



Mapping the Landscape of City Climate and Energy Policies in the United States

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Summary

A previous Center for Global Sustainability analysis demonstrates that achieving deeper greenhouse gas emissions reductions in the United States requires widespread non-federal climate action. Beyond policies from the most ambitious Tier 1 states, enhanced actions from Tier 2 and 3 states will be critical, particularly in the context of recent federal policy rollbacks. Cities present an important opportunity to expand climate-related policies in Tier 2 and 3 states while reinforcing high-ambition policies in Tier 1 states. **This analysis represents the first step in a broader research agenda to better understand the roles cities can play under different state policy contexts.** Here, we compile city-level actions, identify trends across sectors, policy instruments, and policy priorities, and compare these actions with state-level actions. This analysis establishes a foundation for future research that will assess the effectiveness of city policies and their contributions to national and state outcomes.

Key findings of this report include:

- **A total of 1,406 energy- and climate-related policies are collected across 157 cities in 48 states to characterize the actions cities are taking in the United States.** These policies span across six economic sectors in addition to economy-wide: buildings, transportation, electricity, industry, waste, and lands; using seven different policy instruments: ordinances, financial incentive programs, resolutions, plans, non-financial incentive programs, executive orders, and administrative directives.
- **Our data show that the buildings, transportation, and electricity sectors have the largest number of city policies.** Many policies in these sectors exist as land-use planning and zoning decisions, illustrating that cities possess built-in tools to target greenhouse gas emissions reductions within their jurisdictions.
- **Plans, ordinances, and resolutions are the policy instruments employed the most by cities and are among the instruments with the greatest contribution to local climate ambition.** Plans and resolutions are non-binding expressions of a city's goals or policy stances and may not have high effectiveness standalone, but can set strategic direction for additional policies. Ordinances are permanent legislative actions with higher enforceability and standalone effectiveness.
- **The policy priorities of cities and states focus on their jurisdictional strengths and are notably different, yet complementary,** across the buildings, transportation, and electricity sectors. Within these sectors, building energy efficiency, mode shift, and clean and renewable energy policies are focal areas for cities. These policy areas are complementary to state actions, which concentrate on building codes, electric vehicle adoption and infrastructure, and grid stability in those same sectors.
- **Across different state policy environments, cities focus primarily on the same policy areas. Cities in Tier 1 states exhibit the highest levels of policy activity with more diverse policy instruments.** While this pattern could be attributed to differences in state policy environments, it can also indicate potential areas that cities in Tier 2 and 3 states could pursue after accounting for political, financial, and institutional contexts.

- **Given the substantial action being undertaken by cities across the United States, we highlight three exemplary cases of localities setting the bar for ambition.** These include Philadelphia, Pennsylvania's enhancement of building energy performance; Miami and Miami-Dade County, Florida's advancement of electric vehicle adoption; and Atlanta, Georgia's charting of a path for clean and renewable energy.
- **While jurisdictional constraints and implementation barriers exist, cities still possess viable pathways that can help overcome challenges and drive impactful policy implementation,** such as establishing targets and commitments through plans and resolutions, engaging with peer networks and technical support, and aligning mitigation goals with community benefits and priorities.
- **Despite varying state contexts, cities are not only setting long-term strategic frameworks, but are also deploying high-impact tools to drive community-wide decarbonization,** particularly in the buildings, transportation, and electricity sectors. By deploying diverse regulatory tools, these local efforts actively complement state-level measures in alignment with the United States' multi-level governance framework.
- **Future research will assess the efficacy of city policies and examine the varying degree to which cities can continue to contribute to the energy transitions and emissions reductions necessary to support state and national goals.**

Introduction

In recent years, U.S. federal climate policy has undergone a marked retrenchment. Internationally, the United States has withdrawn from the Paris Agreement for a second time and initiated disengagement from key international climate institutions.¹ Domestically, recently passed legislation, executive orders, and budget changes have prioritized fossil fuel development and environmental deregulation.^{2,3} In this context, subnational actors, which have continued to commit to increasingly ambitious and robust climate action, have the potential to fill some of the gaps left by reduced federal government engagement and help keep the United States on track with its climate goals.⁴ While states like California and New York have enacted ambitious climate policies, other states have limited capacity or willingness to pursue climate action. City-level action, therefore, presents an important lever to expand climate-related policies in less ambitious states while supporting high-ambition action in leading states.

