a more coordinated approach and communized regulatory requirements.

[9] Boston University's ISE is in active discussions with the Metropolitan Area Planning Council (MAPC) to adapt the approach on mitigation planning it is developing for Boston so that MAPC could apply it at the regional scale across the 102 municipalities it represents. Within this 102 cities, there are 13 cities in addition to Boston that have made and explicit commitment to carbon neutrality by 2050, but none of them, other than Boston, Somerville and Cambridge, have any actual strategy to achieve that goal.

- Aggregating at the regional scale could give the participating municipalities greater market power and political influence.

There are, however, also significant barriers to overcome, including the difficulty of independent political jurisdictions to agree to collaborate on implementation and communize regulatory requirements.

Contrary to the targeting approach on engaging cities on state-level policy change, (where it makes the most sense to focus on those states that have a weak policy regime in place), it would probably make the most sense to try out this strategy in states with a strong climate policy framework where the challenge for implementation across multiple municipalities is clear.

The grant-making approach could be relatively simple – developing and issuing an RFP soliciting proposals from regional organization committed to this approach.

Examples of Metro Region Climate Strategy

There are very few examples of collections of municipalities acting on climate mitigation at a regional scale. Some of the best examples available are the MAPC in Boston and the King County Cities Climate Collaboration.

MAPC

The Metropolitan Area Planning Council is the association that serves the greater Boston area of Massachusetts. The MAPC serves 22 cities & 79 towns that they have divided into 8 sub-regions; the MAPC's sub-regions contain 3.2 million people living within 1.7 million households (approximately 48% of the state's population, as of 2013). The MAPC has some limited governmental authority, including requiring all municipalities to have an up-to-date master plan, pre-disaster mitigation plan, serving as the regional transportation Metropolitan Planning Organization (MPO), and controlling some recycling/composting requirements.

MAPC's MetroFuture is the regional strategic plan and it is updated every five years. MAPC also serves as the host to the Metro Mayors Coalition, which is a network of 14 cities, including Boston, which have committed to carbon neutrality by 2050.

MAPC is interested in integrating specific GHG reduction targets into its regional planning process and the updated regional strategic plan. They are collaborating with the Institute for Sustainable Energy (ISE) to adapt the policy modeling platform that has been developed for Carbon Free Boston to a broader regional base. This will require some modifications and simplifications in the model inputs and calculations, but will enable the MAPC to prioritize region-wide policies for the energy supply, buildings, transportation and waste sectors that can move the region towards carbon neutrality by 2050.

King County Cities Climate Collaboration (K4C)

Representing 75 percent of the county's 2 million residents, the K4C currently includes King County and the cities of Bellevue, Burien, Issaquah, Kirkland, Mercer Island, Normandy Park, Redmond, Renton, Sammamish, Seattle, Shoreline, Snoqualmie, and Tukwila in Washington State.

The collaboration accelerates emissions reductions through climate and clean energy goal-setting, clean energy transition planning, policy development, program design, and implementation. Through their work, in addition to setting and coordinating county-wide goals, the coalition has developed a multi-city partnership to help build a regional energy efficiency retrofit economy, including tactics such as: collaborating with energy efficiency and green building businesses, partnering with utilities, expanding on existing retrofit programs, adopting local building energy benchmarking and disclosure ordinances, and encouraging voluntary reporting and collaborative initiatives.

Strategy Strengths and Opportunities

The strength of this strategy lies in its ability to coordinate emissions strategies that have regional implications. Transportation, in particular, is a strategy that is well-suited to a coordinated metro region plan. By organizing infrastructure and incentive structures, a regional approach to transportation avoids the challenge of exporting city GHG emissions to surrounding suburbs. Urban planning and land use, waste management, and building codes are also technological strategies that are readily addressed through a regional strategy.

Geographically, this strategy is well-suited to clusters of ambitious cities - such as in Texas or Florida – where transportation emissions are significant. The existence of several ambitious cities lends itself to a next-level strategy of coordination between those cities in a way that provides a magnified impact for the cities themselves as well as the surrounding regions.

