



**NOT ACCORDING TO PLAN:**  
EXPLORING GAPS IN CITY  
CLIMATE PLANNING AND THE  
NEED FOR REGIONAL ACTION

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# EXECUTIVE SUMMARY

The urgency of climate change demands a proactive response—not only delivered through major federal initiatives, but also tailored through plans in cities.

As the country’s primary economic and population centers, cities drive most greenhouse gas (GHG) emissions and will absorb most climate-related costs. And the growing frequency of floods, fires, droughts, and heat waves puts cities of all sizes in greater danger.

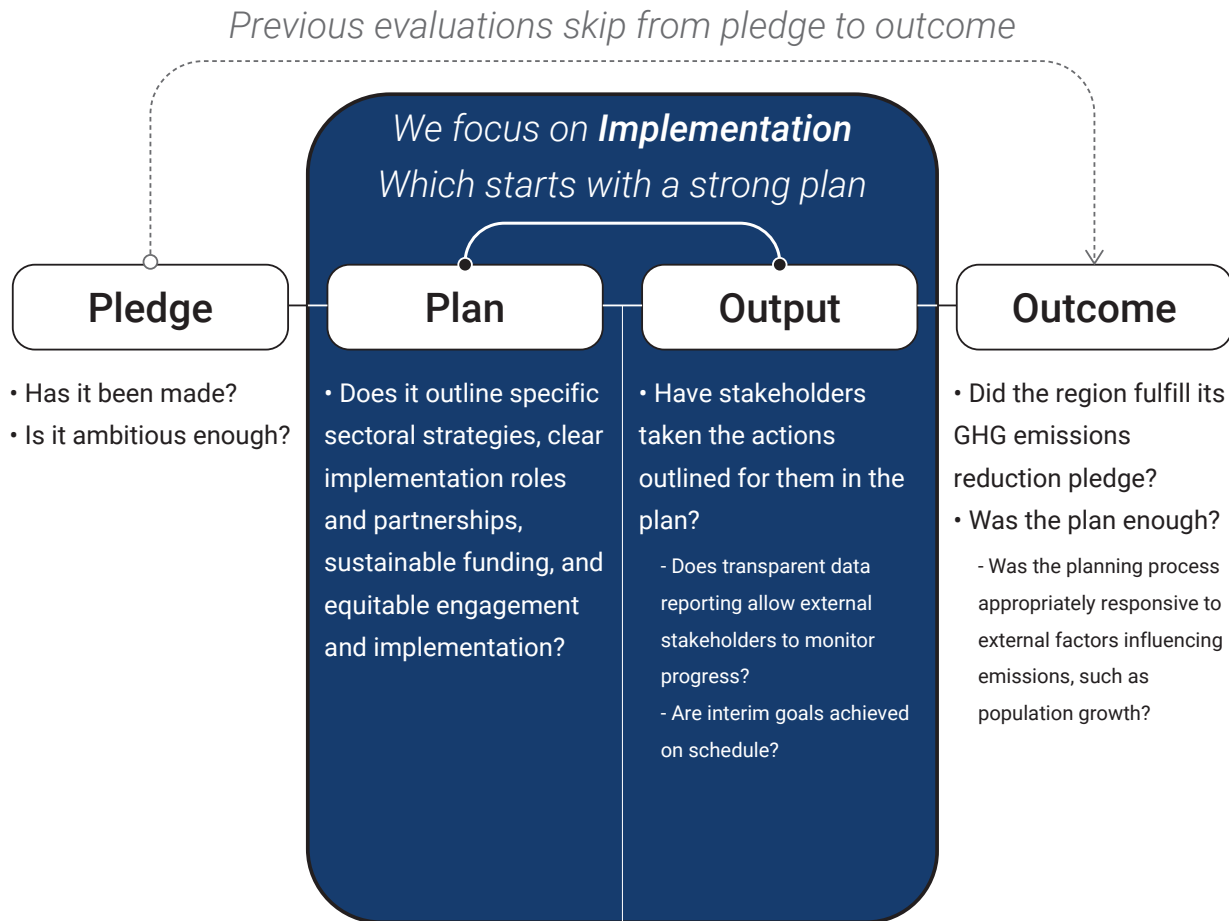
To reduce these costs and amplify benefits, cities need to reduce emissions (or “decarbonize”) their built environment. Eliminating fossil fuel consumption from their transportation, building, and electricity sectors is essential; collectively, these sectors produce nearly two-thirds of national GHG emissions. However, achieving those reductions will require more than simply relying on new federal rules and funding,

including those in the Inflation Reduction Act. Local planners, policymakers, and practitioners need to coordinate on new infrastructure investments.

One of the first steps cities have taken is the drafting of “climate action plans”—many of which pledge specific carbon reductions. Yet even as these plans proliferate, cities leaders are struggling to hit their targets. One gap in city climate planning and action is internal, with cities often failing to specify detailed strategies that will advance their goals. The other gap is regional: Individual cities do not have the fiscal, technical, or programmatic capacity to single-handedly drive decarbonization across their metropolitan regions, and often, they do not coordinate with other jurisdictions.

FIGURE 1

## Planning for decarbonization implementation



SOURCE: Brookings authors

This report attempts to better understand why cities are failing to meet their targets and what can be learned from the planning practices that are working well. By evaluating the most comprehensive decarbonization plans across 50 of the country's largest cities, the report judges how well the strategies and actions in these plans prepare cities for meaningful, accountable decarbonization. Using 25 standardized criteria and interviews with local practitioners to judge city decarbonization plans, we find:

***Most plans have long-term decarbonization goals, but less than one-third (32%) have detailed benchmarks and reporting.*** Despite identifying goals for GHG emissions reductions over the coming decades, cities do not always regularly measure their progress. Plans also tend to lack updated projections or fail to specify interim reduction goals, leading to inconsistent timelines and targets. For example, only 54% of plans aim to achieve net-zero emissions by 2050, putting them out of step with national and international climate goals.

**Only about one-quarter (28%) of plans include detailed, sector-specific strategies for electricity, buildings, and transportation decarbonization.** The same timeline and measurement issues become more egregious within these three sectors. For example, only 60% of cities specify how they will phase specific actions (or implementation schedules) within each sector. Instead, strategies often are not quantifiable, do not set specific deadlines, or do not evaluate progress over time.

**Nearly two-thirds of plans provide some detail on who will lead decarbonization efforts, but few offer extensive detail.** All but one city designates a clear entity or collection of departments to own decarbonization planning. However, those same cities tend to overlook more intricate coordination and execution needs, failing to identify key implementors and partners for specific strategies and actions. This lack of accountable, shared ownership contributes to fragmentation and lack of effective communication when addressing concerns across the built environment.

**Many cities struggle to pay for decarbonization efforts; only 16% of plans identify detailed funding sources or financing approaches.** Cities appear woefully underprepared to invest in short-term infrastructure repairs, let alone advance innovative, long-term decarbonization upgrades. Plans often do not integrate funding considerations across different strategies, identify specific cost estimates, or describe new and existing funding sources to pay for needed improvements. For instance, cities have limited budgets to staff and operate their environmental departments and do not identify or secure additional funding beyond traditional revenue sources such as property taxes.

**While almost all decarbonization plans identify equity as a goal, nearly three-quarters lack details on how to achieve it.** Threats to the physical, social, and economic well-being of many populations—particularly lower-income communities of color—are coming into

clearer focus for cities. Yet their plans usually only pay lip service to it; they lack details when building equity into different strategies, embedding equity into metrics and evaluation, and engaging community members.

Combined, these results show yawning gaps between city ambitions and their preparedness to act. Yet across each of the 25 criteria, we found promising strategies and actions that could be adopted in peer cities. Policymakers, planners, and other public and private leaders need to better understand where they can add more teeth to their plans. Planning for the sake of planning is not good enough; practitioners need to draft clear sets of actionable and accountable steps to drive decarbonization.

The report lays out several recommendations aimed to do just that, stressing the need for city leaders to look both inward at a local level and outward at a regional level:

- 1) City leaders need to conduct an honest assessment of their current capacity to decarbonize.**
- 2) City leaders should establish a regional leadership network to coordinate local and regional strategies.**
- 3) City leaders need to develop a skilled workforce to manage decarbonization efforts.**
- 4) City leaders should use regional entities to standardize climate data and measurement practices.**
- 5) City leaders should use regional conveners to negotiate with private infrastructure and economic development stakeholders.**
- 6) City and regional leaders should establish clear funding sources and financing rules.**

Together, these practitioner-focused recommendations aim to enhance the capacity of local and regional leaders, helping them develop and execute more detailed plans in support of more lasting climate action.





## Introduction

The growing threats from climate change leave the global population no choice: We must decarbonize human activity as soon as possible. Generation, transmission, and distribution systems will need to be fundamentally reconfigured to move enormous amounts of clean electricity. Common technologies that consume fossil fuels—most notably, transportation vehicles and the equipment used in buildings—will need to switch to cleaner fuels wherever possible. Meanwhile, where and how people build their communities must reflect an updated set of climate assumptions, including greater risks from fires, floods, freezes, and heat waves.

Achieving such transformative change will require a mix of policy reforms, new technologies, and significant capital investments. Under ideal circumstances, cities, national governments, global organizations, and private business owners would seamlessly work together to orchestrate actions that deliver results at the scale and speed the planet needs.

The past year has demonstrated that the U.S. federal government can do its part. While political discord has led to paralysis on climate action for well over

a decade, within the previous 12 months, Congress has passed three landmark bills—the Infrastructure Investment and Jobs Act (IIJA), the CHIPS and Science Act, and the Inflation Reduction Act (IRA)—that together invest hundreds of billions of dollars across a range of advanced research programs, utility-focused incentives, modern manufacturing facilities, consumer-facing rebate programs, and more. There is now a real chance that the U.S. can either approach or reach its climate pledges, even after wavering on global accords like the Paris Climate Agreement.<sup>1</sup>

But federal climate action is not sufficient on its own. Cities generate roughly 70% of global greenhouse gas (GHG) emissions, so reforming prevailing approaches to energy use, land use, building designs, transportation, and other areas of the built environment at a sub-national level is a vital part of U.S. decarbonization.<sup>2</sup> Fortunately, more American communities are making climate pledges of their own, leading to bolder climate planning efforts around decarbonization and building more sustainable communities.<sup>3</sup>

Yet even as cities assume a climate leadership role, there is a persistent gap between local ambitions and measurable results. While more cities are adopting formal targets to reduce their GHG emissions by some

future year, their associated planning documents often fail to detail the specific strategies and actions they will use to achieve their goals. For leaders who do want to be more specific about their implementation pathways, there are no universally accepted or required standards around how to design decarbonization practices.<sup>4</sup>

As a result, many cities are falling behind on meeting their pledges, and higher risks and costs are leaving people and places worse off. Acute and chronic climate shocks—from sudden floods to more frequent heat waves—are impacting all types of cities, but the daily impacts are also significant.<sup>5</sup> Too many Americans lack transportation access, live and work in inefficient and dangerous buildings, and deal with higher energy bills and affordability challenges—over the past decade, electricity prices have surged 64%.<sup>6</sup>

Lower-income households and communities of color are especially vulnerable to climate impacts, resulting in greater social, economic, and environmental inequities.<sup>7</sup> Environmental justice—which includes the fair treatment and meaningful involvement of all individuals to support a clean, safe environment—is gaining greater visibility among planners and other practitioners, but is still notoriously difficult to measure and address. The disconnect between addressing climate threats and the deeply embedded social inequities that accompany them represents one of the biggest shortfalls in the country’s decarbonization efforts.<sup>8</sup>

Nevertheless, some cities are accelerating climate action and prioritizing all residents. They are looking beyond traditional car-centric designs, constructing energy-efficient buildings, and relying on cleaner fuel sources—leading to safer streets, more affordable utility bills, and cleaner land and air. They are making it easier for residents to live in neighborhoods with access to parks and green space, install new heat pumps and efficient kitchen appliances, and take advantage of wind and solar power.<sup>9</sup> They are facilitating businesses’ ability to move and deliver goods, upgrade heating and cooling systems, and increase wind and solar output. And they are supporting millions of jobs involved in the transition to a cleaner economy.<sup>10</sup>

What America needs, then, is greater scale and consistency among cities’ decarbonization efforts. Too often, there is a gap within cities between climate ambitions and measurable outcomes. Meanwhile, individual cities do not have the fiscal, technical, and programmatic capacity to single-handedly drive decarbonization across their metropolitan regions.

This report highlights these gaps, with an eye toward faster and more widespread decarbonization implementation. By evaluating the most comprehensive decarbonization plans in 50 of the country’s largest cities, our analysis judges these plans’ strategies and actions to connect climate pledges with demonstrated climate action.

These 50 cities hold approximately 50% of the country’s population and are responsible for approximately 30% of the country’s CO<sub>2</sub> emissions.<sup>11</sup> We examine their plans across 25 different criteria within a consistent set of categories (overarching plan goals, sector strategies, plan ownership, funding and finance, and equity) to assess their level of detail. In many cases, the results show yawning gaps, including a lack of measurement, durable funding, and more. But we also highlight a variety of promising strategies and actions that could accelerate implementation in all types of cities.

The report begins by explaining how human activity creates GHG emissions, how public and private actors share responsibilities to reduce emissions, and how local leaders currently approach decarbonization planning and implementation. Following a brief methodology, the paper then analyzes the general trends and specific cases from our evaluation of 50 city climate plans. The paper concludes with a series of implications and recommendations to help local government officials better understand what they are doing well, what they can do better, and illuminate what they cannot do alone, with a focus on how collaboration at a regional level can advance climate action.

## BOX 1

# Key terms

**GREENHOUSE GASES (GHG)** include carbon dioxide, methane, nitrous oxide, and other gases that trap heat in the atmosphere and contribute to global warming.<sup>12</sup> This report focuses on GHG emissions from a variety of human activities, particularly those from transportation, buildings, and electricity.

**DECARBONIZATION** refers to the removal or reduction of GHG emissions, particularly carbon dioxide. The speed and level of decarbonization can vary; efforts around “deep decarbonization” aim to eliminate GHG emissions almost entirely by 2050.<sup>13</sup>

**CLIMATE ACTION PLAN (CAP)** refers to comprehensive roadmaps that outline the specific strategies and actions that an agency, including local governments, will undertake to reduce GHG emissions. They typically include specific goals, such as carbon neutrality or net-zero emissions by a certain year. As this report’s methodology describes in more detail, we tend to focus on CAPs in most cities for this analysis.

**CARBON NEUTRAL** refers to the state in which emissions are cancelled out through carbon dioxide removal (CDR) and other reduction measures.<sup>14</sup> For example, new designs and technologies, such as home heat pumps running on renewable energy, can remove emissions and contribute to overall reductions annually.<sup>15</sup> “Carbon neutral” targets are often a stated goal for many cities.

**NET-ZERO** refers to the act of reducing emissions to the lowest amount—generally considered to be between 90% and 95% of baseline emissions—and offset any remainder. “Net-zero” targets are often a stated goal for many regions.

**CARBON NEGATIVE** refers to the state in which additional emissions are removed from the atmosphere, beyond what is emitted from human activity.<sup>16</sup> For example, an industrial facility may aim to remove more emissions than it produces.

**GLOBAL WARMING POTENTIAL (GWP)** refers to estimated global warming impacts of different GHG emissions over time—typically over many decades. These values allow policymakers and practitioners to make consistent comparisons and inform reduction strategies. There are international GHG reporting standards—established by the United Nations—to gauge these impacts, and many cities also develop their own GHG emissions inventories to measure impacts, as this report will describe more extensively.<sup>17</sup>

**REGIONS** refer to metropolitan statistical areas (MSAs). This report mostly focuses on planning efforts in individual cities, serving as the basis for an analysis of 50 different decarbonization plans across the country. However, in the Recommendations section, the report explores strategies and actions that can scale at an MSA level and accelerate action across more cities and other jurisdictions.





## Background

### WHY DECARBONIZATION MATTERS AND WHAT CITIES NEED TO DO ABOUT IT

Human activities are responsible for most of the increase in greenhouse gases (GHGs) in the atmosphere over the last 150 years, including a 90% increase in carbon dioxide since 1970.<sup>18</sup> Since the industrial revolution, these activities—including manufacturing, electricity generation, and fossil fuel combustion in vehicles—have intensified GHG emissions, which trap heat, increase temperatures, and contribute to global warming.<sup>19</sup> These changes in the climate have profound impacts around the world, including in the U.S., where the frequency and severity of extreme storms, wildfires, droughts, freezes, and

other events are increasing, and chronic stresses are affecting more people and places, from daily flooding to more polluted land, air, and water.<sup>20</sup>

Out of necessity and with little choice, many Americans keep relying on coal and other nonrenewable fuel sources to power their homes and businesses.<sup>21</sup> They keep developing outward and constructing new buildings along the urban fringe of many regions, which depletes natural resources, consumes more energy, and generates more pollution.<sup>22</sup> They keep driving to cover these longer distances, with the number of per capita vehicle miles traveled (VMT) increasing 1.1% annually between 1981 and 2004, then stabilizing at the highest level among peer countries.<sup>23</sup> All of these prevailing habits (among others) are worsening the country's climate challenges each passing day.

As a result, the need to develop and implement decarbonization strategies has never been clearer. Cities are central to our climate challenges—but can also be sources of solutions.

Cities account for 70% of CO2 emissions and, thus, need to drive climate solutions.<sup>24</sup> Individual cities can vary widely in their economic composition, physical design, and exposure to climate change (e.g., flooding in Miami versus droughts in Phoenix), but their largest emissions sources tend to follow a predictable pattern.

Nationally, the largest sources by economic sector are transportation (with 27% of GHG emissions), followed by electricity (25%), industry (24%), and residential and commercial buildings (13%).<sup>25</sup> For the most part, GHG emissions across different cities reflect these national shares, although totals are often self-reported and there can be errors in measurement. If anything, major cities may underreport their GHG emissions by an average of 18%, according to recent research.<sup>26</sup>

FIGURE 2

### Three built environment sectors are responsible for most GHG emissions



SOURCE: Brookings analysis of EPA data



Leaders face an assortment of challenges around planning and addressing emissions across these sectors:

- The **transportation sector** moves goods and people within and between cities, and now contributes the largest share of GHG emissions nationally. The most discussed intervention is transitioning to electric vehicles (EVs). While cities are reliant on national manufacturers to build enough EVs, cities can incentivize EV adoption through modernizing their fleet, deploying charging infrastructure, and regulating road, port, and other facility uses. Municipalities carry even greater authority to rethink automobile-centric planning or design standards to reduce the distances Americans need to travel and incentivize greater transit use, biking, and walking.<sup>27</sup>
- The **electricity sector** continues to generate significant direct emissions, even as renewable sources such as wind and solar become more affordable and see greater adoption. The core challenges are a continued reliance on fossil fuels for electricity generation, inefficiencies in existing transmission and distribution lines, and an aging

grid responsible for managing these flows.<sup>28</sup> Cities themselves do not often directly own or operate these systems, meaning continued coordination with private utilities and state and federal regulators is key to advancing any technological upgrades or other infrastructure improvements.

- Together, **commercial and residential buildings**—from offices to retail stores to single-family homes—rank among cities’ leading sources of GHG emissions. They involve both direct emissions (related to on-site fossil fuel use for cooking, heating, and air conditioning) and indirect emissions (related to electricity generated off-site to power their operations).<sup>29</sup> Steps to decarbonize this sector generally aim to improve energy efficiency on-site, including electrifying end uses via LED lighting, solar heaters, and other technologies.<sup>30</sup> City leaders can require or incentivize these improvements through zoning or building codes, but must also work with developers and property owners who are most directly responsible for implementing such upgrades—a process that can be slow and inconsistent from city to city.