Other Engagement Strategies for Cities

While we did not select the following strategies as our primary recommendations, we believe they hold merit as potential engagement strategies that foundations should explore. Below, we outline the primary components of each of the additional strategies.

Supporting City Innovation Platform Development

This approach involves sequential investments in the development and implementation of specific city-based solutions for one of the priority de-carbonization strategies. It typically involves a couple of stages:

- Concept development
- Design and prototyping in a small set of leading-edge cities
- Development of a broader city practice network
- Creation of a solutions platform to simplify the implementation process for additional cities
- Broad-based adoption across multiple cities

There are several de-carbonization solutions that are ripe for additional support and funding in both building electrification and in EVs/transportation design. Two notable examples are 1) he Building Electrification Initiative, which developed out of multiple USDN and CNCA investments in thermal de-carbonization strategies and is building a network of cities and TA support to advance city strategies to convert fossil thermal sources to electrification technologies; and 2) the Transportation Climate Initiative organized by the Georgetown Climate Center and working with 12 New England states to drive carbon reductions from the transportation sector.

The opportunity most often mentioned in our interviews is the opportunity to develop a more standardized approach to how cities advance the accelerated adoption of EVs as a GHG mitigation strategy. Achieving the GHG reduction potential of EV adoption has to be considered in the context of achieving an integrated transformation of urban mobility systems that simultaneously achieve other desired outcomes, such as access, affordability, convenience, congestion reduction, etc. In addition, the strategy needs to address a broad range of technical and policy issues such as grid load profile shifting, grid upgrading, charging infrastructure, new development requirements, integration of EVs with AVs and shared mobility, etc. Currently, there is no "template" to help cities navigate across all of these complicated dimensions of mobility transformation. An "electric vehicle Initiative" could create a multi-city solutions platform to accelerate transportation transformation. It could include coordination on the types of state-level policy changes needed to support this transformation at the municipal and metro-region scale.

Other areas for potential innovation platform development that were mentioned by interviewees include:

- Community Choice Aggregation
- Large scale municipal RE purchasing
- Zero Net Carbon building requirements

City Capacity Building

This approach focuses on building the generic capacity of cities to be able to implement climate actions. It does not focus on any specific de-carbonization strategy. It can include training, development of implementation structures (e.g. special purpose entities like green banks, Sustainable Energy Utilities or retrofit accelerators), financial support for staffing, or the development of management tools like performance management systems or policy modeling platforms for strategy development.

Leading cities need help with leadership capacity building for climate advocates in city government; more nascent cities need support for basic sustainability coordinators and emissions inventory. Other ideas in this category include strategic communications support, carbon reduction strategy support, and accountability tools could all be provided with a common framework for city capacity building, a la the cities-LEAP program, will ensure that leading cities set successful examples and following cities begin to address their climate impacts.

Strategic Engagement between Cities and Utilities

Cities and electricity utilities have some shared interests in advancing strategic electrification, which is a pathway for both de-carbonization and increased electricity consumption. There currently is no structure for cities to engage with utilities around the opportunity for a shared framework on how to advance strategic electrification.

There are isolated examples of strategic engagements between cities and utilities in MN, NY, MA and a few other states. On grid modernization, Advanced Energy Economy took the leadership several years ago in organizing a strategic dialogue with utility executives to develop a shared framework for grid modernization. This resulted in the issuance of a shared framework document that was in turn used to drive grid modernization strategies in a number of states, including the REV process in New York. In other examples, some cities have come together to create shared legal and lobbying resources to increase their ability to effectively intervene in public utility commission rate cases. NYC and Westchester County is an example of this.

Foundations could consider supporting strategic collaboration between cities and between cities and electric utilities to both build city capacity to influence utility regulation at the state level and advance a shared framework on strategic electrification.