## HOW CITIES PLAN TO DECARBONIZE

Decarbonization demands action across multiple built environment sectors and geographies, and cities play a central role in developing and implementing plans to accelerate that action.<sup>31</sup> However, unlike major transportation or economic development efforts, there is no federal mandate for cities to produce decarbonization plans, and thus, no federally prescribed planning requirements or standards for the design and key components of the plans.<sup>32</sup>

For the most part, decarbonization plans tend to evolve independently across the country.<sup>33</sup> In many cities and jurisdictions, decarbonization planning takes place through updates to sustainability plans or the addition of climate-focused strategies to sector-specific plans (e.g., transportation or buildings). In other cities and jurisdictions, climate action plans (CAPs) serve as overarching visioning documents that establish ambitious decarbonization targets (e.g., net-zero by 2050) and depend on ongoing measurement (via emissions inventories) to gauge progress. It is not uncommon for city practitioners to outsource planning to consultants. The specific city's context—including past planning efforts, staffing and technical capacity, fiscal health, political will, and the relevant authorities—usually influence the design, detail, and rigor of any decarbonization plans.

Some states do facilitate, incentivize, or require more consistent local and regional decarbonization planning. Pennsylvania's Local Climate Action Program, for instance, provides technical and personnel assistance to city governments as they attempt to reach five state-defined milestones: 1) inventory GHG emissions; 2) establish a reduction target; 3) develop a CAP; 4) implement policies and measures; and 5) monitor and verify results.<sup>34</sup> California's Climate Action Resource Guide for Local Governments is framed around a similar progression: 1) complete a baseline inventory; 2) adopt a target; 3) forecast emissions; 4) select strategies; 5) implement and fund the strategies; and 6) monitor and track progress.<sup>35</sup>

Philanthropic-supported programming has also emerged as a partner for local decarbonization efforts.

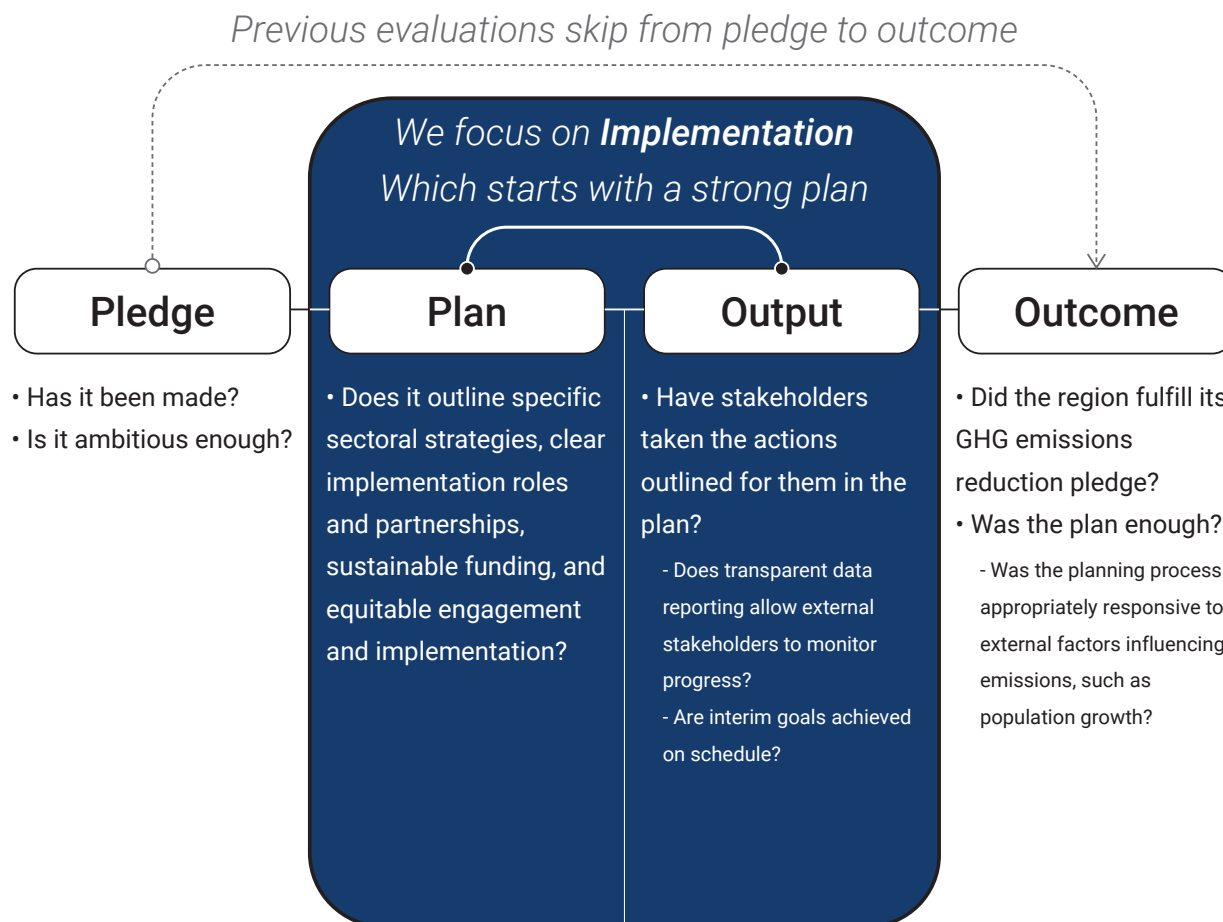
For example, the Rockefeller Foundation's 100 Resilient Cities effort and Bloomberg Philanthropies' American Cities Climate Challenge have supported research, innovation, funding, and staffing around these issues. Other regional and local decarbonization planning efforts are shaped informally through national or global best practices; groups such as C40 Cities and the Urban Sustainability Directors Network are among the largest providing guidance, resources, and peer-to-peer learning opportunities.<sup>36</sup> Similarly, the Global Covenant of Mayors for Climate and Energy outlines an eight-step "journey" for cities take toward climate action: commit, assess, set goals and targets, develop an action plan, implement, monitor and report, validate, and update.<sup>37</sup>

Altogether, the combination of local, state, and nonprofit efforts enshrines a general step-by-step progression for local and regional decarbonization. Places should pledge, then plan, then implement. Follow the script, and GHG emissions will fall.

Researchers are beginning to study these decarbonization attempts by evaluating the relationship between city pledges and GHG emissions reductions, and they are finding mixed results. Pledges alone do not guarantee desired outcomes.<sup>38</sup> And with pledge-based approaches driving climate policies at the global and state levels, it is little wonder why frameworks and evaluations underestimate the complexities of implementation.

The shortfalls aren't hard to find. Key steps—such as planning, measuring, implementing, and tracking progress—all happen in tandem, tend to be driven by different actors, and are both interdependent and prone to stalling. GHG inventories—standard measurements to gauge GHG emissions for a given geography—are essential to chart progress, but they are often methodologically and programmatically inconsistent.<sup>39</sup> Timing and pace are essential to any planning efforts, but the longer it takes to implement consequential climate action, the higher the necessary year-over-year GHG emissions reductions will be. There is no room for negotiation or extending the timeline for climate action.<sup>40</sup>

Planning for decarbonization implementation



**SOURCE:** Brookings authors

**NOTE:** Originally appears on p.3 as Figure 1

Rather than focusing on pledges or outcomes in isolation, this report focuses on the actual planning process, with an emphasis on “implementable” plans. These plans start with strong measurement and data informing ambitious pledges. They spell out detailed, equitable strategies and ensure lead implementors’ buy-in. They secure long-term funding to support action and hold implementors accountable through timely, transparent data and progress tracking. They give implementors the information, alignment, and resources they need to deliver quality outputs. These outputs, in turn, are what will bring real results.

However, too many major cities lack detailed plans. They do not always have the clear measures and benchmarks to consistently gauge progress. They do not always spell out clear strategies and actions. They do not always establish clear entities to drive these strategies and actions. They do not always identify durable funding sources or experiment with innovative financing approaches. And they do not always embed equity into their overall or sector-specific strategies. To truly accelerate decarbonization and tackle the country’s climate crisis, cities and the larger regions in which they exist need to fire on all of these cylinders.



## HOW CITIES CAN BETTER COORDINATE AROUND DECARBONIZATION AT A REGIONAL LEVEL

Cities cannot solely accelerate decarbonization—it takes a variety of local leaders who work outside a city government to fully decarbonize a community. Single municipalities may not have the skilled staff or technical resources to measure and address their decarbonization needs; they may not have the funding to deliver new infrastructure projects; and they may not have the specific programs and organizational structures in place to organize all this activity. To overcome their technical, financial, and programmatic capacity constraints, city leaders work with a mix of federal and state colleagues, neighbors in other local governments, private leaders within utilities and other sectors, and civic leaders to build complementary decarbonization goals and strategies.

However, there can be a notable lack of coordination, especially at a regional level. The inability for cities to consistently develop and implement plans across multiple public and private entities and jurisdictions represents another hurdle to action.

Decarbonizing the built environment is scientifically challenging, and our governance structures only add to the complexity. The enormous geographic scale and variety of infrastructure systems in need of upgrades—from constructing bike lanes to delivering clean electricity—is a multifaceted challenge that traverses the public and private sectors across cities. Different ownership structures, regulatory needs, planning approaches, and funding and financing mechanisms are involved, with no one-size-fits-all solution or even common templates for action. This fragmentation of leadership and responsibilities is a nontrivial component of designing decarbonization strategies at the appropriate scale.

In many metropolitan areas, a variety of geographic and jurisdictional challenges can emerge. The primary cities and urban cores of these areas can feature dense street grids, large buildings, and older infrastructure systems (buried power lines, transit networks, and more), which present very different emissions challenges than suburbs or exurbs. These outlying cities, towns, and counties can feature expansive highways, sprawling subdivisions, and newer infrastructure systems. The prevailing transportation strategies, land use plans, building codes, and other built environment practices can differ from jurisdiction to jurisdiction, as can the specific entities involved.



FIGURE 4

## GHG emissions are produced throughout a region

### National GHG Sectors



**Buildings**  
13%



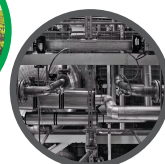
**Transportation**  
27%



**Electricity**  
25%

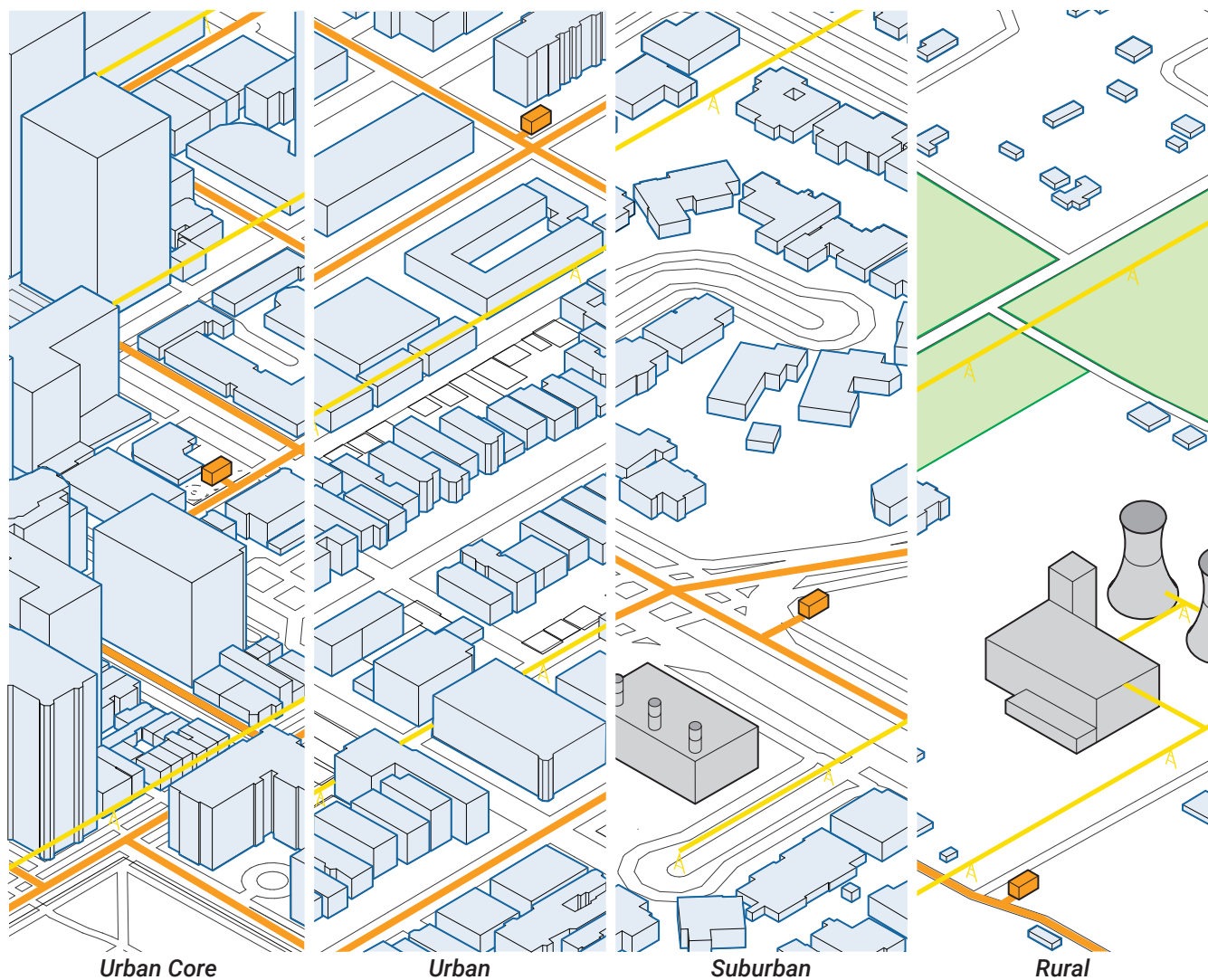


**Agriculture**  
11%



**Industry**  
24%

### Snapshot of a Region



Major cities have decarbonization plans and take the lead, but they often fail to think of the challenges and opportunities of acting regionally. All portions of a region contribute to regional GHG emissions, and all have their own part to play in effective decarbonization.

**SOURCE:** Brookings analysis of EPA data

Indeed, the actors across individual cities and entire regions can vary widely when it comes to their respective roles around decarbonization planning and action.

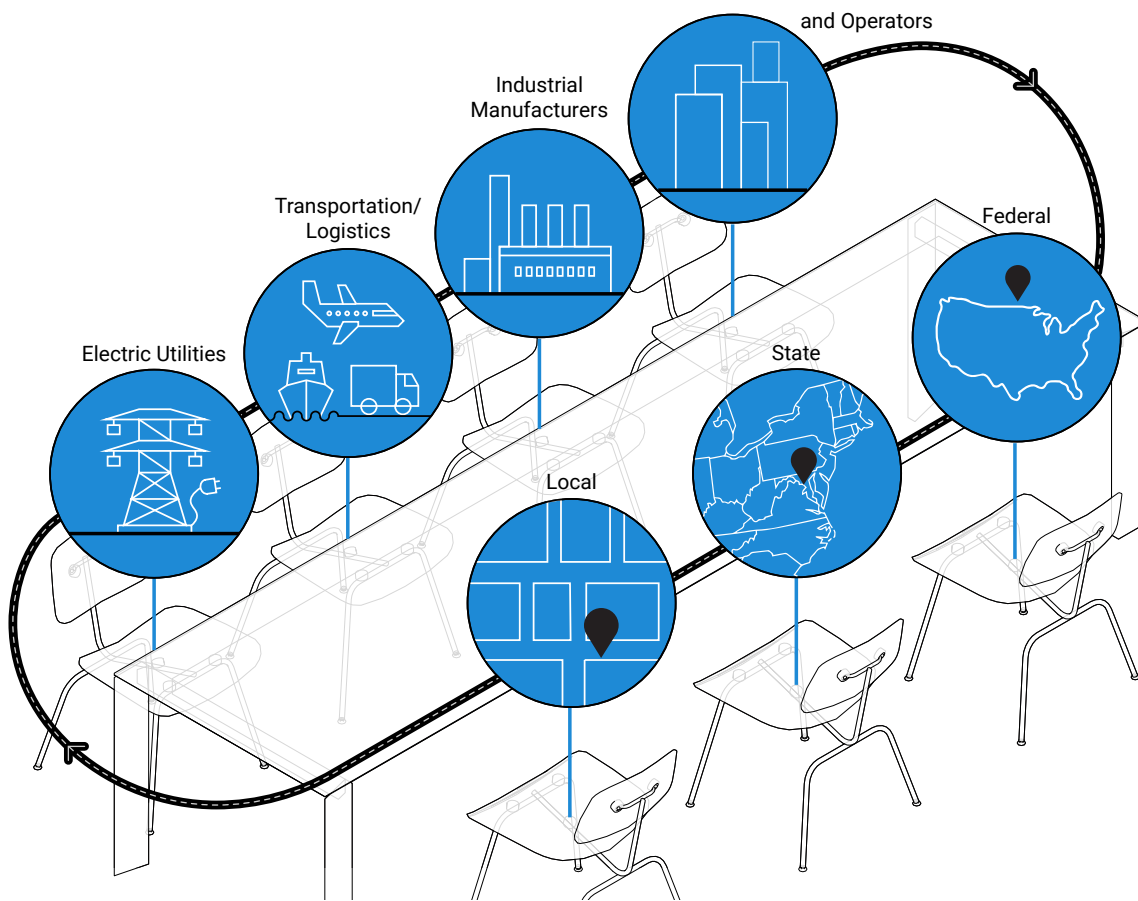
In the private sector, for instance, multiple industries are involved in producing and addressing GHG emissions—most notably, electric utilities. Across the country, thousands of different utilities generate, transmit, and distribute electricity for millions of residential, commercial, and industrial customers.<sup>41</sup> Nearly 3,000 such entities across the country provide 4 trillion kilowatt hours of electricity annually.<sup>42</sup> Among other private entities, logistics firms oversee supply chains that can account for more than 90% of all GHG emissions for companies, whether selling goods, transporting materials, or making deliveries.<sup>43</sup>

Emissions from daily operations is also a concern, especially for manufacturers that carry out high-emitting, on-site processes involved in the production of chemicals, oil, and gas. Lastly, land developers, real estate firms, and other building owners and operators have enormous geographic reach, determining the location, design, and performance of the country's building stock.<sup>44</sup>

The public sector is perhaps even more fragmented across different regions. The range of state and local government entities involved in decarbonization goal setting, regulating, monitoring, and funding can be dizzying. These state and local entities serve as the focus of this report.

**FIGURE 5**

**Decarbonization efforts must bring many stakeholders to the table**



**SOURCE:** Brookings authors

Among state entities, departments of environment (or of natural resources/environmental quality) are often the agencies responsible for enforcing regulations, monitoring performance, and funding projects related to land, air, and water. They frequently work with local governments in executing these responsibilities; however, the collaborations are not always frictionless given the challenges around fiscal capacity, data collection, and other rapidly evolving policy and programmatic priorities.<sup>45</sup> State public service commissions are another type of entity that regulates utilities providing power, telecommunications, water, and other essential services; they also can confront a long list of challenges, including around equity, affordability, and performance.<sup>46</sup> Other state agencies, including those involved in transportation and housing, are instrumental in providing strategic direction, administering funding, and advancing projects to reduce emissions.<sup>47</sup> And all these various entities must coordinate with state legislatures when it comes to budgeting and related political priorities.<sup>48</sup>

At a local level, the number of departments involved in decarbonization multiplies even further. There are more than 89,000 local governments nationally; they own and operate the majority of U.S. public infrastructure systems and must balance multiple competing

priorities.<sup>49</sup> Many cities and counties have their own departments of environment (or sustainability) that enforce regulations, draft CAPs, conduct community outreach, and coordinate with other agencies with parallel responsibilities, including departments involved in land use, transportation, housing, and other functions. Regional entities, such as metropolitan planning organizations (MPOs) and councils of government (COGs), also frequently engage with local government departments and other constituents to aid in planning, funding, and technical assistance.<sup>50</sup> These inter- and intra-jurisdictional coordination challenges are even more complex when considering the public utilities (e.g., water) and authorities (e.g., transit) that have service areas, service populations, and service needs traversing regions.<sup>51</sup>

The sheer number of actors and their overlapping geographies and authorities is overwhelming. The national—and regional—complexity around planning, managing, and paying for upgrades to the built environment represents a huge hurdle for decarbonization. The report's analysis will further highlight this complexity and point to the need for greater clarity and detail in ongoing implementation.





## Methodology

To analyze the decarbonization landscape across the country, this report explores planning efforts in 50 different cities. These efforts go by many names—climate action plans, sustainability plans, decarbonization plans, etc.—but our analysis is less concerned with the semantics. It also does not concentrate on measuring actual changes in GHG emissions.<sup>52</sup> Rather, this analysis is more concerned with decarbonization implementation potential—in other words, the strategies and actions that cities are pursuing to remove or reduce GHG emissions across the built environment, particularly from buildings, transportation, and electricity.<sup>53</sup>

The “strategies and actions” that cities take usually center around specific implementation pathways, which aim to achieve certain desired goals. For example, these pathways can involve new policies and programs that reduce vehicle miles traveled or expand the number of electric vehicle charging stations. They can involve the creation of new local government departments and staff positions focused on improved climate measurement and community outreach. They can involve new climate funding sources and financing approaches. Above all, these pathways often appear in specific planning documents and represent the key levers city policymakers, planners, and other practitioners use.

## BOX 2

# Key planning terms

**SECTORS** are different parts of the built environment, including buildings; transportation systems; and facilities that generate, transmit, and distribute electricity.

**STRATEGIES** refer to broader policies and programs aimed at eliminating emissions associated with the built environment, such as new funding sources and equity initiatives.

**ACTIONS** are specific steps taken to eliminate emissions associated with the built environment, such as solar installations and transit upgrades.

**IMPLEMENTATION PATHWAYS** refer to collections of strategies and actions featured in plans that drive decarbonization implementation.

**GOALS** are desired decarbonization outcomes that guide planning and action, typically communicated through short- and long-term pledges (e.g., carbon neutrality by 2050).

In addition to an analysis of plans, the author team also interviewed planners and other leaders across over a dozen cities to shed light on the variety of actors and actions involved in implementing plans over time. With an eye toward geographic and economic diversity, these interviews complemented the analysis and provided real-time knowledge of the challenges and opportunities facing different city leaders around plan development, measurement, evaluation, community outreach, funding, financing, inter- and intra-jurisdictional coordination, and more.

In this way, the analysis examines the breadth and depth of the various ways cities are driving implementation across multiple built environment

sectors. By doing so, it also aims to complement other assessments of sub-national climate action. One of the most expansive assessments is the City Clean Energy Scorecard from the American Council for an Energy-Efficient Economy (ACEEE), which “measures the progress of city policies and programs that reduce greenhouse gas emissions,” especially when it comes to “improving energy efficiency and moving toward a cleaner electric grid and fuels.”<sup>54</sup> As described more extensively below, the analysis looks to expand the geographic footprint of these comparisons to consider a variety of other programmatic and fiscal capacity issues facing city and regional leaders.

## GEOGRAPHIC SCOPE

Decarbonization implementation represents an enormous task that not only spans multiple sectors of the built environment, but also traverses the public and private sectors and many individual jurisdictions. This can complicate any consistent analysis of cities' decarbonization strategies and actions. To help bound all this activity, the analysis focuses on implementation in 50 cities where decarbonization plans are readily available. The cities cover all corners of the country and range considerably in size, from New York and Los Angeles to Boise, Idaho and Madison, Wis. They do not cover every geography currently addressing decarbonization, but they provide a wide sample.

### MAP 1

## Cities analyzed for decarbonization planning



**SOURCE:** Brookings analysis of city decarbonization plans

Cities in themselves do not reflect the full variety of jurisdictional issues at play in decarbonization.<sup>55</sup> Each jurisdiction has a unique combination of factors that can influence the plan implementation—from building codes to energy facilities—which speaks to the complexity of the issues at play. An individual city does not represent or capture all of these unique factors across an entire metropolitan area, but it tends to carry the greatest economic weight, contain the most population, and generate the most GHG emissions. This analysis scratches the surface of these inter- and intra-regional differences, signaling the need for additional research.



## PLAN SELECTION

Decarbonization implementation is not only fragmented across different jurisdictions, but also within individual jurisdictions. As this analysis will describe in greater detail, some cities may have a single overarching decarbonization plan, but they may also have a handful of plans developed and used by specific local government departments (e.g., a clean transportation plan or an energy efficiency plan for buildings). Other cities may have two or three overarching plans related to decarbonization. And other cities may still be actively developing their first set of strategies to feed into a new or updated decarbonization plan.<sup>56</sup>

The analysis concentrates on the single “most comprehensive” decarbonization plan in each city—the document that primarily or solely focuses on implementing a comprehensive set of decarbonization pathways to reduce GHG emissions across multiple built environment sectors (typically including buildings, transportation, and electricity). While plans specific to individual departments or built environment sectors may have more detailed goals, measures, and strategies, the analysis looks to identify and assess the document with the broadest topical coverage. In addition, the analysis concentrates on the most current decarbonization plan available, typically created or updated in the last two to three years.<sup>57</sup> While there is no one plan to rule them all, this analysis tries to examine a consistent type of plan in each city: one structured to be public-facing and implementable, which allows for clearer assessments and takeaways.



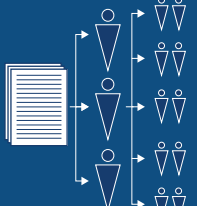

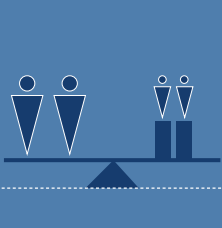


## PLAN EVALUATION CRITERIA

Once selected, the plan is evaluated across several categories to better gauge the city’s capacity and ability to decarbonize. Investigating the types of actions specified in the plan is revealing, as are the groups of actors listed, sources of funding and financing, and the measures related to certain key goals, such as equity. In particular, the scan examines plans across five categories:

FIGURE 6

### Level of decarbonization plan detail is measured across five categories

	<p style="text-align: center;"><b>Overarching Plan Goal</b></p> <p>Evaluates:</p> <ul style="list-style-type: none"> <li>• The stated GHG reduction targets</li> <li>• Whether plan updates, progress reporting, and interim GHG reduction checkpoints are to be tracked</li> </ul>	<p style="text-align: center;"><b># of Criteria</b></p> <p style="text-align: center;"><b>6</b></p>
	<p style="text-align: center;"><b>Sector Strategies</b></p> <p>Evaluates:</p> <ul style="list-style-type: none"> <li>• Whether sectors and strategies are measurable</li> <li>• Whether they are given time horizons</li> <li>• Whether they build over time</li> </ul>	<p style="text-align: center;"><b>5</b></p>
	<p style="text-align: center;"><b>Ownership</b></p> <p>Evaluates:</p> <ul style="list-style-type: none"> <li>• Whether champions for each strategy are made explicit</li> <li>• Whether the document highlights partnerships</li> <li>• Whether previous planning documents are aligned with</li> </ul>	<p style="text-align: center;"><b>6</b></p>
	<p style="text-align: center;"><b>Funding and Finance</b></p> <p>Evaluates:</p> <ul style="list-style-type: none"> <li>• Whether existing funding sources are outlined</li> <li>• Whether funding options are integrated throughout the strategies</li> <li>• Whether innovative future funding techniques are outlined</li> </ul>	<p style="text-align: center;"><b>4</b></p>
	<p style="text-align: center;"><b>Equity</b></p> <p>Evaluates:</p> <ul style="list-style-type: none"> <li>• Whether equity considerations are embedded throughout the strategies</li> <li>• Whether equity is used to evaluate plan success</li> <li>• Whether the planning process engaged community</li> </ul>	<p style="text-align: center;"><b>4</b></p> <p style="text-align: center;"><b>Sum:</b> <b>25</b></p>

SOURCE: Brookings analysis of city decarbonization plans

Within each of these categories, the analysis relies on a set of 25 individual criteria to consistently score each plan. The number and type of criteria vary depending on the category evaluated, but they all aim to determine the plan's level of detail and precision. We consistently evaluated criteria based around the idea of advancing actionable strategies.

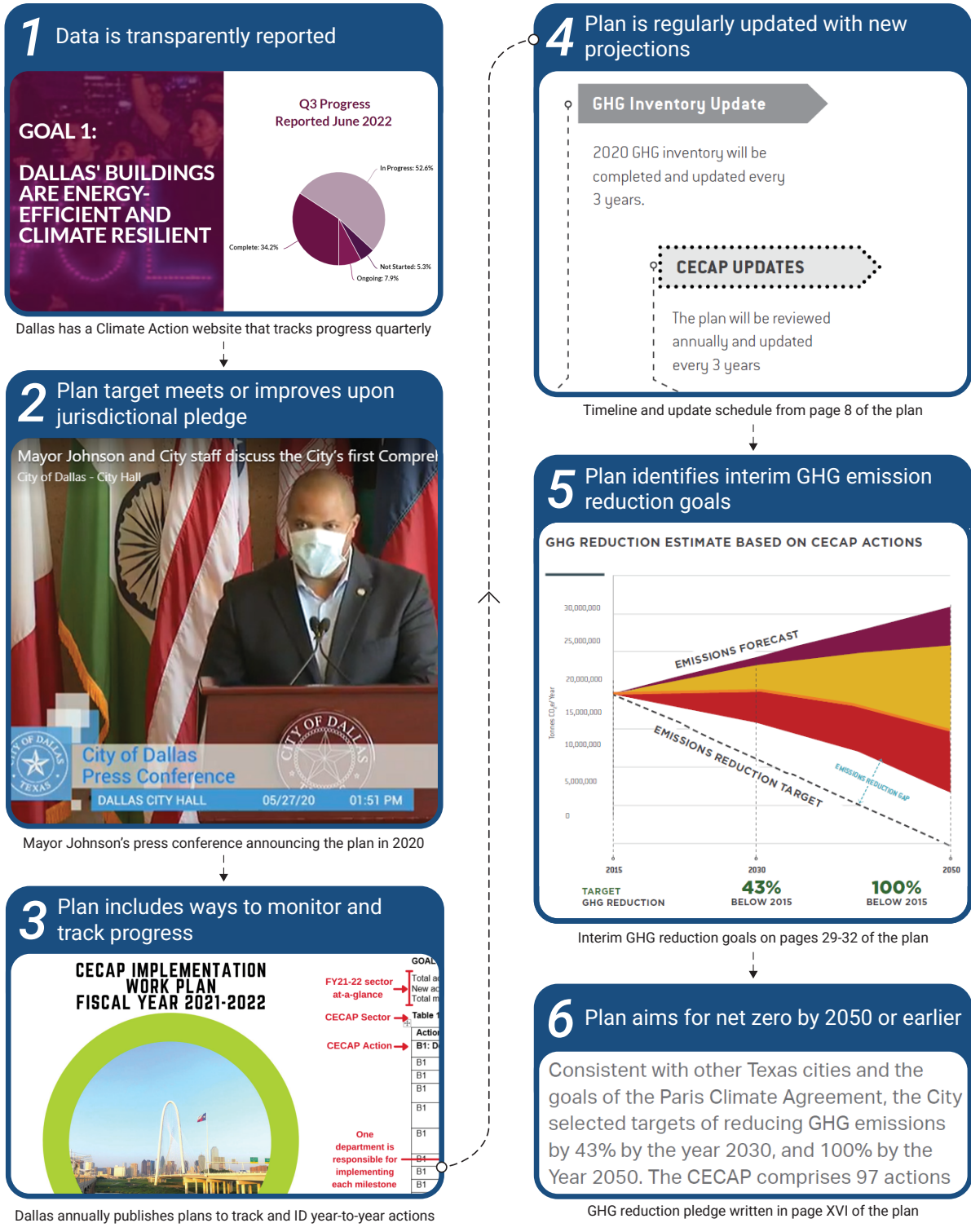
For instance, when evaluating the “overarching plan goal,” the analysis not only considers the overall GHG emissions reduction goals listed, but also delves deeper into the measures and benchmarks used to gauge progress toward these goals, including whether they are publicly updated and easily accessible. In

total, there are six criteria in this category. The analysis determines whether the plan is “detailed” for each of these criteria—assigning a value of 1 if so and 0 if not—and then aggregates these scores for the respective category. For example, exploring whether a plan aims to achieve net-zero emissions by 2050 or earlier reveals a more precise level of detail. The aggregated scores ultimately determine whether a plan is categorized as “most detailed,” “less detailed,” or “least detailed.” Below is an example using the Dallas Climate Action Plan. Evaluating the other categories involves a similar process, as the subsequent findings will describe.



FIGURE 7

Evaluating level of detail for ‘overarching plan goal’ in the Dallas Climate Action Plan



SOURCE: Brookings analysis of city decarbonization plans

NOTE: This visual shows specific snapshots of different parts of the Dallas Climate Action Plan that the research team used to evaluate the level of detail for each criterion.

A methodological appendix has more details on all the categories scored, individual criteria, and other methodological considerations.

### BOX 3

## How to read our data

This analysis highlights the level of detail in decarbonization plans in two primary ways. First, it shows “Individual Criteria Scores,” which report the number of plans that satisfy each criterion (i.e., scored a 1) under a given category. Second, it shows “Cumulative Category Scores,” which report the number of plans that satisfy multiple criteria (i.e., scored a 1) under a given category. The five findings below summarize both score types in a consistent table and chart while providing specific examples throughout.

Meeting all the criteria is essential to advance decarbonization in each category, given the urgency and scale of the climate challenge facing cities. Plans need to demonstrate the breadth and depth necessary to tackle this challenge, which is why satisfying one or even a handful of criteria in a given category is insufficient. Addressing multiple built environment sectors, for instance, means little if the plan lacks quantifiable, measurable strategies (and vice versa). This analysis aims to set an ambitious baseline to evaluate the rigor of different plans and amplify the need for many city leaders to make them more detailed and (ultimately) more actionable.

Hence, the goal for every city plan is Cumulative Category Scores of 100% in every category. Anything less is missing some key component of a thorough decarbonization plan.



## Findings

While many cities have developed plans to address decarbonization—and are in the process of updating them or even adding more plans—the rigor of these plans varies widely. Establishing clear goals such as carbon neutrality is only a start in the range of strategies and actions needed to decarbonize the built environment. The breadth and depth of these implementation pathways can be lacking across several plan components, including the benchmarks gauging decarbonization progress, the sector-specific strategies described, the funding and financing sources used, and the emphasis (or lack thereof) on equity. The following sections describe the scan results in greater depth and demonstrate the need for city leaders to address several key gaps that might limit action.

### **MOST PLANS HAVE LONG-TERM DECARBONIZATION GOALS, BUT LESS THAN ONE-THIRD (32%) HAVE DETAILED BENCHMARKS AND REPORTING**

Successful decarbonization plans include both clear goals and the methods to hold themselves accountable, including detailed monitoring. However, most plans are failing to do that. Most cities only satisfy some of the six criteria this analysis uses to evaluate the level of detail in “overarching plan goals,” meaning the plans did not consistently provide enough precision or clarity in their measurement and evaluation.

Under this category, only 16 of the 50 city plans analyzed (32%) have detailed benchmarks and reporting. That means only a small share of plans are “most detailed” when it comes to satisfying all six criteria: **1) transparently reporting data; 2) meeting or exceeding previously announced pledges for the jurisdiction; 3) consistently monitoring and tracking progress; 4) regularly updating new projections; 5) identifying interim emissions reduction goals; and 6) aiming for net-zero goals by 2050 or earlier.** Most of the plans analyzed (27 of the 50, or 54%) are “less detailed,” and the remaining seven plans (14%) are “least detailed.”



**TABLE 1**

**Level of detail for “overarching goals” in decarbonization**

Individual Criteria Scores

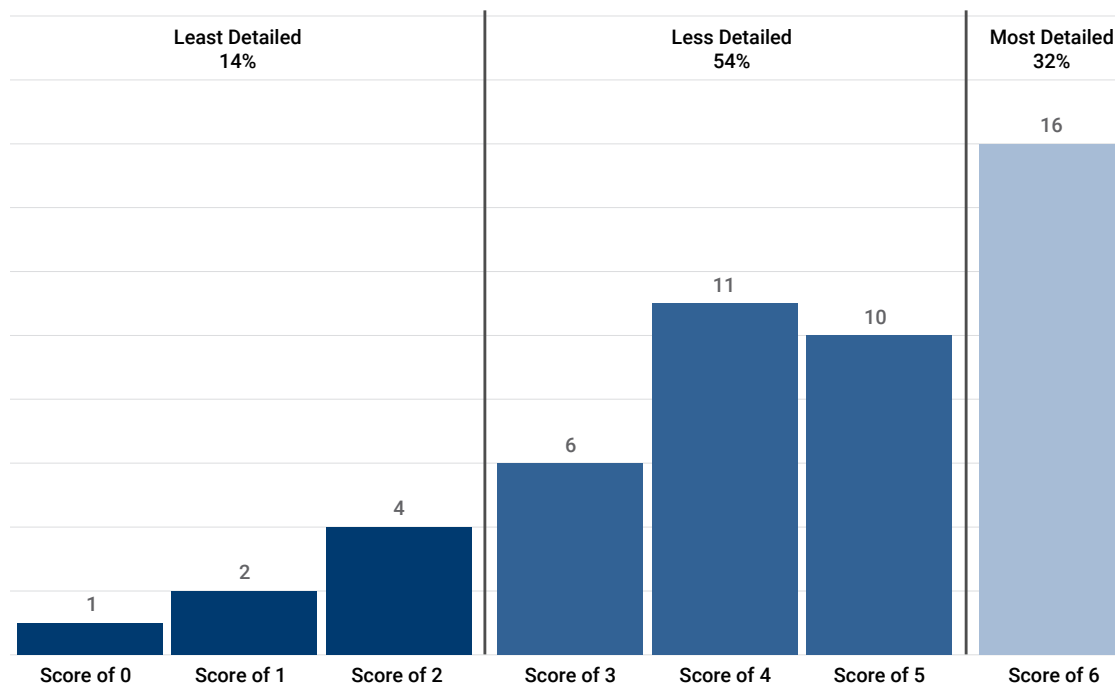
Criteria	Count of plans that scored a 1	Percent of plans that scored a 1
Data is transparently reported	47	94%
Plan target meets or exceeds previously announced jurisdictional pledge	40	80%
Plan includes ways to consistently monitor and track progress	38	76%
Plan is regularly updated with new projections	35	70%
Plan identifies interim GHG emission reduction goals	31	62%
Plan aims for net zero by 2050 or earlier	27	54%

**SOURCE:** Brookings analysis of city decarbonization plans

**NOTE:** Denotes the number of plans that scored a 1 for level of detail per each given criterion.

**FIGURE 8**

**Cumulative Category Scores**



**SOURCE:** Brookings analysis of city decarbonization plans

**NOTE:** Analysis includes 50 plans total. Levels of detail for “overarching goals” are divided into three categories based on the number of criteria met: 0-2 is “Least Detailed,” 3-5 is “Less Detailed,” and 6 is “Most Detailed.”