6. Concluding Thoughts

It is well known that cities are making progress in reducing greenhouse gas emissions. The good news is that there are already large numbers of organizations helping to do the work; however, there is still much to do. There are still critical roles for additional funding to help cities build the capacity, networks, and strategies necessary to reduce emissions both within their boundaries and outside of them. A key responsibility of foundations seeking to support city climate mitigation is to be additive, not duplicative, of existing efforts.

Our review of the status of climate mitigation in U.S. leads us to recommend two key engagement strategies for cities. Specifically, we recommend focusing on 1) organizing cities to influence state policy, and 2) coordinating mitigation at the metro region scale. If a foundation chooses to engage with strategy 1, the strategy is best suited for states with diffuse GHGs and the potential for significantly changing the energy supply to cleaner generation sources, implementing cap-and-trade strategies, building and vehicle incentives, and other statewide policy. If implementing option 2, the strategy is best targeted to states with GHG emissions that are concentrated within metro regions (i.e. high transportation GHGs), as well as regions with a goal of transforming transportation infrastructure, regional planning, and building code sectors.

The devil of mitigating climate emissions is in the details. Large sectoral or geographic potentials must be supported by a coordinated ground game of dedicated experts, politicians, and advocacy groups. In this matter, foundations are essential in providing the capacity necessary to follow through on the promise of large mitigation gains.

List of Appendices

Appendix 1 – Background Document for City Interviews

Document Purpose

This document provides some project background for the individuals being interviewed for the project on city climate strategies. It covers:

- Project purpose and background
- Strategic assumptions
- Interview questions

Project Purpose

The purpose of this project is to review current U.S. city climate activities in order to identify areas where additional investment could help accelerate city action to reduce urban greenhouse gas emissions. The focus of the inquiry is on aggressive actions cities can take that significantly up their level of ambition on achieving emissions reductions on an accelerated timetable. City strategies on climate adaptation are not encompassed in this project.

The report could be used to inform internal decision making on potential grant making strategies.

The project is being conducted by the Institute for Sustainable Energy (ISE) at Boston University. Lead project staff are Peter Fox-Penner, John Cleveland, and Jennifer Hatch.

The timeline is to complete the report by the end of October 2018.

Strategic Assumptions

Below is a short summary of the strategic assumptions we bring into this project. Since the city climate landscape is a complicated field with many moving parts, it is important to be clear about where we are focusing this inquiry. These strategic assumptions are grouped under several different categories:

1. The role of cities in climate mitigation.
2. Relevant existing initiatives and materials on city climate mitigation strategies.
3. Some potential high-impact city strategies.

More detail is provided below on each of these categories.

The Role of Cities in Climate Mitigation

- **Urban areas account for an increasingly large percentage of GHG emissions.** Globally, cities are estimated to account for 75% of GHG emissions. In the U.S., 80% of the population is now located in urban areas.

- **There are four primary city GHG emissions sectors.** These are: electricity, buildings (including thermal uses), transportation and waste.

- **We know the broad strokes of what is required to achieve city carbon neutrality.** While the details will vary by city context (political, regulatory, climate, existing assets, etc.), the broad outline of "must haves" is now relatively well documented:

    - Electricity:
        - De-carbonization of the electrical grid and increased use of renewable distributed generation resources.
    - Buildings:
        - Elimination of the use of fossil fuels for heating and cooling buildings, primarily through conversion to thermal electric technologies.
        - Deep improvements in building energy efficiency, in both new and existing buildings.
        - Zero Net Carbon requirements for all new construction.
    - Transportation:
        - Dramatic mode shifts away from personal vehicles to mass transit and active transportation (walking & biking).
        - More compact settlement patterns organized around Transit-Oriented Development.
        - Elimination of the use of fossil fuels for transportation, primarily through vehicle electrification.
    - Waste:
        - Achievement of 100% waste diversion
        - Minimization/utilization of GHG emissions from waste processing.

- **There are important emissions that are often not included in city climate strategies.** These include agriculture, air transport, consumption-based emissions, and industrial emissions.

- **There are significant variations in the city level of control over key emissions sectors.** Cities often do not have direct control over decisions that drive GHG reductions. Their level of control varies by type of municipal governance and state and federal laws.
    - Control over electricity will vary depending on whether the city has its own utility; whether the market is regulated or deregulated, and what kinds of incentives and permissions state government has allowed for renewable energy generation. In most cases, electricity emissions reduction policy is controlled by

the state, and transmission decisions made by the Independent System Operator of the regional electrical grid.
    - Control over transportation will vary based on the complex set of transportation funding and governance structures that are in place, including whether the city does or does not control its public transit system and what entit(ies) controls private transportation routes into the city.
    - Control over buildings will vary by the degree to which the city does or does not control its own building code, and how it regulates new development.
    - Control over waste will depend on the how the waste management regime in the city is regulated.

- **City mitigation action is significantly influenced by state-level policy.** Cities located in states that have aggressive state-level clean energy and climate strategies have a more supportive environment in which to implement aggressive actions at the city level.

- **There is an increasingly refined practice field around city climate mitigation strategies.** The discipline has evolved professionally in significant ways over the last two decades. There are now many common protocols (e.g. GPC for emissions inventories), frameworks (e.g. the Carbon Neutral Cities Alliance Framework for Long-Term Deep Carbon Reduction Planning), and analysis tools (e.g. the sophisticated policy modeling platforms developed by NYC and Boston). This field evolution is producing increasingly sophisticated city strategies for mitigation.

- **There are still many cities that have done little or no serious climate planning.** While the larger, more sophisticated cities have tended to move forward on some version of a climate mitigation plan, the vast majority of mid-sized and smaller cities have not done much other than rudimentary planning.

- **Having a plan does not automatically translate into implementation success.** Even for the cities with sophisticated mitigation strategies, there is often a serious gap between planning and implementation. Implementation of aggressive carbon reduction strategies requires politically difficult regulation, strong financial incentives, dedicated revenue sources, and staffing resources.

- **There are many ways that funders can support city mitigation implementation.** Types of support include:
    - Analysis and research to create the foundation for strategy (e.g. Carbon Free Boston; C40 Deadline 2020)
    - Risk capital to help develop the feasibility of innovative strategies (e.g. the USDN and CNCA Innovation Funds)
    - Support for execution and implementation (e.g. City Energy Project)
    - Networks to support best practice sharing and collaboration (e.g. USDN, CNCA, C40)
    - Support to help cities influence state policy
    - Cross-sectors collaboration (health care, higher education, corporate, etc.)

Relevant Existing Initiatives and Materials on City Climate Mitigation Strategies

There is a broad range of activities already taking place that are designed to support cities in taking aggressive climate mitigation actions. It is important to acknowledge these and not duplicate existing efforts.

- **Cities are developing increasingly broad and sophisticated networks for peer learning and collective action.** These networks include the Urban Sustainability Directors Network (over 200 municipalities in NA), C40 (XX global cities), the Carbon Neutral Cities Alliance (12 NA and 12 international cities committed to carbon neutrality by 2050 or earlier), the Global Covenant of Mayors, and Climate Mayors.

- **Many documents, plans and research reports have been published on city climate mitigation.** These include:
  - CNCA's Framework for Long-Term Deep Carbon Reduction Planning.
  - C40's Deadline 2020 report.
  - Bloomberg Philanthropy Report, Innovations in Climate Action.
  - CNCA's report on seven high impact "game changer" practices pioneered by their membership, scheduled to be released at the CA Global Climate Action Summit.
  - Multiple reports by USDN and CNCA on specific mitigation approaches funded by their innovation funds.
  - Reports commissioned by the Kresge, Summit and Energy Foundations, and written by Cadmus consulting, on various aspects of renewable energy strategies for cities:
    - *Pathways to 100 – An Energy Supply Transformation Primer for Cities*
    - *Road to Renewables -- A Needs Assessment for NA Cities Leading on Energy Supply Transformation*
    - *Framework for an Equitable Energy Supply Transformation*

- **Cities are part of broader networks of sub-national players committed to achieving the targets of the Paris Climate Accords.** Primary among these networks are We Are Still In and America's Pledge.