The problem is not usually a lack of stated goals. The urgency of climate change—and the need to plan and act—is evident in many cities across the country. Some cities have developed strategies around climate for decades, led by places such as Portland, Ore., which in 1993 created the country’s first local action plan to cut carbon emissions. But others are increasingly making new pledges, creating new plans, and pursuing new actions following the Paris Climate Agreement and other global and national initiatives over the last few years.<sup>58</sup> The drive for bottom-up, locally led action is widespread, with 47 of the 50 plans analyzed (94%) reporting at least some data on meeting goals and satisfying the first criterion in this category. Likewise, 40 of the 50 plans analyzed (80%) are looking to meet or exceed previously announced goals—the second criterion in this category.

Cities such as San Francisco are even declaring “climate emergencies” to reaffirm ambitious targets and accelerate action. While San Francisco—like Portland—has aimed to decarbonize over the last few decades and committed to net-zero emissions by 2050, recent resolutions adopted by city leadership are looking to take even faster action.<sup>59</sup> Their proposals include transitioning to renewable electricity sources and pursuing additional multimodal transportation improvements, among other such efforts over the next decade. Portland has also adopted a climate emergency declaration intended to hasten its renewable electricity transition, further reduce the carbon footprints of its buildings, and take other actions with an emphasis on climate justice and equity.<sup>60</sup>

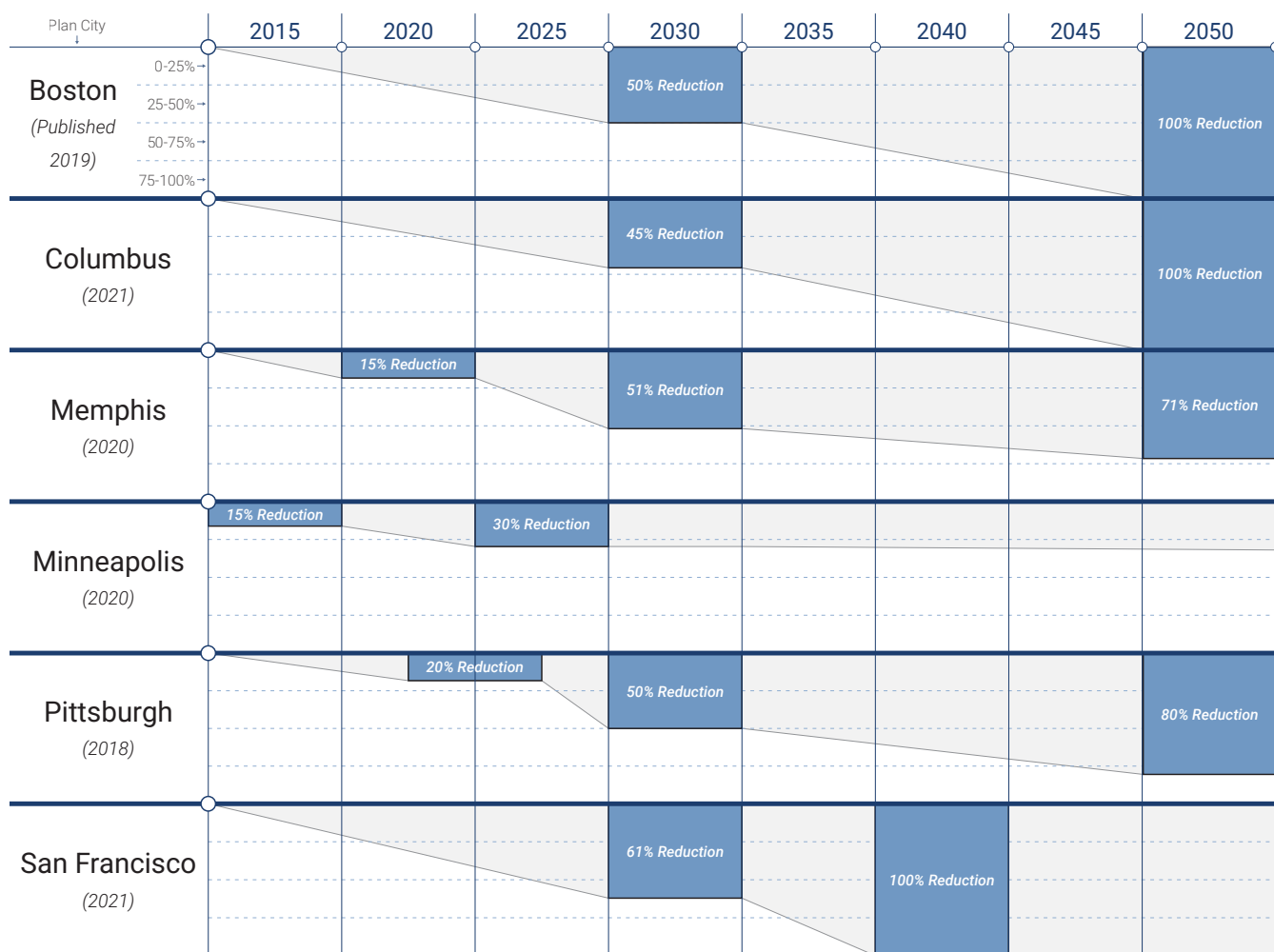
Yet fewer plans—38 of the 50 analyzed (76%)—consistently track and monitor progress, and even fewer—35 of 50 (70%)—are regularly updating with new projections. Without a short- or long-term sense of where plans are headed, cities may not be as ready to implement strategies and action.

For instance, Atlanta’s Climate Action Plan is a document that sets long-term goals, but the benchmarks to achieve them are in the “least detailed” category. Released in 2015, the plan still represents the most current decarbonization strategy at time of publication and sets targets that may already be out of date: 20% reductions by 2020 from 2009 GHG levels, and 40% reductions by 2030.<sup>61</sup> While the plan strives to hit these targets across multiple built environment sectors and lays out several proposed actions for each, ongoing evaluation is unclear and out of sync with subsequent announcements from city leadership, including a 2017 resolution to use 100% renewable energy by 2030.<sup>62</sup> The 2017 resolution also focuses almost exclusively on energy-related actions, in contrast to the CAP’s earlier emphasis on transportation and other sectors. Without more clarity, the lack of consistent evaluations and updates can throw a wrench into the city’s ongoing implementation efforts.

Atlanta is not alone in these inconsistencies. Timelines to guide action can differ markedly across the country; only 31 of the 50 plans analyzed (62%) identify interim emissions reduction goals, and around half (27 of 50, 54%) aim for net-zero goals earlier than 2050. For example, Boston uses 2030 and 2050 as benchmarks for action, while Minneapolis uses 2015 and 2030. A previous Brookings analysis on city-level climate pledges revealed similar disparities: Decarbonization targets can be inconsistent, lacking, or simply evolving as new plans emerge over time.<sup>63</sup> In some cases, cities may only set net-zero targets for certain parts of the built environment, and the timelines for those targets can appear arbitrary.<sup>64</sup>

**FIGURE 9**

**Timelines and benchmarks vary across different decarbonization plans**



**SOURCE:** Brookings analysis of city decarbonization plans

In contrast, planning efforts in Los Angeles—namely, the city’s Green New Deal (GND)—show how leaders are aspiring to decarbonize while setting detailed benchmarks.<sup>65</sup> Serving as an “ambitious update” to the city’s earlier Sustainable City pLAN, the 2019 GND clarifies targets and expands the reach of several existing actions, including: supplying 55% renewable energy by 2025, 80% by 2036, and 100% by 2045; reducing building energy use 22% by 2025, 34% by 2035, and 44% by 2050; and reducing per capita vehicle miles traveled 13% by 2025, 39% by 2035, and 45% by 2050. It also seeks to create “measurable, quantitative, and time-bounded outcomes” and promote greater accountability through annual updates that are available to the public.<sup>66</sup>

Similarly, Indianapolis released its first-ever decarbonization strategy—Thrive Indianapolis—in 2019. It commits to net-zero emissions by 2050, aligns with prior public statements by the mayor and city leadership, and provides detailed benchmarks.<sup>67</sup> The plan specifies over 59 “ambitious but achievable” actions by 2025, which look to build off of past transit upgrades, solar installations, and other improvements.<sup>68</sup> Additionally, it establishes a matrix of “summary actions” to steer ongoing implementation and gauge the ultimate GHG reduction potential for each action across the built environment.



## BOX 4

# What are GHG emissions inventories?

Using a combination of direct measurement and modelling, GHG emissions inventories quantify emissions within a designated geographic boundary. Inventories categorize emissions based on their source, and generally include: residential and commercial building energy use, transportation, industrial processes and product use, and waste. The final output of this emissions accounting exercise is essential—accurate and timely inventories create a baseline figure from which to set goals, prioritize strategies, and benchmark progress. At the same time, inaccuracies can misdirect decarbonization planning and strategies, diverse methodologies can complicate interjurisdictional coordination, and “analysis paralysis” can halt decarbonization efforts before they start.

A 2021 study of self-reported GHG emissions inventories in 48 major U.S. cities found a pattern of under-reporting. This finding reflects a key challenge: As more cities embark upon decarbonization planning and implementation activities, a widening range of GHG accounting methodologies is emerging. Differences can be observed from region to region, between cities within a region, and between public agencies operating within a city. The 2021 study pointed to specific methodological choices—e.g., which fuels and sources to include, or how to estimate transportation emissions—as a culprit, and the availability and quality of input data are limiting factors as well.

Widespread adoption of GHG emissions inventory “protocols” is a step in the right direction; many of the plans analyzed in this report followed the Global Protocol for Community-Scale Greenhouse Gas Inventories from World Resources Institute, C40 Cities Climate Leadership Group, and ICLEI—Local Governments for Sustainability. The protocol acts as a kind of recipe for GHG emissions inventories, explaining the necessary ingredients and methods to local practitioners to produce a city inventory comparable to national inventories prescribed by the IPCC. To accommodate a range of technical capacity and data availability, protocols also include flexibility. The Portland, Ore. and Multnomah County Climate Action Plan, for example, references both a traditional sector-based emissions inventory and a consumption-based inventory that includes externally produced emissions caused by local consumer demand. The Austin, Texas Climate Equity Plan uses an inventory created with the Global Protocol, but working groups also considered consumption-based emissions when crafting strategies for natural systems, food and product consumption, and sustainable buildings. These kinds of “scoping” flexibilities are well defined in protocols, and the Global Protocol proactively prescribes methodologies for how to combine multiple inventories while controlling for scoping choices.

Even a flexible protocol—a recipe with well-defined substitutions—cannot guarantee perfectly aligned GHG emissions inventories. Poor-quality data, like poor-quality recipe ingredients, can spoil the result. And just as recipes cannot guarantee a skilled chef, protocols cannot guarantee that cities have the technical and staff capacity, time, and resources to follow them accurately.

After dedicating significant time and resources to successfully completing their first inventory, many places later fall behind on updates. The 2020 Oklahoma City Adapt OKC plan includes an initiative to conduct GHG inventories every five years—recognizing that the city’s last inventory was conducted 10 years prior and can provide only limited information to advance climate goals. Similarly, the 2019 Detroit

## BOX 4 CONTINUED

Sustainability Action Agenda notes the need for an updated inventory, as the University of Michigan School for Environment and Sustainability conducted the city’s most recent inventory in 2012. Key GHG inventory protocols recommend updating inventories annually—a standard that most cities are currently unable to meet. This measurement backlog can impact planning processes by providing an outdated perspective on emissions activity and obscuring longitudinal trends.

Together, these challenges underscore the importance of approachable, standardized inventory methodologies combined with technical assistance targeted to low-capacity communities tackling interjurisdictional planning efforts. Emergent regional approaches to GHG emissions inventory standardization, coordination, and capacity building are explored further in the Recommendations section.

## ONLY ABOUT ONE-QUARTER (28%) OF PLANS INCLUDE DETAILED SECTOR-SPECIFIC STRATEGIES FOR ELECTRICITY, BUILDINGS, AND TRANSPORTATION DECARBONIZATION

Similar to the overarching GHG emissions goals and benchmarks discussed above, plans do not always spell out how city leaders will carry out different implementation pathways across the three focus sectors. Only 14 of the 50 plans analyzed (28%) are “most detailed,” meaning they: 1) address electricity, buildings, and transportation; 2) outline quantifiable, measurable sector-specific strategies; 3) set deadlines for these strategies; 4) measure progress toward strategies; and 5) identify timelines and/or phasing for strategies. These details are key to building plans that outline the where, what, how, and when of decarbonization implementation. Twenty-four of the remaining plans are “less detailed” (48%) and 12 are “least detailed” (24%).

TABLE 2

### Level of detail for “sector strategies” in decarbonization plans

Individual Criteria Scores

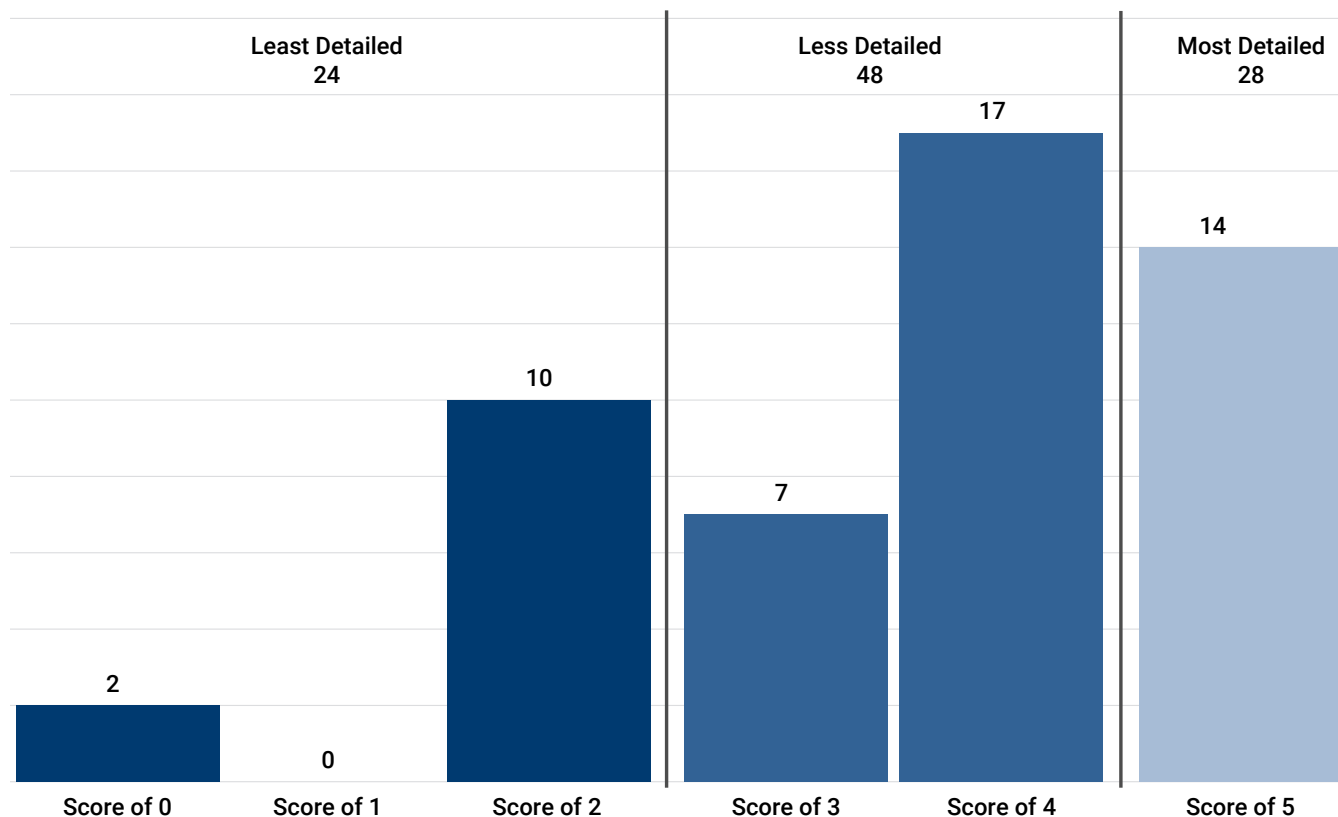
Criteria	Count of plans that scored a 1	Percent of plans that scored a 1
Plan spans 3+ built environment sectors including electricity, buildings, and transportation	43	86%
Sectors have quantifiable, measurable sector-specific strategies	37	74%
Plan sets deadlines for each sector-specific strategy	36	72%
Plan measures progress toward sector-specific strategies	33	66%
Plan identifies timelines and/or phasing for each strategy	30	60%

**SOURCE:** Brookings analysis of city decarbonization plans

**NOTE:** Denotes the number of plans that scored a 1 for level of detail per each given criterion.

**FIGURE 10**

**Cumulative Category Scores**



**SOURCE:** Brookings analysis of city decarbonization plans

**NOTE:** Analysis includes 50 plans total. Levels of detail for “overarching goals” are divided into three categories based on the number of criteria met: 0-2 is “Least Detailed,” 3-5 is “Less Detailed,” and 6 is “Most Detailed.”

In some places, plans do not include any sector strategies. For example, Salt Lake City’s Climate Positive 2040 plan only briefly introduces current programming and potential impact areas.<sup>69</sup> Likewise, not all strategies are quantifiable or measurable. Hartford, Conn.’s Climate Action Plan includes potentially promising strategies such as “Upgrade and Install New Technology in Public Buildings” and “Encourage Clean Energy Vehicles,” but without further detail or measurable commitments, there is little indicating how, to what extent, and when the city plans to implement those strategies.<sup>70</sup>

At the same time, many plans share some, but not all, of the necessary details for different sector strategies.

The SA Climate Ready: A Pathway for Climate Action and Adaptation plan developed by San Antonio outlines general strategies across the three key built environment sectors. However, the plan’s strategies and underlying actions are not quantifiable (i.e., “support and incentivize district-scale clean energy projects”) and lack clear deadlines and metrics to track progress.

Among the plans that span multiple built environment sectors—representing 43 of the 50 plans analyzed (86%)—many include a focus on electricity, buildings, and transportation, plus a variety of other sectoral pathways ranging from food to water and waste systems.<sup>71</sup> The Miami Forever Carbon Neutral Plan



includes five main sectoral strategies: transportation, renewable energy (electricity), electric vehicles, energy efficiency for buildings, and a new “green economy,” which includes workforce and economic development strategies.<sup>72</sup>

The lack of quantifiable, measurable strategies—and deadlines for these strategies—are gaps in several plans. Thirty-seven of the 50 plans analyzed (74%) craft quantifiable, measurable strategies for sector-based decarbonization, while 36 of 50 (72%) set specific deadlines. Among the more detailed plans, St. Louis’s Climate Action and Adaptation Plan sets measurable strategies with clear deadlines for each of the three critical decarbonization sectors.<sup>73</sup> The plan connects sector strategies to overarching 2050 emissions reduction goals by identifying the share of total reductions intended through implementation of each strategy’s outlined actions.

An even smaller number of plans—33 of the 50 analyzed (66%)—measure progress toward these key strategies, and 30 of 50 (60%) identify timelines and/or phasing. While Nashville, Tenn. is still preparing its full climate action plan, the current Sustainability Advisory Committee Report does not yet set deadlines, measure progress, or identify the timelines and phasing necessary to meet goals. The Minneapolis Climate Action Plan links to a “Sustainability Indicators” tracker, but the link is no longer live, and the tracker has been either moved or removed. The plan also lacks deadlines or implementation timelines toward key sector strategies.

Still, there are promising models in some cities. For instance, the Boston Climate Action Plan has several “metrics for success” for each strategy, including

an especially detailed transportation strategy to “support citywide zero-emissions vehicle (ZEV) deployment.”<sup>74</sup> This strategy has two key metrics for success: 1) every Boston neighborhood should have public charging infrastructure available by 2023; and 2) 100% of residents should live within a 10-minute walk of a public EV charger or EV carshare facility. The Boston Climate Action Plan also measures progress by tracking which actions have been completed each year; the 2021 annual report found four ZEV strategy actions to be complete, four in progress, and two not yet started.<sup>75</sup>

The Kansas City, Mo. Climate Protection and Resiliency Plan distinguishes between immediate actions—which are either underway or should take place during 2022—and near-term actions to be taken between 2023 and 2025.<sup>76</sup> The Louisville Greenhouse Gas Emissions Reductions Plan includes both a “logistics” and “solutions” table for each strategy.<sup>77</sup> The logistics table includes a “timeline” column, which notes whether actions will be implemented in the short, medium, or long term. The logistics table also includes “tracking metrics” to aid in evaluating progress over time. Charleston, S.C. maintains a live tracker of the 52 actions its climate action plan’s 12 strategies propose. Each action is updated regularly to indicate one of three implementation stages: not started, started, or completed/ongoing. Such simple, transparent timelines, trackers, and progress metrics build opportunities for accountability and demystify the decarbonization process.

## NEARLY TWO-THIRDS OF PLANS PROVIDE SOME DETAIL ON WHO WILL LEAD DECARBONIZATION EFFORTS, BUT FEW OFFER EXTENSIVE DETAIL

Ideally, city decarbonization involves cross-sectoral and cross-jurisdictional coordination. But fragmentation between sectors—both within and across different jurisdictions—can make this kind of coordination difficult. Decarbonizing the built environment frequently involves a range of policy and programmatic needs, including questions around “ownership”: the specific public and private entities responsible for executing different strategies and actions.

Most plans—34 of the 50 plans analyzed (68%)—tend to provide “less detail” around ownership, acknowledging other entities and plans responsible for leading decarbonization efforts, but not covering more intricate needs around strategy coordination and execution. Only 16 of the 50 plans (32%) are “most detailed,” meaning they: 1) identify existing sector-specific plans; 2) include cross-sectoral partnerships in plan development; 3) identify a central entity (other than just “the city” or “the mayor”) to coordinate implementation; 4) engage cross-sectoral partnerships in plan implementation; 5) align with other existing plans; and 6) identify lead implementers and partners for each strategy. No plans are “least detailed,” meaning that all the plans analyzed satisfy at least some of these criteria.

TABLE 3

### Level of detail for “ownership” in decarbonization

Individual Criteria Scores

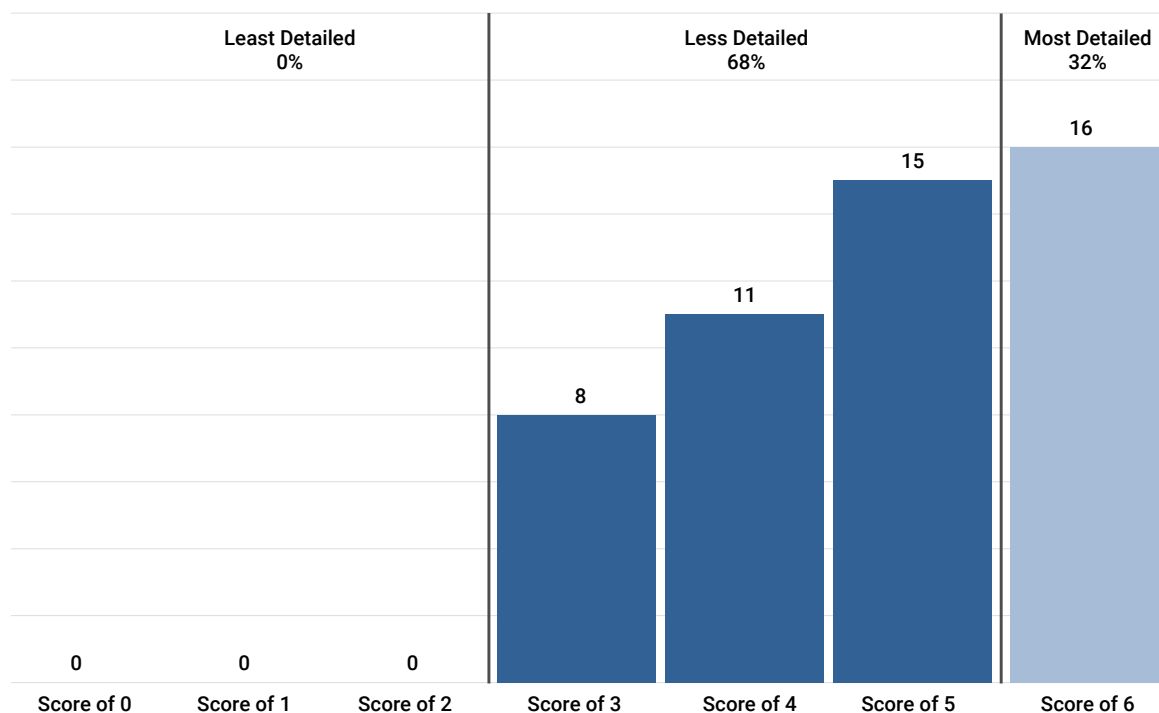
Criteria	Count of plans that scored a 1	Percent of plans that scored a 1
Plan identifies existing sector-specific plans and/or past plans (if they exist)	49	98%
Plan included cross-sectoral partnerships in development	44	88%
Plan identifies a centralized entity (other than just “the City” or “the Mayor”) to coordinate implementation	42	84%
Plan engages cross-sectoral partnerships in implementation	39	78%
Plan aligns with other existing plans	38	76%
Plan identifies lead implementation and partners for each strategy	28	56%

**SOURCE:** Brookings analysis of city decarbonization plans

**NOTE:** Denotes the number of plans that scored a 1 for level of detail per each given criterion.

FIGURE 11

## Cumulative Category Scores



**SOURCE:** Brookings analysis of city decarbonization plans

**NOTE:** Analysis includes 50 plans total. Levels of detail for “overarching goals” are divided into three categories based on the number of criteria met: 0-2 is “Least Detailed,” 3-5 is “Less Detailed,” and 6 is “Most Detailed.” No plans in this category are “Least Detailed,” meaning all satisfy at least some of the criteria.

Ideally, decarbonization plans for a given jurisdiction coordinate with other existing planning efforts, including those for individual sectors. And nearly all the plans we analyzed do that; 49 of the 50 (98%) explicitly acknowledge or identify other existing city plans and department-specific plans. These often include long-range transportation plans or consolidated housing plans, which contain extensive sector-specific detail and technical considerations—although they may also focus on goals and processes that do not inherently center around climate. San Antonio’s SA Climate Ready Plan includes a table noting the lead agency implementing each sector strategy, the phasing of the strategy, any constraints for implementing the strategy, whether the strategy appears in a current city plan, and the associated co-benefits of the strategy. This simple step of noting whether each strategy is listed in the current city or partner agency plan allows the city to focus and coordinate its implementation efforts. Strategies appearing in a current plan may already have

champions, resources, and details associated with them, but may require coordination. Strategies unique to the city’s plan will likely need to be shepherded through implementation and accountability processes, or may need to be added to future city plans.

Many decarbonization plans also complement existing sector-specific plans and, in some cases, direct specific departments to add new climate-related goals, strategies, and actions to existing sector-specific planning processes. Thirty-eight of the 50 plans analyzed (76%) not only acknowledge existing plans, but also look to align with them in their implementation. In addition, to facilitate even better alignment with existing sector-specific plans, most decarbonization plans—44 of the 50 (88%)—involve engagement with cross-sectoral experts and groups across city departments and community organizations during the plan development process.



Austin, Texas' Climate Equity Plan features a diagram showing how the city's energy, water, waste, mobility, transit, housing, park system, and urban forestry plans align with its goals and strategies.<sup>78</sup> For instance, the plan's three transportation and land use goals ("increase public transit," "increase people-powered transportation," and "preserve and produce affordable housing") and 10 of their component strategies are shown to connect and align with the Austin Energy Resource Plan and the Water Forward plan.<sup>79</sup> This alignment came through careful cross-sectoral engagement during the plan development process, which included the formation of five advisory groups: sustainable buildings, transportation and land use, transportation electrification, food and product consumption, and natural systems. Careful coordination and alignment produced a Climate Equity Plan that acts as a final missing puzzle piece, filling the climate and equity gaps left by other sector-specific planning efforts.

Beyond acknowledging and aligning with existing planning efforts, most decarbonization plans also name key implementors and stewards of translating plans into action. Forty-two of the 50 plans analyzed (84%) explicitly identify a key implementer, beyond making vague references to "the city" or "the mayor." In the vast majority of cases, a city Office of Sustainability leads implementation, although some newer plans are implemented by more explicitly climate-focused offices or workgroups. Acknowledging the need "to build core capacity within the City" and "ensure alignment and integration with other City initiatives and projects," Charlotte, N.C.'s Strategic Energy Action Plan creates a new implementation team as its first strategy. The City Resilience Delivery Team (CREDIT) is recommended to include representatives from existing teams such as the sustainability team, the Sustainable Facilities Oversight Team, and individuals within other city departments.

A slightly smaller share of plans—39 of 50 (78%)—identify cross-sectoral partnerships for future implementation and action. Many strategies in Washington, D.C.'s Sustainable DC Plan direct implementors to "develop partnerships" with other city departments, external stakeholder groups, and

even city residents. These kinds of cross-sectoral partnerships can give implementation actions a form of durability and accountability, which protects them from getting lost during staff turnover between political transitions, or otherwise impacted by challenges within any single office or sector.

However, where many plans fall short is assigning implementation leadership and ownership at a more granular level; only 28 of the 50 plans (56%) identify lead and partner implementors for sector-specific strategies. In some cases, this is due to a general lack of detailed strategies, but it also appears in otherwise detailed plans with strong sector-specific strategies.

In Florida, the Green Works Orlando Community Action Plan was created as an overarching, community-oriented document. While not as detailed as the sector-specific Municipal Operations Sustainability Plan,<sup>80</sup> OUC Integrated Resources Plan,<sup>81</sup> or E-Mobility Roadmap,<sup>82</sup> the plan offers references to these and other existing local planning efforts. The Green Works plan does not clearly identify lead and partner implementors for its fairly specific sectoral strategies; some mention intended future partnerships, but not all. Cleveland's climate action plan successfully meets each of the cross-sectoral ownership criteria *except* naming lead implementors for each strategy. The plan features success stories of completed projects and initiatives to celebrate past partnerships, but does not assign implementation leaders or partners to its future strategies. Without identifying a department or organization responsible for implementing each action, there is little guarantee or accountability that actions will be taken.

New York City's A Livable Climate plan is one of nine major components of a consolidated planning effort called OneNYC 2050.<sup>83</sup> Originally published in 2017 and updated in 2019, OneNYC covers topics across almost every sector, from "a vibrant democracy" to "healthy lives," "equity and excellence in education," and, of course, "a livable climate." Across its four climate-oriented strategies, the plan includes "steps to get there" and lists an agency owner for each. A single agency owns most steps, although some implicate multiple agencies.

**BOX 5**

## Cross-jurisdictional challenges

Emissions do not start or stop at a city's boundary line. While this report is limited to criteria that can be evaluated through a single decarbonization planning document produced by the primary city of a metro area, examples from other cities demonstrate the need for future research into the coordination—or lack thereof—among neighboring jurisdictions.

For example, in the San Francisco-Oakland-Berkeley, Calif. metro area, several jurisdictions have separate decarbonization plans. This report analyzes San Francisco's 2021 Climate Action Plan, but Oakland, the region's second most populous city, published its own Equitable Climate Action Plan in 2020.<sup>84</sup> Berkeley's most recent climate action plan was published in 2009, although the city still publishes regular implementation updates.<sup>85</sup> These plans reflect differences in local cultures, politics, and priorities. Yet the cities are taking some similar actions in the face of shared climate challenges: All three have declared climate emergencies and taken major municipal actions such as banning natural gas in newly constructed buildings.<sup>86</sup> Coordinated planning and action—such as San Mateo County's Regionally Integrated Climate Action Planning Suite<sup>87</sup> or the Bay Area Regional Collaborative's Joint Resolution to Address Climate Change<sup>88</sup>—could provide efficiency and scale beyond the actions of large primary cities, and may be able to bring along smaller jurisdictions and unincorporated areas.

Similar local alignments and distinctions appear across the country. In the New York-Newark-Jersey City, N.Y.-N.J.-Penn. metro area, New York City is planning to reach net zero by 2050 using its OneNYC plan (analyzed in this report),<sup>89</sup> but Jersey City's 2021 Climate and Energy Action Plan<sup>90</sup> sets a less ambitious goal of only 80% emissions reduction by the same year. In Phoenix-Mesa-Chandler, Ariz., Phoenix's 2021 Climate Action Plan (analyzed in this report)<sup>91</sup> and Mesa's 2022 Climate Action Plan<sup>92</sup> share similar goals and mention existing cross-jurisdictional partnerships. Cities in Minneapolis-Saint Paul-Bloomington, Minn. are also producing plans: Beyond the 2013 Minneapolis Climate Action Plan (analyzed in this report),<sup>93</sup> the Saint Paul Climate Action and Resilience Plan was released in 2019,<sup>94</sup> and Bloomington released its decarbonization-focused Energy Action Plan in 2018.<sup>95</sup> These more recently updated plans indicate that in some regions, even the most populous city can fall behind on climate planning.

Due to the cross-jurisdictional nature of decarbonization, regional planning and implementation approaches are emerging, and will prove helpful in bringing more stakeholders, staff, technical capacity, and resources to the table. Partners—whether from the state or federal level, anchor utilities, or civic bridge-builders like philanthropy—can all help foster alignment at the metropolitan scale. Key components of cross-jurisdictional collaboration are explored further in the Recommendations section.

## MANY CITIES STRUGGLE TO PAY FOR DECARBONIZATION EFFORTS—ONLY 16% OF PLANS IDENTIFY DETAILED FUNDING SOURCES OR FINANCING APPROACHES

Struggles to pay for basic infrastructure maintenance, let alone pursue new projects, are common across the country.<sup>96</sup> Maintenance backlogs, constrained budgets, long-term debt obligations, inconsistent revenues from user fees, and other financial and economic pressures are mounting on many cities.<sup>97</sup> A lack of consistent asset management—including incomplete inventories of priority infrastructure repairs—can also be widespread.<sup>98</sup> These struggles run even deeper when paying for decarbonization upgrades, where transportation agencies, water utilities, planning

departments, and other local entities frequently opt for traditional, short-term fixes rather than investing in innovative, long-term improvements.<sup>99</sup>

One of the most glaring gaps in decarbonization plans is a lack of detail on funding and financing. Only eight of the 50 plans analyzed (16%) are “most detailed,” meaning they: 1) integrate funding considerations across different strategies; 2) identify existing funding sources or financing approaches; 3) propose new funding sources or pilot innovative financing approaches where needed; and 4) identify cost estimates for different strategies. The vast majority are either “less detailed” (28 of 50, or 56%) or “least detailed” (14 of 50, or 28%).

TABLE 4

### Level of detail for ‘funding and financing’ in decarbonization plans

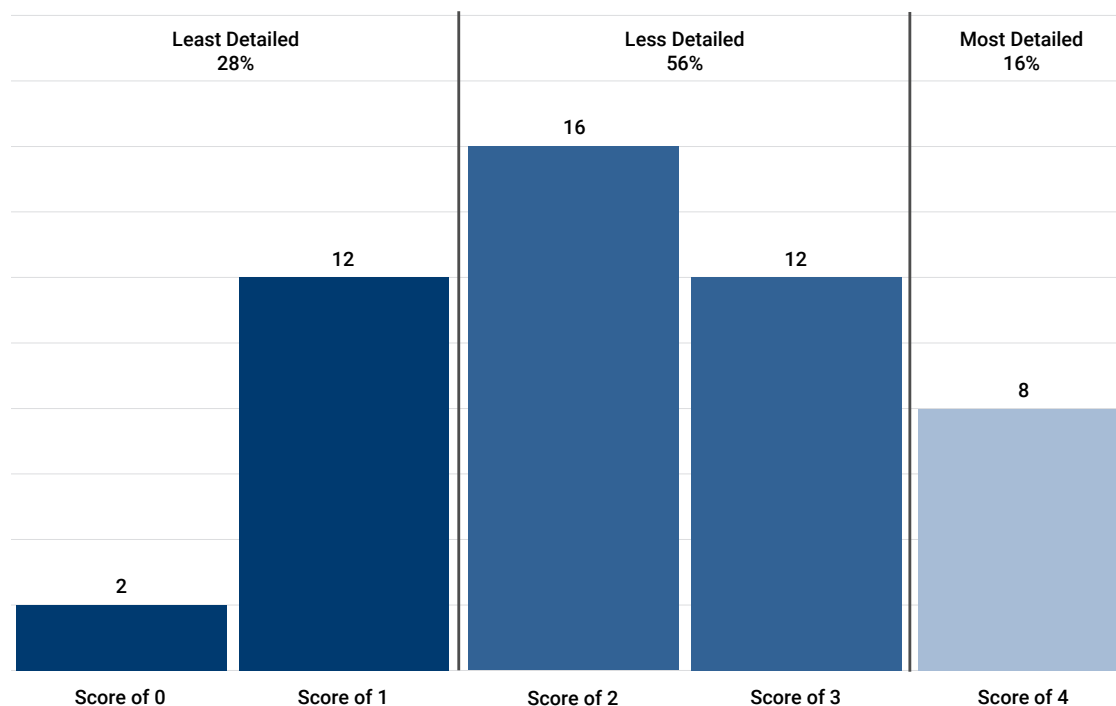
Individual Criteria Scores

Criteria	Count of plans that scored a 1	Percent of plans that scored a 1
Plan integrates funding considerations across different strategies	35	70%
Plan identifies existing funding sources or financing approaches	33	66%
Plan proposes new funding sources or pilots innovative funding approaches where needed	27	54%
Plan identifies cost estimates for each strategy	17	34%

**SOURCE:** Brookings analysis of city decarbonization plans

**NOTE:** Denotes the number of plans that scored a “1” for level of detail per each given criterion.



**FIGURE 12****Cumulative Category Scores**

**SOURCE:** Brookings analysis of city decarbonization plans

**NOTE:** Analysis includes 50 plans total. Levels of detail for “funding and financing” are divided into three categories based on the number of criteria met: 0-1 is “Least Detailed,” 2-3 is “Less Detailed,” and 4 is “Most Detailed.”

While all decarbonization plans need to have detailed—and durable—funding and financing to drive ongoing implementation, several do not. About two-thirds of the plans analyzed (35 of 50) integrate funding and financing considerations throughout, and nearly the same share (33 of 50) identify existing funding sources or financing approaches. As one example, Albuquerque, N.M.’s Climate Action Plan includes various sector strategies and notes some of the constraints to achieve them, including needed “investment”—but it provides no indication of how much funding is needed or potential funding sources.<sup>100</sup> The plan aims to “increase funding” for transit and sidewalk improvements, and also “emphasizes the importance of investing in additional infrastructure and technologies such as microgrids, battery storage and grid modernization,” but offers no clear roadmap of how this will happen. The involvement and coordination with private sector entities such as utilities in these improvements is not always evident.