- **There are many promising sector-specific strategies emerging that are focused on, or include, cities.** Several examples include:
  - The Building Electrification Initiative, which developed out of multiple USDN and CNCA investments in thermal de-carbonization strategies and is building a network of cities and TA support to advance city strategies to convert fossil thermal sources to electrification technologies.
  - The Transportation Climate Initiative organized by the Georgetown Climate Center and working with 12 New England states to drive carbon reductions from the transportation sector.

- **Commitments and progress on electricity de-carbonization are outpacing actions in transportation and thermal de-carbonization.** An increasing number of cities are committing to convert municipal or community-wide electricity consumption to 100% renewable sources. Far fewer cities have made aggressive commitments or acted to de-carbonize their thermal or transportation sectors.

- **There are many funders already providing support to cities for climate mitigation.** Some notable examples include:

    - Bloomberg Philanthropy's recently announced $70 million City Climate Challenge.
    - On-going investments by the Barr Foundation, Kresge Foundation, RBF, Summit Foundation and others.

<u>Some Potential High-Impact City Strategies</u>

The table below summarizes a very preliminary list of potential high-impact and aggressive strategies that cities might take to accelerate GHG emissions reductions.

Sector	High Impact Strategy
Electricity -- Purchase and Supply	Implement Community Choice Aggregation to provide 100% of residents with access to 100% renewable energy.
	Procure renewable energy for 100% of the municipal energy requirements.
	Establish city mandates for on-site renewable energy for all new buildings.
	Implement aggressive community solar programs.
	Municipalize the local electricity supply.
	Establish a local RPS.
	Mandate de-carbonization of in-boundary electricity generation (district energy, CHP).
Electricity -- Regulatory	Intervene in PUC deliberations to accelerate RPS, Net Metering, Storage and other clean energy standards.
Buildings	Implement a Zero Net Carbon requirement for all new buildings in the city.
	Prohibit the use of fossil fuels for heating after a certain date.
	Aggressively advance market adoption of building electrification technologies.
	Expand and decarbonize CHP and District heating systems.
	Require upgrading to increased levels of energy de-carbonization at key points of market transaction on existing buildings.
	Mandate building energy performance labeling and connect building energy performance to real estate appraisal and transaction processes.
	Prohibit the construction of any new natural gas pipelines in the City by a certain date.
Transportation	Create car-free zones for parts of the city.
	Prohibit internal combustion engine vehicles in city boundaries by a set date.

	Establish high levels of fees for parking and congestion pricing to discourage vehicle use.
	Mandate electrification of the city fleet.
	Mandate electrification of Class 4-6 freight delivery in the City.
	Make access to public transit free.
	Mandate that all new buildings are “EV ready” and implement a robust EV charging infrastructure in the city.
Waste	Mandate organics recycling.
	Implement plastics bans.
Other Emissions	Include consumption-based emissions (Scope 3) in the city GHG inventory and develop strategies to reduce them.
Cross Cutting	Mandate a multi-year climate budget to quantify mitigation investments and track performance.
	Create a municipal climate utility with the authority to levy fees and impose regulations to achieve climate targets.

Questions for the Interview Process

- Are there any of our strategic assumptions you think are off the mark?
- Are there any important strategic assumptions we are missing?
- Are there important initiatives and resources that are not on our list?
- What is your reaction to our list of potential high-impact strategies? What is missing? What is on the list that does not qualify?
- What is the best way for a funder to make sure its investments are aligned with city strategies and needs?
- Are there current initiatives where funding could complement, magnify or accelerate impact?

Appendix 2 – Frameworks, Protocols and Tools for City Climate Mitigation

Frameworks:

- CNCA Long-Term Deep Carbon Reduction Planning
  - By identifying potential pitfalls, detailing the processes, strategies, practices, tools, and institutional structures used; the framework serves as an initial template that cities can use to take a comprehensive approach to developing carbon reduction plans.
- Scope Framework
  - By using the Scope 1 to 3 GHG emissions accounting method; it allows cities to separate the sources of GHG emissions produced within the geographic boundary of the city, consistent with national-level GHG reporting.
- City-induced Framework
  - This method totals GHG emissions attributable to activities taking place within the geographic boundary of the city. This framework encompasses the key emitting sources occurring in almost all cities, and for which standardized methods are generally available.
- Five Milestones Framework
  - This ICLEI method offers a systematic approach for analyzing baseline greenhouse gas emissions, developing an emissions reduction target, developing and implementing a climate action plan, and monitoring emissions reduction progress.

Protocols:

- Greenhouse Gas Protocol (GPC)
  - The tools enable companies to develop comprehensive inventories of their GHG emissions. Each tool reflects methods that have been extensively tested by industry experts. The documentation and tool itself provide step-by-step guidance on the use of it
- ICLEI
  - Local Government Operations Protocol (LGO Protocol)
    - The document provides detailed guidance on accounting for emissions from the buildings, facilities and vehicles operated by a local government.
  - Recycling and Composting Emissions Protocol
    - This protocol guidance on accounting for the GHG emissions benefits of recycling and composting of community-generated waste.
  - U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions
    - This tool provides detailed, cutting-edge guidance on completing a GHG emissions inventory at the community scale in the United States — including emissions from businesses, residents, and transportation.
  - Global Protocol for Community-Scale Emissions (GPC)
    - The global counterpart to the US Community Protocol because the US Community Protocol provides more detailed methodology tailored to US

communities; those communities that want to report to international registries such as carbon Climate Registry should also consult the GPC.

Analysis Tools:

- GPC Emissions Inventory
  - A global standardized frameworks to measure and manage greenhouse gas (GHG) emissions from private and public sector operations, value chains and mitigation actions. The GPC offers online training to learn their standards & tools, as well a review service. The review recognizes sector guidance, product rules and tools that are in conformance with GHG Protocol standards.
  - Corporate Accounting & Reporting Standards
    - The standard covers the accounting and reporting of seven greenhouse gases covered by the Kyoto Protocol – carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PCFs), sulphur hexafluoride (SF6) and nitrogen trifluoride (NF3). It was updated in 2015 with the Scope 2 Guidance.
  - Cross Sector Tools
    - Applicable to many industries and businesses regardless of sector.
  - County Specific Tools
    - Customized for particular developing countries.
  - Sector Specific Tools
    - Designed for the specific sector or industry listed, though they may be applicable to other situations.
  - Country & Cities Tools
    - Help countries and cities track progress toward their climate goals.
- Environmental Insights Explorer (Google & Global Covenant of Mayors)
  - The tool, created with the assistance of Google, links city resources to private sector data. The system will save cities time, normally spent measuring their local impacts, which would allow more time and resources for other climate action. Cities can use the explorer tool to make affordable analyses, adjust reduction goals to their specifications, and look for areas in which carbon-cutting has not yet been tried. All information gathered will be made publicly available.

Appendix 3 – Implementation Strategy for Engaging Cities in State-Level Policy Change

1. Prioritize states based on the potential impact.
2. Conduct background analysis:
    a. State baseline research
    b. Analysis of top state energy users/employers
    c. Analysis of city climate strategies
    d. Analysis of clean energy/climate NGOs capabilities and strategies
3. Identify opportunities for cross-sector collaboration:
    a. Opportunities for best practice sharing and joint projects
    b. Opportunities to influence state-level clean energy policy
4. Develop the implementation strategy, including staff and support.