Most plans note a general or sector-specific investment need, but only slightly over half (27 of 50) propose new solutions; many tend to rely on traditional funding sources and financing approaches instead. Property taxes and local sales taxes, for instance, already feed into city budgets and support ongoing transportation projects and municipal building upgrades; these same sources also support existing planning departments and staff. Yet they are frequently insufficient to support needed new hires, additional technical resources (e.g., new data), and new types of projects.<sup>101</sup> From Pittsburgh to Charlotte, N.C., the lack of nimble or new funding can limit strategies’ short- and long-term reach, complicate monitoring and enforcement, and narrow the scope of decarbonization improvements. Whether it is installing a wider network of EV charging stations, expanding solar projects, or incentivizing more renewable energy, these improvements become harder without stronger financial backing.

Even fewer plans—17 of 50 (34%)—identify cost estimates. Baltimore’s Climate Action Plan lays out several strategies and actions to promote renewable energy, denser development, and more, yet it lacks any cost estimates.<sup>102</sup> It describes the different mechanisms and timeframes for individual actions (e.g., whether the action will take a regulation or incentive to execute, and whether it is short term or long term), but does not point to any funding ranges or other budget estimates. For example, increasing walking and biking is an overarching strategy in the plan, but actions such as expanding and improving bicycle infrastructure (including 60 miles of new bike lanes) have no stated costs.

There are exceptions. Denver’s Climate Protection Fund Five-Year Plan represents one of the most detailed and actionable approaches to pay for decarbonization.<sup>103</sup> Following the 2020 passage of Ballot Measure 2A, Denver established a Climate Protection Fund that will generate \$40 million annually toward climate action via a 0.25% sales tax. This effort explicitly aims to build off past plans, including the city’s 100% Renewable Electricity Plan and Electric Vehicle Action Plan. The newly established Office of Climate Action, Sustainability and Resiliency will oversee this funding across six “allowable use categories,” ranging from “increased investments in solar power, battery storage and other renewable energy technology” to “neighborhood-based environmental and climate justice programs.”

Chicago’s Climate Action Plan is another effort that identifies clear funding sources and cost estimates.<sup>104</sup> Building off the \$2.5 billion Chicago Recovery Plan from 2021 (supported partially by federal American Rescue Plan funding), the CAP has a specific “climate financing and delivering capacity” section that details how \$188 million of this new funding will go toward investments such as: \$6 million to decarbonize affordable multifamily buildings; \$46 million to expand tree canopy coverage; and \$10 million for low-carbon mobility projects. Amid many other competing budgetary priorities—which can frequently slow down decarbonization implementation—cases like Chicago demonstrate the need for flexibility and leveraging other federal resources.<sup>105</sup>

## **WHILE NEARLY ALL DECARBONIZATION PLANS ANALYZED IDENTIFY EQUITY AS A GOAL, NEARLY THREE-QUARTERS OF THEM LACK DETAILS ON HOW TO ACHIEVE IT**

The uneven impacts of climate change are prompting many cities to emphasize the importance of equity in planning efforts. Threats to the physical, social, and economic well-being of many populations—particularly lower-income communities of color—are coming into clearer focus for planners and other leaders, who may seek to reduce pollution from highways, lower household energy costs, or improve heating and cooling in buildings.<sup>106</sup> Ensuring that more people in more places can safely, affordably, and reliably benefit from a decarbonized built environment offers enormous economic potential, but requires proactive planning and continued experimentation.

While equity is often a stated goal, most cities offer few concrete actions to deliver it. Although nearly all plans analyzed note equity as a key goal, most are either “less detailed” (28 of 50 plans, 56%) or “least detailed” (eight of 50, 16%) when describing how to achieve it. They frequently lack details when: 1) mentioning equity considerations; 2) building equity into different strategies; 3) engaging community stakeholders around equity; and 4) embedding equity into metrics and evaluation. Just 14 of the 50 plans (28%) are “most detailed” across all of these equity criteria.

**TABLE 5**

**Level of detail for ‘equity’ in decarbonization**

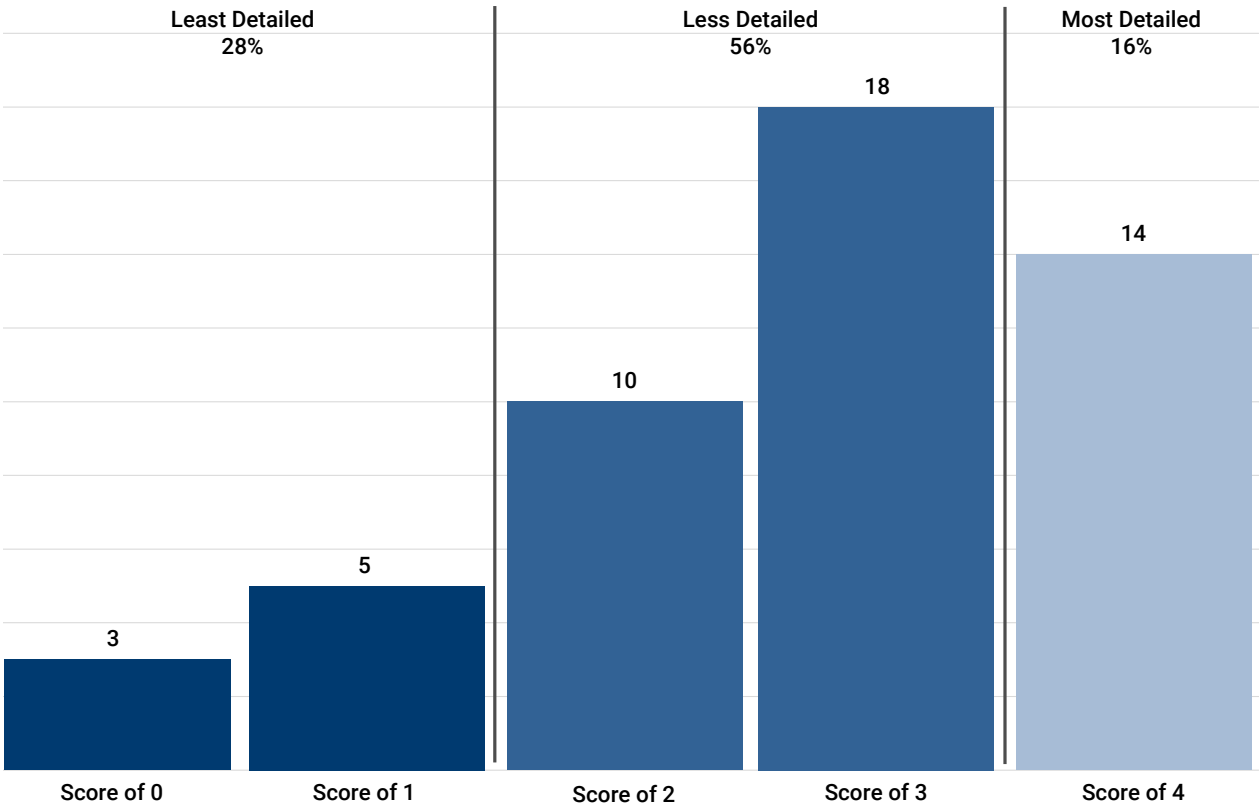
Individual Criteria Scores

Criteria	Count of plans that scored a 1	Percent of plans that scored a 1
Plan explicitly mentions equity considerations	47	94%
Plan builds equity into different strategies	37	74%
Plan engages community stakeholders around equity	33	66%
Plan embeds equity into metrics and evaluation	18	36%

**SOURCE:** Brookings analysis of city decarbonization plans  
**NOTE:** Denotes the number of plans that scored a “1” for level of detail per each given criterion.

**FIGURE 13**

**Cumulative Category Scores**



**SOURCE:** Brookings analysis of city decarbonization plans  
**NOTE:** Analysis includes 50 plans total. Levels of detail for “funding and financing” are divided into three categories based on the number of criteria met: 0-1 is “Least Detailed,” 2-3 is “Less Detailed,” and 4 is “Most Detailed.”

Most plans only pay lip service to equity. Forty-seven of the 50 plans analyzed (94%) mention equity considerations, usually when framing the larger climate challenge and impetus for decarbonization action. Oklahoma City's first sustainability plan, Adapt OKC, clearly notes the need to "to leverage scarce resources, create new partnerships, and use new tools and technologies...to deliver a more equitable community," but it does not delve into much detail.<sup>107</sup> Louisville, Ky.'s GHG Emissions Reduction Plan only mentions equity in passing, in terms of energy use.<sup>108</sup> A variety of other plans—from Rochester, N.Y. to Madison, Wis. to San Jose, Calif.—identify equity needs, but lack specifics across strategies and actions.

Simply mentioning equity does little to advance it. And while many plans describe how equity fits into different strategies and actions, it is not universal. Thirty-seven of the 50 plans (74%) actually build equity into their strategies—many note how emissions reductions need to benefit all current and future residents, while pointing to the potential for additional community engagement, workforce development opportunities, and other improvements over time. Yet, the level of detail can be missing in sector-specific strategies. Boise, Idaho's Climate Action Roadmap demonstrates some of these gaps—while it aims to "advance equity, improve human health and wellness, and grow a climate economy" through "engagement of all Boiseans," it does not consistently specify how this will happen in transportation, buildings, and other sectors.<sup>109</sup> Like other cities, the fact that Boise's plan is so new (released in 2021) may partially explain why equity strategies are still evolving; the visibility and impetus for action around economic and racial equity have assumed greater importance only recently.<sup>110</sup>

Many cities are just beginning to engage with community members and organizations around equity in general, let alone around decarbonization specifically. Thirty-three of the 50 plans (66%) describe community engagement efforts around equity—typically, informing the community of what decarbonization means, and more rarely, empowering the community to address it. Several plans note the involvement of many different groups in informing goals and strategies; for example, Indianapolis relied

on "resilience ambassadors" to "serve as resilience- and sustainability-focused community organizers, connecting their neighborhood's priorities to the City's Sustainability Plan."<sup>111</sup> Yet the ultimate reach and long-term durability of these and other grassroots efforts across different cities are less clear, especially since they may lack funding and staffing.<sup>112</sup>

Still, several cities are centering equity throughout their framing, strategies, and community engagement. Detroit's Sustainability Action Agenda represents one of the clearest plans around equity, using it as a guiding force for strategy development and implementation.<sup>113</sup> In its stated goals, the plan focuses on "healthy, thriving people," "affordable, quality homes," "clean, connected neighborhoods," and an "equitable, green city" before even specifying emissions reductions. It includes 43 actions and 10 measurable goals, many of which are public-facing, such as "honoring people and place" and "acting with transparency and accountability." The reliance on widespread community engagement is also evident—leaders conducted more than 1,600 surveys and engaged with more than 50 organizations to amplify "community voice" in the plan development, with an eye toward quantifying and enhancing resident involvement.

Central to Detroit's plan and other promising efforts is an emphasis on equity measurement. But these are more the exception than the norm. Only 18 of the 50 plans (36%) embed equity into metrics and evaluation. Monitoring emissions reductions across specific sectors or the city as a whole does little to recognize or address the impacts for specific neighborhoods. The different indicators and scale of measures used can also be lacking, where emissions per capita or for particular geographies are not always evident.<sup>114</sup> Even the data platforms used can be lacking, where public websites, data dashboards, and other visualizations may be static or entirely missing. Developing new methodologies, collecting new data, analyzing new measures, and communicating findings represent an evolving process in many cities; plans from Philadelphia to Austin, Texas are just beginning to measure and analyze equity considerations in their approach to decarbonization.



Providence, R.I.'s Climate Justice Plan is one of the more notable examples of embedding equity into strategy development and measurement.<sup>115</sup> Whether focusing on transportation, buildings, or electricity, the plan seeks to “measure and monitor the level of environmental burden and investments being made in each neighborhood” by setting benchmarks around pollution reduction, household energy savings, and more. City leaders developed a Racial Equity Screening Tool and “department-specific racial-equity

impact assessments”—among other steps—to gauge decarbonization progress. Similar mapping and evaluation efforts are emerging across several other cities, including a Racial and Social Equity Assessment Tool and Environmental Justice Communities Map in San Francisco<sup>116</sup> and a Racial Equity Toolkit in Orlando, Fla..<sup>117</sup>

## BOX 6

# Mapping equity to guide and evaluate climate action

As cities attempt to deliver greater environmental justice, equity-driven mapping is an emerging best practice. This array of mapping and measurement activities can enhance several stages of the decarbonization planning process, from introductory framing that makes the case for climate equity to targeted investments and initiatives that bring overdue resources to marginalized populations.

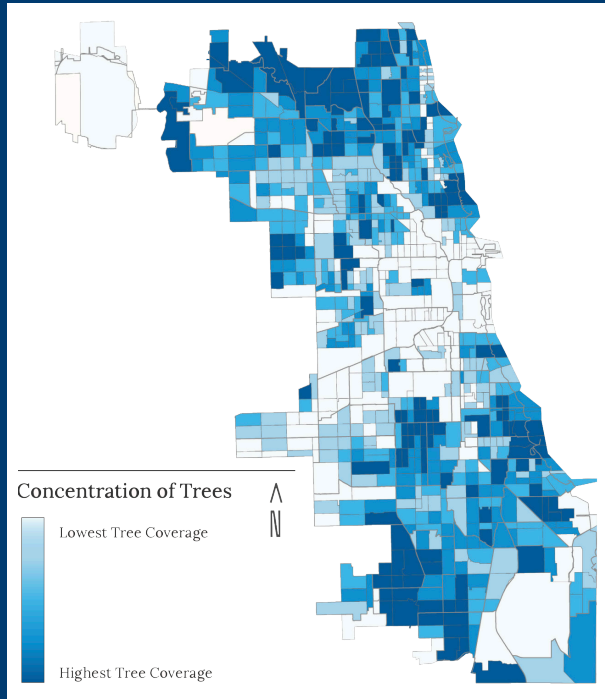
Many cities are beginning to use equity mapping to demonstrate the disproportionate distribution of climate risks and vulnerabilities across neighborhoods. These maps are particularly effective as tools to make the case for climate equity, and can highlight the connections between planning choices, disinvestment, and poor climate-related outcomes. Chicago's Climate Action Plan includes a “Pollution Patterns and the Lines of Urban Segregation” section with maps identifying areas of concern for tree equity, extreme weather vulnerability, and affordable energy access, and notes the role of redlining in shaping climate vulnerabilities. This is particularly powerful because the maps go beyond an isolated data visualization exercise. For example, the tree equity map was used to create a tree equity strategy with support from a 70-member community-based working group. These maps implement climate equity by changing narratives and inviting community-level collaboration.

San Francisco's Climate Action Plan includes a draft Environmental Justice Burden map to define “Disadvantaged Communities”—areas where the population experiences a high pollution burden and a high share of residents earn low incomes. This map, created to fulfill the requirements of California's Senate Bill 1000, combines well-established state level data from CalEnviroScreen with more nuanced local data, and acts as a key progress tracking tool for the plan's equity goals. For example, the city's strategy to increase zero-emissions vehicles is paired with an equity metric: the number of “community-endorsed charging infrastructure projects in communities with environmental justice burden as identified in EJ Communities Map.” Tying success metrics to equity mapping is a simple way to track progress on implementing climate equity over time.

## BOX 6 CONTINUED

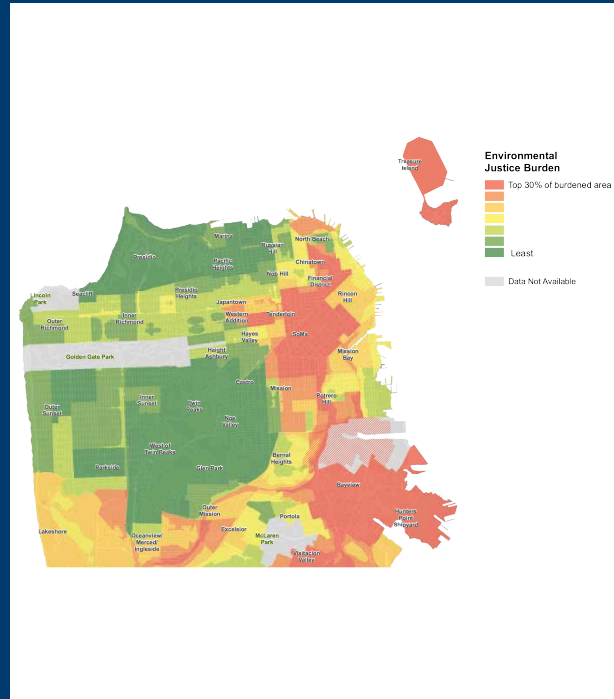
Equity mapping can promote a better understanding of the diverse lived experiences within and across geographies, and can demonstrate the impact of past planning decisions on current climate risks. But the tool is most powerful when leveraged not just for narrative change, but for action as well—building coalitions, informing strategies, and targeting investments.

### Chicago's Tree Equity Map



SOURCE: [2022 Chicago Climate Action Plan](#)

### San Francisco's Environmental Justice Burden Map



SOURCE: [2021 San Francisco Climate Action Plan](#)



## Implications

Cities play a central role in the country's decarbonization efforts, but this analysis reveals that very few are planning those efforts well. While cities' plans often set ambitious goals and lay out strategies to reduce emissions from transportation, buildings, and electricity, they do not always spell out essential details around who will lead implementation, how they will pay for needed upgrades, or what people and places will be most impacted. Nor do most plans conduct all these actions across all three sectors of the built environment. Decarbonization is hard, and cities cannot afford to skip steps along the way.

Yet the urgency of the moment—combined with the fact that many local climate plans are already in motion—creates a window to expand and improve local

decarbonization planning. This analysis has illuminated several limitations for city action—for example, having enough staff to lead new community outreach or having enough money to cover new projects—but it has also explored the need for leaders to think more strategically.

Failing to meet local and national climate pledges should be unacceptable—it represents a missed opportunity to deliver environmental and economic benefits to more people and places. Reducing environmental risks, conserving natural resources, protecting communities, and ensuring all individuals can live safely, affordably, and reliably in an increasingly uncertain climate will be critical in the coming years. With these goals in mind, policymakers must reckon with the following implications of inadequate decarbonization efforts.

## **IMPLICATION #1: CITY LEADERS ARE DEVELOPING CLIMATE STRATEGIES, BUT ARE STRUGGLING TO MOVE PAST PERPETUAL PLANNING**

If the basic measure of progress is whether a decarbonization plan is written at all, then most cities are succeeding. And in cities that only recently developed plans, announcing initial strategies represents an important first step in taking action when compared to doing nothing over the last few decades. However, realizing sustained GHG emissions reductions and evaluating progress require committed leadership, sustained technical and programmatic resources, and ongoing community buy-in.<sup>118</sup>

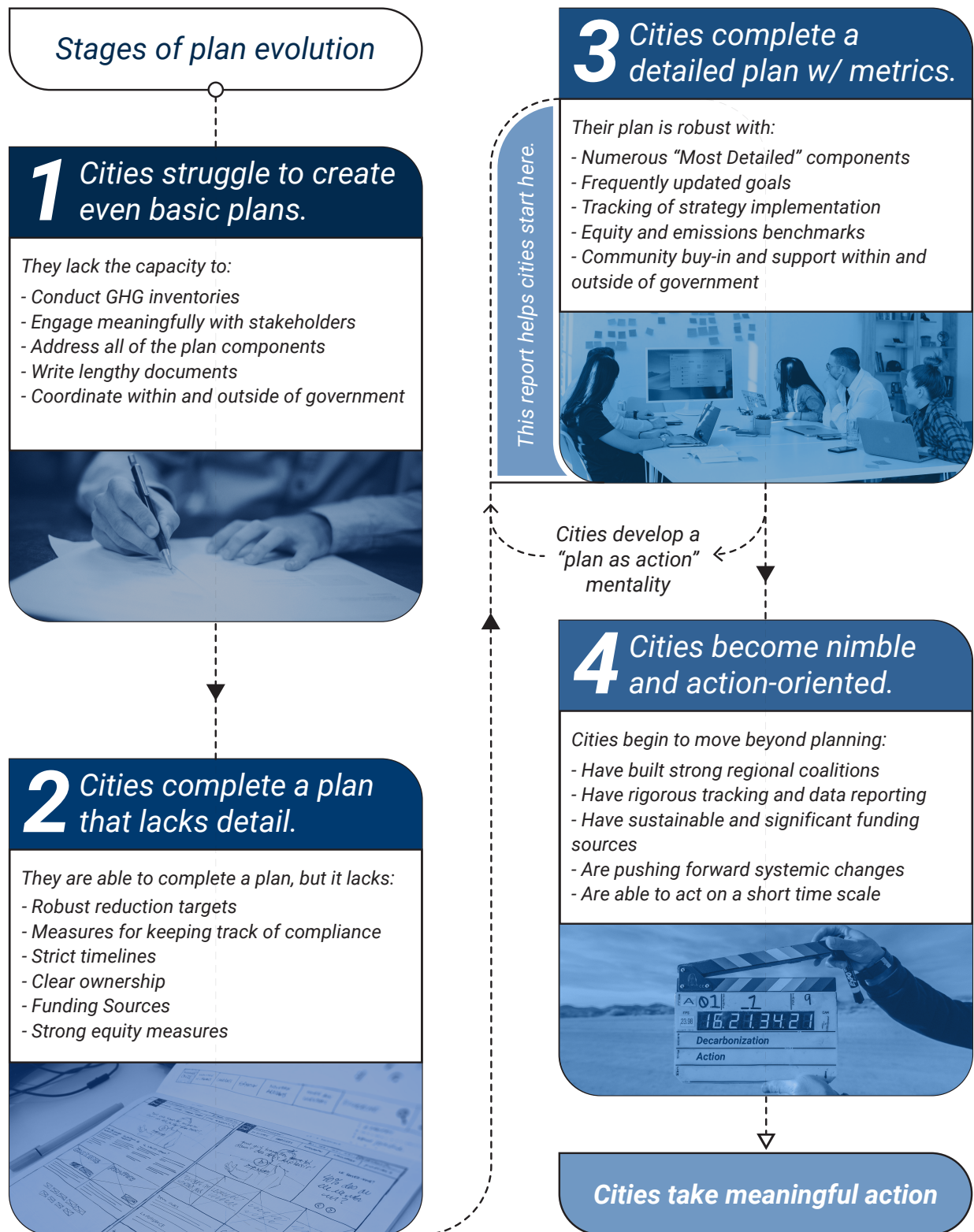
The data analysis and interviews conducted for this report show how cities are in various stages of their decarbonization planning efforts. Some are just beginning to launch basic plans, which aim to more

consistently measure emissions, engage stakeholders (including residents), and define strategies that may or may not be sector-specific. Other cities are updating their older plans, including incorporating new measures and adding more sector-specific benchmarks. Another group of cities have several iterations of plans, are actively updating goals, and are advancing more detailed sector-specific strategies. And a final group of cities have decades of planning under their belt, but are now moving beyond plan updates to become more nimble and action-oriented, aiming to execute on well-funded priorities with significant community support. The visual below describes these various stages in more depth.



FIGURE 14

## Decarbonization planning evolves as cities move from inaction to action



SOURCE: Brookings analysis of city decarbonization plans

With no consistent template to follow when developing decarbonization plans, it stands to reason that cities vary widely in their accountability measures. Just as the ultimate decarbonization goals can differ, so too can the indicators to gauge progress. While some cities focus exclusively on total GHG emissions, others are trying to better track emissions across different sectors or monitor impacts across different populations and neighborhoods. Other cities may defer to a third party and hire consultants to develop plans and measures. And in just about every city, career staff must balance shifting demands depending on the current elected leadership, the number of staff involved, and budgetary resources available.<sup>119</sup>

This environment can put cities in a perpetual loop, with planners and practitioners spending all their time trying to develop the “perfect” plan, but leaving

little time for action.<sup>120</sup> In addition, some departments may focus exclusively on planning, while may others focus more on implementation—creating further divides where more effective senior management is needed. With an overwhelming number of needs to consider across the built environment, over-analysis is simultaneously attractive and a direct barrier to improving climate outcomes. Attempting to build consensus around the most politically divisive issues can derail an entire planning process; changes to zoning and building codes, for instance, are often under direct city control, but can get entangled in ongoing debates among businesses, residents, and other stakeholders. The key is breaking free from this loop, which requires imaginative leadership, more proactive experimentation, and a flexible budget to test new approaches.





## IMPLICATION #2: CITY LEADERS NEED HELP SECURING ENOUGH FISCAL RESOURCES TO PAY FOR DECARBONIZATION PROGRAMS

Even if they have detailed decarbonization plans in place, a lack of funding and financing is the single biggest hurdle facing city leaders. It ranks as the lowest-scoring category in this analysis, with many plans consistently failing to integrate funding considerations, identify existing funding sources, propose new funding sources, or include cost estimates for different strategies. The few plans that do consistently acknowledge these needs often do so in a limited way, either for a single strategy or for a limited (and uncertain) duration. No matter the quality of proposed actions, cities are most likely to skip or even lack awareness of the necessary steps around paying for them.

Put simply, this is dangerous behavior. If a city genuinely believes in the need to decarbonize, failing to secure fiscal resources to animate their plans is akin to admitting defeat. Many local governments already face a growing list of expensive infrastructure repair and replacement needs, as aging transportation systems and other assets reach the end of their useful life.<sup>121</sup> They are carrying high levels of debt from past projects and are continually struggling to generate predictable revenue to cover new projects.<sup>122</sup> Now, with added climate risks thrown into the equation, they need to accelerate the adoption of new designs and technologies to reduce emissions, which may involve higher upfront costs and deviate from traditional project approaches.<sup>123</sup> If leaders do not demonstrate a willingness to pay for these upgrades—let alone understand their budgetary and staffing impact—it is difficult to imagine how they can get them done.

Beyond the analysis, practitioners interviewed for this report also repeatedly stressed funding and financing gaps as a limiting factor for decarbonization planning and action. Many cities are operating from weak fiscal starting points, with some only recently coming out

of bankruptcy—making it difficult to keep up with existing infrastructure repairs or to even consider new spending. Department budgets are often stretched thin, and staff positions focused on decarbonization are few and far between. Mayoral leadership and other political transitions can also further complicate the budget picture, with climate programs sometimes relegated behind other priorities.<sup>124</sup> Although philanthropic support for these planning efforts has offered some stability and private sector investment has made a difference—especially in the electricity sector—neither represents a comprehensive solution.

Cities need to consider all funding and financing tools at their disposal, but they tend to instead rely on the same sources: municipal bonds, user fees, and other pots of money insufficient to keep up with the pace of needed climate investment.<sup>125</sup> Newer tools such as green bonds are gaining greater interest, but they are still nascent and lack widespread use across all types of projects; city leaders follow a rigid process of scoping, identifying, procuring, and maintaining projects, with a lack of experimentation and consideration of new approaches.<sup>126</sup> Inconsistent data collection and measurement, an inflexible capital planning process, and a project financing process based on unknown climate risks dominate current local thinking, which makes it hard to test new tools and exposes cities to additional costs over time.

Shifting this approach will require additional leadership and direction from federal, state, and private partners—coordination which also remains elusive. However, the infusion of new federal funding from the Inflation Reduction Act and Infrastructure Investment and Jobs Act holds considerable promise in bridging some of these long-standing divides.

## IMPLICATION #3: FRAGMENTATION ACROSS MULTIPLE DIMENSIONS LIMITS CITY DECARBONIZATION EFFORTS

While this analysis finds that most cities' decarbonization plans have "less detail" when it comes to issues of plan ownership, it only scratches the surface of a big challenge facing leaders: programmatic and geographic fragmentation. Decarbonizing the built environment cuts across many different sectors, local government departments, and private sector entities. These efforts also cut across many different geographies, from individual buildings to entire neighborhoods to other jurisdictions and regions. The overlapping ownership structures and responsibilities in infrastructure planning, design, construction, operation, and maintenance can lead to several conflicting approaches to decarbonization.

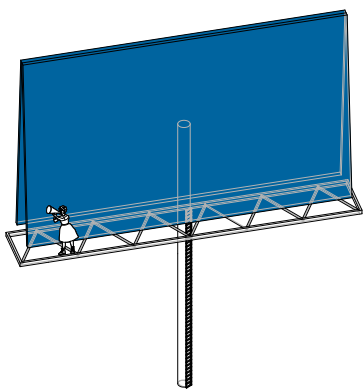
Cities can be internally aligned around a single overarching decarbonization plan, but that does not mean that individual departments or other entities cannot have their own (sometimes competing) visions and risk tolerances.<sup>127</sup> That is true not only when it comes to overall GHG emissions reduction timelines and priorities, but also when it comes to specific strategies and actions. Not coincidentally, many of the plans analyzed in this report fall apart due to

inconsistencies with sector strategies. A transportation department may have specific emissions targets based on its mobility strategies, while an environmental department may have its own targets based on a separate buildings or green infrastructure strategy. Furthermore, both departments may have strategies that conflict with updated plans unveiled by a new mayor or other city leadership.

In other words, even within a single jurisdiction, the structure and reach of decarbonization plans can vary considerably, which makes it hard to accelerate action. In some cities, plans primarily act as visioning documents for a local government to build or signal support for broad, climate-oriented action. Other cities craft decarbonization plans as independent and original collections of detailed, action-oriented strategies—including involvement from local government, academic institutions, and other actors—with rigorous metrics and tracking. Many plans fall between these two extremes by pointing to various pre-existing planning efforts or filling climate-related gaps left across a patchwork of plans across different local government departments.

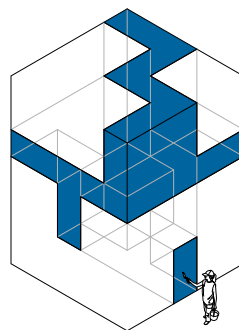
FIGURE 15

### City decarbonization plans play various roles



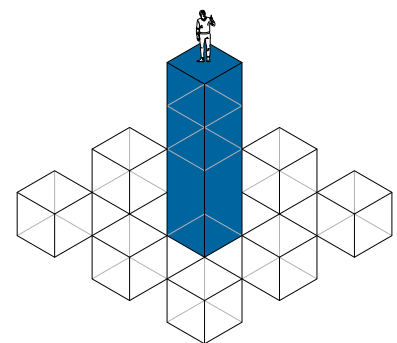
#### Sending a Signal

These plans demonstrate and build support for broad, climate oriented actions.



#### Filling the Gaps

These plans address holes in the patchwork of other local government documents.



#### Standing Alone

These plans represent an independent collection of detailed climate strategies.

**SOURCE:** Brookings analysis of city decarbonization plans



Across regions, different municipalities and independent infrastructure agencies face similar constraints related to their plan oversight and execution. One city may have a detailed decarbonization plan and is looking to prioritize several new strategies, while a neighboring city may lack any plans and not even acknowledge certain climate realities. Similarly, a regional electrical utility may not be willing to switch to renewable sources, while a primary city in that same region may be looking to do so quickly. A single metro area can contain a variety of cross-jurisdictional concerns; for example, the city of Pittsburgh is operating off the third version of its Climate Action Plan, while 35 communities in the area are also beginning to create their own individual plans.<sup>128</sup> The fracturing of responsibilities across different jurisdictions can obstruct larger regional climate planning efforts and ambitions.

Cities and their state leaders are also often in conflict. It can be challenging enough for local transportation and environmental departments to coordinate with state agencies when it comes to funding, data collection, regulatory compliance, and more—and political dynamics can further complicate matters. A governor or state legislature may ignore or dismiss climate concerns, but a mayor or city council may prioritize them; this is common in red states such as Texas, where state leaders have often been adversarial on decarbonization efforts, despite blue cities such as Austin trying to pioneer new plans. Shifting political priorities and pots of money can stall cities' climate action and limit the durability of any long-term efforts.



## Recommendations

Cities develop plans to form new strategies, assess ongoing progress, and chart future actions. Yet planning for the sake of planning is not good enough. Plans need to feed into a clear set of actionable and accountable steps to drive decarbonization. Planning is the lynchpin to meeting climate commitments; if done well, it helps leaders coordinate each step in the decarbonization process to prevent delays and ensure accountable action. The analysis shows that no city is perfect in this planning phase, but some are beginning to figure it out—relying on updated data, establishing inter-departmental collaborations, testing new funding sources, and embedding equity in strategies.

These are some of the essential ingredients to move cities from planning to action. Local planners, policymakers, and other practitioners need to develop greater technical, programmatic, and financial capacity to accelerate action—and demonstrate their ability to deliver on different goals over time. Pursuing one strategy or action for only a couple years—such as an expansion of EV charging stations—will not unleash the type of transformative change needed across the entire built environment. There are no shortcuts; leaders must

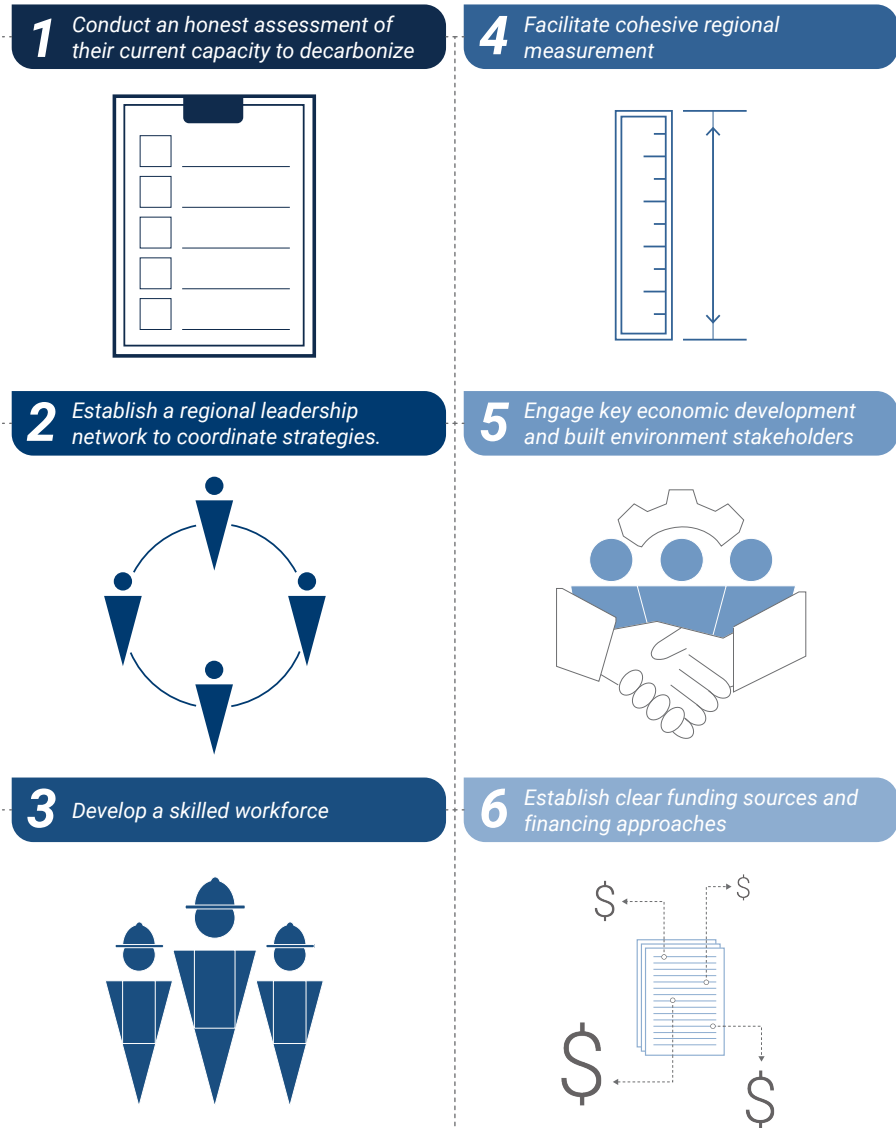
fight their instinct to avoid difficult choices and short-term pushback. Core to decarbonization is the idea of transforming everyday human life—because if left unchanged, future prosperity is in doubt.

At the same time, cities cannot go it alone. Even if city leaders have an appetite to get more done, that does not mean they will be able to form all the new strategies and pursue all the new actions needed to decarbonize. They need templates to guide and inspire their work, some of which have already emerged from national and international initiatives such as the Bloomberg Philanthropies American Cities Climate Challenge, the Rockefeller Foundation’s 100 Resilient Cities effort, the Global Covenant of Mayors for Climate and Energy, and the C40 Cities Climate Leadership Group.<sup>129</sup> Supported by philanthropy, nonprofits, and other private sector partners, cities have been able to connect with one another, identify best practices, hire more staff, rely on outside technical experts, and pursue a clearer course of action. Other federal and state efforts—including new programs and funding available through the Inflation Reduction Act and Infrastructure Investment and Jobs Act—hold promise in further expanding these types of collaborative approaches.<sup>130</sup>

Ultimately, city leaders must look both inward and outward to accelerate decarbonization. They first need to boost their internal capacity by identifying the gaps in current decarbonization plans, as this analysis has explored. They then need to focus on the strategies and actions they can implement on their own, including within specific sectors of the built environment where they have direct ownership or oversight. Lastly, they need to collaborate with other leaders—particularly at a regional level—on strategies and actions they cannot accomplish on their own.

FIGURE 16

## Recommendations



SOURCE: Brookings authors

The following subsections describe these locally focused recommendations in greater depth and with a purposeful phasing. While there are numerous other federal, state, and private sector needs for addressing decarbonization nationally, those go beyond the scope of this local-practitioner-focused series of recommendations.

## **RECOMMENDATION #1: CITY LEADERS NEED TO CONDUCT AN HONEST ASSESSMENT OF THEIR CURRENT CAPACITY TO DECARBONIZE**

Before pursuing new goals or launching new investments, city leaders first need to understand their starting point. Too often, they set arbitrary (and unattainable) decarbonization goals with few programs, staff, or other resources in place. City staff then struggle to establish and adhere to measurable benchmarks and lack accountability when progress slows. However, a clearer and more honest assessment of where current plans fall short—and the lack of related staff and resources—can reveal outstanding gaps, pave the way toward actionable strategies, and equip leaders with the knowledge they need to execute on different goals.

This analysis offers one way for leaders to gauge the level of detail in their plans and a checklist to gauge their capacity to act. Bucketed under five different

categories, the 25 individual criteria assess the technical, fiscal, and programmatic readiness of cities to accelerate decarbonization. Do current plans have detailed data collection and reporting mechanisms in place to measure progress? Do they identify detailed and quantifiable sector strategies? Do they describe detailed collaborations and lead implementors to guide ongoing efforts? Do they include detailed funding sources and financing approaches? Do they embed detailed equity considerations across different strategies? If plans lack these essential details, that should serve as a signal to local planners, policymakers, and practitioners that they have room to improve their current approaches.