Step 1 – Prioritize States Based on Potential Impact

The first step in this strategy is to select a set of states where city engagement on state policy is most likely to have a substantive impact on policy and subsequent GHG reductions. The main factors that should guide this selection of states includes:

- State level carbon emissions (Which states have the highest levels of emissions where a reduction will have the largest overall impact?)
- City leadership (Are there cities in the state that are advanced enough to play a leadership role on state-level policy change?)
- Policy opportunities (Are there important state-level policy changes that are within political reach?)
- Other partners (Are there other large energy users – companies, hospitals, higher education – that could be recruited as partners?)
- NGO capacity (Are there NGOs with operations in the state that could help support and manage the initiative?)

We have conducted a very high-level review of six states using these criteria – Florida, Pennsylvania, Ohio, Texas, Michigan and Illinois. The details of this analysis are provided in a second attachment.

Step 2 – Conduct State Background Research

Once a small set of states has been prioritized, you will want to conduct additional background research in each state on the following factors:

- State baseline research
- Analysis of top state energy users/employers
- Analysis of city climate strategies
- Analysis of clean energy/climate NGOs capabilities and strategies

Additional detail on the specific information you will want to have on each of these categories is provided below. These details will help shape your specific implementation strategy.

Step 2A – State Base Line Research

Before you develop an approach to a state, it would make sense to do a basic assessment of where the state is on the clean energy policy spectrum. There is a myriad of items you might want to know, but the following would be priorities:

- What is the overall state political context – which parties are in control of what branches of government, and what the future looks like?
- What is the status of state climate plan – is there one in place, and what are its de-carbonization targets? Is it an administrative document, or is there state legislation mandating it?
- Has the state signed on to any climate commitments?
- What is the electricity regulation regime (regulated/deregulated/hybrid); and the nature of the Public Utility Commission or its equivalent?
- Which ISO/RTO is the state part of and what is the current mix of electricity fuel sources and the resulting emissions factor for the grid? Are there large grid/transmission issues under deliberation?
- What is the status of state policy (what is in place; what is under consideration/debate) on:
    - Renewable portfolio standards
    - Net metering
    - Community choice aggregation
    - Utility tariff decoupling
    - Energy efficiency incentives (including ratepayer funds), and how they are managed (i.e. are they run by utilities or is there an independent Program Administrator).
    - Grid modernization
    - Cap and trade systems or other forms of carbon pricing
    - State building code upgrading
- What are overall energy costs in the state – electricity (residential and commercial) and natural gas, and where does the state rank nationally?

Step 2B – Analysis of City Climate Strategies

For the top municipalities in the state, you will want to know the following information from each:

- Who is the mayor and what are their politics relative to energy and climate?
- Do they have a sustainability director?
- Do they have a climate action plan? What are its targets and strategies?

- What is their level of control over key energy and emissions sectors?
    - Do they have a municipal utility?
    - Do they control their building code?
    - Do they run their local transit systems?
- How much energy do they buy, and do they have a municipal energy manager?
- Do they have a strategy for reducing emissions from municipal operations?
- What is their relationship with Investor Owned Utilities? Do they have any form of a utility partnership?
- What city networks or initiatives are they part of? (USDN, CNCA, C40, America's Pledge, Global Covenant of Mayors, Under2 MOU, etc.)
- Which of the large state employers are located in these cities, and what is the nature of the city's relationship with them?

The focus on cities is to determine which ones have strong clean energy/climate commitments, and which ones would have a strategic interest in, and capacity to support, advancing state policy in collaboration with other large energy users.

Step 2C – Analysis of Top Employers & Energy Users in the State

Large employers can play a key role in influencing state policy. They probably can have more impact than cities. So it is key to create strategic collaboration between the cities and the large employers/energy users. This means it is important to understand as much as you can about them, and to design the initiative so that it adds strategic value to them.

- We recommend starting with a list of the top 20-25 employers and get the basic data on them (most of this would be desk research):
    - Industry segment
    - Anything we can tell about their Energy Use Intensity (EUI) – probably driven by industry segment or sub-segment
    - Total employment
    - Location of operations in the state (which offices/plants in which cities)
    - Anything known about their energy/climate commitments (membership in initiatives; commitments signed; sustainability/CRS plans; etc.)