## Assessment of current capacity



## Demonstrated Capacity to Decarbonize

SOURCE: Brookings analysis of city decarbonization plans

Of course, this is just one possible way to gauge readiness. Several of the national and international groups noted previously have developed more consistent standards for cities to follow in decarbonization planning and action. In addition to several technical guides and resources, C40 has led a “Race to Zero” campaign to recruit 1,000 cities around science-based targets and ensure they are aligned with a clear set of reporting metrics, without adding an additional reporting burden.<sup>131</sup> The World Resources Institute has similarly partnered with cities to promote more integrated planning that “prioritizes comprehensive action across departments and sectors.”<sup>132</sup> ICLEI—Local Governments for Sustainability is another organization that has led engagements with cities and aimed to create “interconnected pathways that cut across sectors and jurisdictional boundaries” in support of faster climate action; its GreenClimateCities Program has developed guides, including a Climate Neutrality Framework, to help leaders craft more holistic strategies around emissions reductions.<sup>133</sup> CDP, a global organization that looks

to improve environmental disclosures among cities and other entities, has produced guides to help “build climate change into city master planning” and undertake other climate and vulnerability assessments.<sup>134</sup>

Individual cities are beginning to create their own checklists too. For example, New York City, along with Con Edison and National Grid, has conducted a thorough assessment of existing policies across buildings, industries, transportation, electricity, and other sectors to determine their potential contribution to citywide emissions reductions, while also creating additional strategies and benchmarks for action.<sup>135</sup> With the city aiming to reduce emissions 80% by 2050, the assessment leaves no stone unturned, looking at how new strategies can complement existing policies to reach this goal. The public-private, cross-sectoral analysis highlights the full range of pathways needed to decarbonize the built environment and provides a comprehensive look at the city’s current trajectory.

## **RECOMMENDATION #2: CITY LEADERS SHOULD ESTABLISH A REGIONAL LEADERSHIP NETWORK TO COORDINATE LOCAL AND REGIONAL STRATEGIES**

With the potential for many decarbonization efforts to be happening within a single city, it's difficult to ensure each agency is creating complementary climate plans. That effort is even harder at the metropolitan scale, where multiple cities, counties, and regional governments may all be creating separate strategies. To overcome communication breakdowns and competing goals, local governments in the same region should establish a permanent meeting point to coordinate their strategies.

Fortunately, American federalism ensures there is already a regional government in every metropolitan area. Metropolitan planning organizations (MPOs) and councils of government (COGs)—which are oftentimes a single entity serving both roles—already manage regional conversations and lead many built environment practices across the transportation, building, and energy sectors. MPO and COG staff tend to have deep expertise with regional data and mapping and state law may also embolden them with certain legal rights to negotiate on behalf of their local partners.<sup>136</sup> These entities are ideally suited to host regional climate conversations.

In many regions, MPOs and COGs are already demonstrating climate leadership. The Atlanta Regional Commission (ARC) offers one example. In 2016, the staff organized a “peer-to-peer exchange” that included

presentations from MPOs, technical consultants, academics, and planners operating within Georgia, as well as many from outside the state, to share knowledge, experience, and best practices.<sup>137</sup> Building on this, in 2017, ARC developed the Vulnerability and Resilience Framework, which outlines strategies for integrating resilience planning into transportation decisionmaking. In 2018, ARC won a grant to participate in the Federal Highway Administration's Extreme Weather and Durability Pilot Program, and in 2020, they developed an emissions calculator that quantifies the impacts from a suite of emissions reductions strategies.<sup>138139140</sup> Collectively, these actions demonstrate the leadership that an engaged regional actor can offer—leadership that facilitates the type of regional conversations and collaborations that are often missed in decarbonization planning.<sup>141</sup>

Once established, a regional decarbonization network should offer downstream benefits to cities. On issues where municipal leaders are better off pooling their resources and making decisions together—particularly around clean electricity planning and negotiating with large energy utilities—a regional strategy gives localities greater bargaining power. On issues where each municipal leader will need to adopt local rules—for example, building codes—a regional network can provide common lessons to help draft policy.

### **RECOMMENDATION #3: LOCAL AND REGIONAL LEADERS NEED TO DEVELOP A SKILLED WORKFORCE TO MANAGE DECARBONIZATION EFFORTS**

Local governments need internal staff to complete plans and design actions. But decarbonizing the economy also requires significant investment in the built environment, from new capital projects to monitoring environmental conditions. Since labor markets function at a regional scale, cities alone cannot be responsible for ensuring there are enough workers in the skilled trades (and other related fields) to operate and maintain more climate-friendly built environment systems. Having a consistent pipeline of talent to execute strategies and actions across a range of employers—from transportation agencies to electric utilities—is essential to advance decarbonization, and represents an enormous economic opportunity.<sup>142</sup>

Workforce development efforts at a regional level hold promise in creating flexible and accessible career pathways in the infrastructure space compared to siloed approaches among individual employers in individual jurisdictions. The variety of occupations involved—from solar installers and wind turbine technicians to environmental engineers and planners—demands a hands-on approach from multiple industries.<sup>143</sup> In addition, since many of these occupations require on-the-job training, employers have a direct role to play in helping students and other prospective workers gain experience. Expanding earn-and-learn opportunities such as apprenticeships and internships can boost knowledge and skills across many in-demand fields, including those in science, technology, math, and engineering (STEM), which are required in decarbonization activities.<sup>144</sup>

Embracing sector strategies—collaborations among employers, educational institutions, labor groups, and other workforce development entities focused on filling a specific cluster of occupations—should be a hallmark of regional decarbonization planning and action.<sup>145</sup> At the same time, workforce development boards (WDBs)—the primary local and regional

entities responsible for strategic workforce planning and oversight—should be building capacity around decarbonization hiring and training.<sup>146</sup> This sector-wide approach spearheaded by WDBs could help: identify mission-critical occupations; monitor hiring and training needs; inform new strategies around hiring and training; and invest in additional earn-and-learn opportunities. For example, as part of its Green Jobs Initiative, Boston is investing \$2 million in local funds in 2022 alone for placing workers—particularly younger workers—in jobs related to energy efficiency, carbon reduction, and resource conservation.<sup>147</sup> Local government leaders are collaborating with other regional groups, such as the Greater Boston Labor Council and Roxbury Community College, to track and address hiring needs, with an eye toward supporting long-term pathways.

A dual focus on climate action and equity should also inform regional workforce development. Reducing barriers for women and people of color is crucial for expanding the talent pool, given their long-standing marginalization and underrepresentation in many occupations.<sup>148</sup> However, investing in training by itself is often insufficient to expose more and different people to careers in the decarbonization space; rather, additional supportive services (e.g., housing, transportation, child care, and more) can help unemployed, underemployed, out-of-work, and other nontraditional job seekers gain a foothold on the career ladder.<sup>149</sup> Service and conservation programs, including those through the Corps Network, offer some national precedent and guidance on how these efforts could take shape.<sup>150</sup> Philadelphia's PowerCorpsPHL initiative is perhaps one of the most well-known examples of how this could work; it represents a four- to 18-month paid serving learning program geared toward disconnected youth and filling positions in clean energy, green infrastructure, and other fields.<sup>151</sup>



## **RECOMMENDATION #4: CITIES SHOULD USE REGIONAL ENTITIES TO STANDARDIZE CLIMATE DATA AND MEASUREMENT PRACTICES**

Several of the barriers this analysis identifies—accurate, timely, and consistent GHG emissions inventories; strategy-by-strategy cost estimates; and implementation tracking metrics—require capacity and resources unavailable in many localities. But pooling resources at the regional scale can help localities take advantage of the decarbonization field’s rapidly evolving best practices and minimize the limitations associated with smaller municipal budgets.

These challenges are not fundamentally impossible to overcome; certain cities, academic institutions, and others have piloted innovative approaches. International and national networks have even translated these success stories into technical guidance and best practices, suggesting protocols to facilitate replication.<sup>152</sup> While those shared resources are immensely valuable to those with the resources to implement them, many localities lack the necessary capacity to do so. MPOs, COGs, and regional academic institutions can lend their technical expertise and data infrastructure to fill the gap.

Local governments are already seeking out regional bodies to meet this need, and some are rising to the challenge.<sup>153</sup> The San Diego Association of Governments (SANDAG), an MPO representing San Diego County and its 18 incorporated cities, leads two such efforts.<sup>154</sup> The Regional Climate Action Planning Framework (ReCAP) project includes a technical report with regionally relevant guidance on data

sources, GHG emissions inventories, how to calculate the emissions impacts of plan strategies, cost-benefit and implementation cost analyses, California Environmental Quality Act legal considerations, and plan monitoring and reporting. Beyond the document itself, the ReCAP program provides “snapshots” for 16 participating jurisdictions using common data sources and methods. Critically, snapshots include GHG emissions inventories—one of the most significant measurement challenges in the decarbonization planning process. Snapshots also include implementation tracking for certain sector strategies. SANDAG’s other major climate effort, the Roadmap Program, provides no-cost technical assistance and climate planning services—including added capacity through consultants and staff members—to member jurisdictions. Since 2016, the effort has supported five local climate action plans, three local implementation plans, two cost-benefit analyses, and several other technical support deliverables.

Effective regional support for data management, measurement, and technical assistance should help meet the diverse needs of member jurisdictions. Some may only need technical guidance documentation and a shared database. Others may need targeted support: a GHG emissions inventory, implementation tracking, or developing metrics based on available data. A few localities may need regional support throughout the entire climate planning process.

## RECOMMENDATION #5: USE REGIONAL CONVENERS TO NEGOTIATE WITH PRIVATE INFRASTRUCTURE AND ECONOMIC DEVELOPMENT STAKEHOLDERS

Even as public officials develop their decarbonization strategies, the private sector is still the primary owner of the major assets that determine emissions levels. Private utilities own and operate the vast majority of power plants and grid infrastructure. Automakers' R&D and manufacturing investments will do far more to determine the fuel economy of America's vehicle fleet than current federal and state emissions rules. Private actors—including households and private firms—own the majority of the country's real estate and the appliances within them. Regions simply cannot reach their decarbonization goals without engaging with private stakeholders.

Here too, regional bodies are well suited to negotiate with private actors on behalf of all localities. Regional bodies have inherently larger geographic footprints than local governments—an asset when engaging with electric and other energy utilities, whose service areas likely cross jurisdictional lines. Regional-level engagement may offer more streamlined decarbonization touchpoints to these essential partners. Certain decarbonization actions that are already common at the local scale, such as local government utility partnerships, can deliver even greater impact when regionally coordinated.<sup>155</sup> For example, two innovative regional-level technical assistance programs in San Diego (discussed further in the next recommendation) were initially funded through an MPO partnership with the San Diego Electric and Gas utility.

Economic development stakeholders and the business community can also be brought to a regional decarbonization table. Business siting decisions and

the dynamism of local markets have clear economic—and climate—implications for the entire region. To ensure access to the regional workforce, the business community relies on vibrant regional transportation systems, for which MPOs already coordinate interregional transportation planning. With appropriate regional engagement, this authority can be used to carefully align the desired outcomes of a variety of stakeholders toward cohesive strategies that reflect shared regional values.

In the case of both private utilities and other private industries, regional actors should look to use two distinct strategies.

First, where clear targets are in place, the regional entity can negotiate permanent rules with the relevant actor. For example, many communities and states are already working with utilities to adopt integrated resource plans (IRPs) that reflect jurisdictions' emissions reduction targets.<sup>156</sup> Regional entities can make sure each locality doesn't have to separately negotiate with utilities. Similarly, regional entities could also use bulk procurements and prioritize local firms to build local wealth.

Second, where localities want to first test new strategies or emerging products, regional entities can design and execute pilots. For example, multiple localities may want to test how a citywide rooftop solar program works or whether a consumer rebate for heat pumps leads to household adoption. A regional entity can pool ideas and financial resources, expediting pilots and programs that are worth adopting at scale.

## BOX 7

# Electric vehicles and environmental justice

With personal and freight vehicles generating most of the transportation sector's GHG emissions, transitioning to electric vehicles (EVs) is now a national priority. The degree to which EVs can contribute to the country's overall emissions reduction goals will depend in part on a simultaneous transition to clean electricity generation, since an EV powered by a fossil fuel-dependent grid is far from emissions-free. But no matter how long it may take for a cleaner grid to come online, adopting EVs can immediately reduce harmful tailpipe emissions and disproportionately benefit people of color and lower-income households.

The core problem is that ambient particulate matter (PM2.5) air pollution from heavy- and light-duty vehicles is not equally distributed across demographic groups. People of color are exposed to 19% higher concentrations of PM2.5 air pollution produced by heavy-duty diesel vehicles than the total population. This disparity rises to 24% for light-duty gas vehicles.<sup>157</sup> And the most harmed groups tend to pollute the least: On average, non-Hispanic white Americans are exposed to approximately 17% less air pollution than they cause, while Black Americans are exposed to 56% more air pollution than they cause.<sup>158</sup> Exposure variability is especially clear when comparing local geographies: Neighborhoods targeted by redlining practices or within 100 meters of a highway experience higher exposure and exhibit significantly higher rates of asthma-related emergency visits and higher childhood asthma prevalence.<sup>159</sup>

While a non-trivial share of vehicle PM2.5 emissions are attributed to factors like tire wear that take place in all vehicles, PM2.5 also forms from the secondary combination of other harmful tailpipe emissions: sulfur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), volatile organic compounds (VOCs), and ammonia (NH<sub>3</sub>).<sup>160</sup> EVs, which produce no tailpipe emissions, therefore have the potential to significantly reduce PM2.5 concentrations, and if targeted strategically, could decrease the unjust disparities in PM2.5 exposure and related health outcomes.

Cities can lead by example in EV adoption by electrifying their municipal fleets and building out local charging infrastructure. This first step is entirely within cities' procurement power, and can lay the groundwork for broader community adoption. Many are already well on their way: 267 cities, counties, courts, school districts, state governments, and public universities across the country have joined the Climate Mayors EV Purchasing Collaborative to pool their buying power, which reduces the costs of municipal EV adoption and charging station deployment.<sup>161</sup> New federal programs such as the \$5 billion National Electric Vehicle Infrastructure Formula Program will further promote charging deployment in many communities.

Beyond their own vehicles, cities also have the potential to influence equitable EV adoption within their communities and freight networks. Building codes can be updated to encourage readiness for EV parking and charging, and rights of way can be utilized to site EV chargers for on-street parking.<sup>162</sup> These tools can increase the availability of EV chargers in lower-income communities that charging networks are already leaving behind. Local governments could also supplement federal purchasing incentives by targeting specific households. Publicly owned port facilities can use regulatory authority to accelerate EV adoption within their facilities, and municipalities could create clean driving zones like many European peers. As EVs continue to comprise an increasing share of commercial and private vehicles as well as emissions reduction strategies, thoughtful policy can improve local air quality and reduce health disparities.<sup>163</sup>

## RECOMMENDATION #6: CITY AND REGIONAL LEADERS SHOULD ESTABLISH CLEAR FUNDING SOURCES AND FINANCING RULES

Since cities have limited and stretched budgets—amid a growing number of existing infrastructure costs—planners, policymakers, and other practitioners must think beyond traditional revenue streams. That not only means testing new financial instruments (e.g., green bonds), but also experimenting with new ways to measure costs and benefits, identify and procure projects, and collaborate with other public and private peers. In many cases, all of the above can involve working with a broader collection of regional (or even state and national) partners.

As previous Brookings research has explored, leaders are not lacking financial instruments to pay for infrastructure upgrades—they are lacking ways to tap their full power.<sup>164</sup> Public and private interest in climate investment is surging: Environmental, social, and governance (ESG) investing on has risen 42% since 2018, and an estimated \$17 trillion of professionally managed assets in the U.S. involve some type of ESG criteria, which represents one-third of all professionally managed assets (\$51 trillion).<sup>165</sup> According to federal estimates, another \$2.5 trillion will be needed over the next decade to transition to a net-zero economy.<sup>166</sup> Many of these investments, though, concentrate on clean energy projects, and overlook other opportunities in transportation and buildings.

Deploying all this private capital—and harnessing other federal funding from the Inflation Reduction Act and the Infrastructure Investment and Jobs Act—cannot be limited to one type of instrument or approach. For example, green bonds represent a newer debt instrument available to issuers (e.g., local governments) with similar financial terms as standard municipal bonds (the most common way cities finance infrastructure projects). But green bonds only represent 2.1% of all municipal bond issuances.<sup>167</sup> Public-private partnerships are another approach with widespread interest for accelerating projects, but they are similarly

fledgling.<sup>168</sup> Other funding sources, including federal formula and competitive grants, are often insufficient to address all the country's various infrastructure needs—although the increased reach of these grants (\$590.7 billion in transportation funding and \$98.1 billion in energy funding over the next five years) promises to attract more local attention.<sup>169</sup> Critically, many regional entities are already legally permitted to issue traditional and emerging municipal securities, of which many can directly advance emissions goals.

To better understand their investment needs, local and regional leaders also need to connect their climate goals and measurement efforts in terms of capital budgets. That means better estimating climate costs and benefits across an infrastructure asset's full life cycle.<sup>170</sup> For example, “climate-smart capital improvement planning” is a new approach—initially tested by the San Francisco Public Utilities Commission—that aims to accomplish this task by: establishing consistent climate criteria during the budget process; allowing for the modification of projects early in design for climate mitigation and adaptation purposes; and evaluating multiple projects based on standardized scores.<sup>171</sup>

Decarbonization should not be an ad-hoc consideration for single infrastructure projects; it needs to inform how cities and regions evaluate and support collections of projects at a greater geographic scale. As previously described, Denver's Climate Protection Fund is one of the most notable efforts aiming to do just that. It has a dedicated revenue source (via sales tax revenues), a plan to target up to \$40 million in spending each year, a process to evaluate different projects, and a team of staff to drive all this work.<sup>172</sup> While the Fund is still relatively new and its scale of impact could likely be even larger, it offers a model for other cities and regions to consider.





## Conclusion

The urgency of climate change demands a proactive response—not just at a national level, but in cities as well. As the country’s primary economic and population centers, cities not only drive most GHG emissions, but they also absorb most of the costs. To reduce these costs and amplify benefits, cities need to decarbonize all types of sectors across the built environment, particularly transportation, buildings, and electricity. Local planners, policymakers, and practitioners—alongside other federal, state, and private peers—need to coordinate on new upgrades and related investments. However, doing so often runs into hurdles around planning and implementation.

This report has highlighted the shortfalls in current decarbonization planning across 50 cities, with the aim to identify steps toward building greater technical, financial, and programmatic capacity—and ultimately supporting more widespread implementation. In addition to conducting interviews with city leaders, the Brookings team led an analysis to consistently score the level of detail in these city plans across 25 criteria under five categories: overarching plan goals, sector strategies, ownership, funding/finance, and equity. The analysis found that most cities have decarbonization goals and are beginning to execute several strategies and actions. However, they are struggling to provide extensive detail across all strategies and actions, including notable gaps around funding and equity.

Without elucidating these details, leaders are failing to execute on necessary steps to drive short- and long-term implementation.

Continued struggles in planning are holding back decarbonization, but cities cannot focus only on planning itself—they need to define measurable steps toward advancing action. Honestly assessing their current capacity to decarbonize is a first step for local leaders, before coordinating with regional partners—such as MPOs and workforce development boards—on strategy development, hiring and training workers, collecting and evaluating data, engaging with other stakeholders, and exploring new funding opportunities.

The plans this report analyzes and the solutions it proposes are not comprehensive. Decarbonization planning and implementation straddle multiple geographies, levels of governance, and actions. Even within the cities analyzed, there are many other climate plans and initiatives evolving in real time. However, the issues highlighted here remain key roadblocks facing many local leaders, and it is essential that those leaders address them in future plans and other efforts. Continually making new pledges, adjusting plans, and lacking durable strategies delay action and continue the harm climate change is inflicting on people and places. Only when leaders finally commit to well-crafted, forward-looking decarbonization plans can they position themselves to take action to protect their communities from this global threat.

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