- Once you narrow it down to 10-15, a deeper level of detail can be developed. This will likely require actual contact with individuals at the organization. You will need to use your network in the state to identify potential points of contact. Here is what you would want to know about each employer:
    - Information on their management team and how it relates to their different operations in the state. (Example: Partners Healthcare is the largest health care system in Massachusetts and its largest employer. However, as a health system, it is comprised of 12 different hospital operations, each of which has a certain level of autonomy. So while some actions can be taken centrally, other need to have buy-in from each hospital in the system.)

- Who are the sustainability and energy leads in the organization? Sometimes these are the same, but often they are different. The energy lead is often part of the real estate management division.
- Does the enterprise have a version of a Strategic Energy Master Plan (SEMP)?
- What energy/climate related actions have they taken or are they planning on taking?
  - Building energy efficiency
  - Renewable energy purchasing
  - Combined heat and power or district energy initiatives
  - Thermal de-carbonization
  - Changes in transportation systems
  - Recycling and waste management
- Has the organization signed on to any climate commitments (e.g. We Are Still In, Ceres 100, etc.)?
- Does the organization have any operations that are particularly energy intensive?
  - Labs and research operations
  - Data centers
  - Industrial materials and processing
  - Etc.
- Does the organization have a strategic relationship with any utilities on energy efficiency implementation?
- Has the company taken any public positions on clean energy issues?
- Does the organization have any coastal operations that are at risk from sea level rise and coastal flooding?

The point of this analysis is to come to some determination on:

- Which organizations are already committed to some version of a clean energy future and would therefore benefit from collaboration with peers.
- Where the overlap is between a state policy agenda and their strategic business interests.
- Who the best people are in the company to engage on this initiative.

Step 2D – Detailed Analysis of Clean Energy NGOs

There are several roles that lead NGOs might play in the state strategy. These include:

- Potentially serving as the "field coordinator" for a state strategy.
- Helping identify the right large energy users and providing strategic intelligence about them.
- Providing TA and other kinds of support for the network of large energy users and cities.
- Directly advocating for policy changes at the state level, in alignment with the large energy users.

It is useful to remember that it is the cities and large energy users, not the NGOs, which are the focus of your strategy. To figure out how to work with them, you will need to do secondary and primary research to understand who they are; what their clean energy agenda is; what assets they have to mobilize in the state; and what relationships they have with the large energy users.

Step 3 – Identification of Opportunities for Cross-Sector Collaboration

There are two kinds of cross-sector collaboration opportunities you will want to identify and flesh out. The details of these will need to wait until you have done your state-level market research, but it would be useful to think through the "menu" in advance. The two different types are:

- **Cross-sector collaboration at the enterprise level.** These will involve actions that the large energy users and cities can take on their own without any changes in policy. They include things like:
    - Peer-to-peer best practice exchanges
    - Pilot projects on specific clean energy technologies (e.g. behind the meter storage; heat electrification)
    - Collaborative purchasing

  In the context of this initiative, the purpose of this type of collaboration is to build strong relationships between these key players. To work together as a team on state policy, they need to get to know each other, understand strengths and weaknesses, and build a sense of share objectives and trust.

- **Cross-sector collaboration on policy change.** These actions would be intended to bring together the large energy users around a common policy agenda for the state. It may or may not involve the formation of some kind of formal coalition. (As an example, Health Care Without Harm has organized the Massachusetts Health Care Climate Alliance for this purpose.) The agenda, of course, will depend on a combination of your analysis of policy opportunities, and the strategic interests of the large energy users.

Step 4 – Development of a Potential Implementation Strategy

Finally, your plan will need to include a strategy for on-the-ground implementation. This will need to address:

- Who the lead organization is and what their role will be
- Who will staff the initiative
- Timelines for implementation
- Budget and funding sources

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