The U.S. political system distributes policy authority across multiple levels of government, enabling subnational actors and the federal government to shape climate action through distinct tools and at varying scales. This division of authority allows cities and states to drive national emissions reductions even during periods of federal retrenchment. Importantly, this multi-level governance dynamic is not unique to the United States. Other countries such as Australia, Canada, and Mexico also demonstrate similar commitments and capacities at the local and state government level to advance climate action.⁴

While states have long been recognized for their substantial policy authority, local governments are increasingly acknowledged as key actors to advance climate initiatives and sustain emissions reductions.⁵ Globally, cities are central to achieving national climate objectives, given their role as population and economic centers and their ability to design and implement impactful local policies.^{6,7} In the United States, approximately 80% of the population resides in urban areas,⁸ and cities account for a substantial share of energy consumption and greenhouse gas (GHG) emissions.⁹ This concentration of population and economic activity underscores the significant influence that city-level policies and decarbonization efforts can have in accelerating emission reductions and advancing broad national climate goals.

U.S. cities are implementing a wide range of ambitious strategies to decarbonize across sectors, demonstrating leadership and innovation at the local level. Many local governments have adopted policies that establish GHG reduction targets, commit to clean energy transitions, and outline sector-specific policy interventions. These mechanisms vary in their level of ambition, from long-term, non-binding policies that require minimal resources, to near-term policies that have concrete implications and require significant resources and capacity.

However, the level of action a city can take also depends on its state policy environment. A recent Center for Global Sustainability analysis developed a tiering system based on current policy and emissions trends to represent the variation in climate ambition across states. Tier 1 states are considered climate-leading states and include states with numerous high-ambition policies, such as California, Colorado, Illinois, and New York. Tier 2 states are follower states with some policies but less ambitious than Tier 1. Tier 3 states are lagging states with few or no climate policies on the books.¹⁰ Tier 1 states generally provide environments that are supportive of climate action, including state governments that prioritize climate policy as well as more technical and financial resources that local governments can leverage. In contrast, cities operate under more constraints in Tier 2 and 3 states, characterized by less supportive political contexts and more limited technical and financial resources.

As the first step of a broader research agenda to understand how cities can contribute to state and national climate goals, this analysis establishes an evidence base of city action aimed at reducing GHG

emissions. Using policies as the unit of analysis and the state tiering framework described above as context to examine cities within their state policy environments, we first characterize the type and focus of policies at the state and city levels to demonstrate how the scope of policies across governance levels can differ. Next, we examine city-level actions based on policy area and instrument selection to describe variations across state contexts. Finally, we explore targeted case studies to showcase ambitious cities situated within more stringent state contexts and the opportunities for local climate action.

For this analysis, we compiled a database of city-level climate and energy-related policies across sectors and policy instruments. In total, 1,406 policies across 157 cities in 48 states (Figure 1) are analyzed, characterizing city actions across six economic sectors as well as economy-wide: electricity, buildings, transportation, industry, waste, and lands. These policies are further categorized into seven policy instrument categories: ordinances, financial incentive programs, resolutions, plans, non-financial incentive programs (e.g., expedited permitting for new buildings with rooftop solar, technical assistance for heat pump installations, and public recognition for green sustainable businesses), executive orders, and administrative directives. Number of policies is used as the unit of analysis for this study because it is a straightforward measure for policy comparison and has been widely used as an indicator of commitment to climate action.^{11,12} Here we define cities as Census-defined incorporated places (hereafter referred to as cities or municipalities).

Given the large number of cities nationwide and the study's focus on evaluating city-level climate action for emission reductions, only cities that contribute at least 2.5% of their respective state's carbon emissions were included.¹⁴ While a lower threshold would expand the set of cities, the 2.5% threshold was used because it balances broad geographic representativeness with the scope of policy collection.

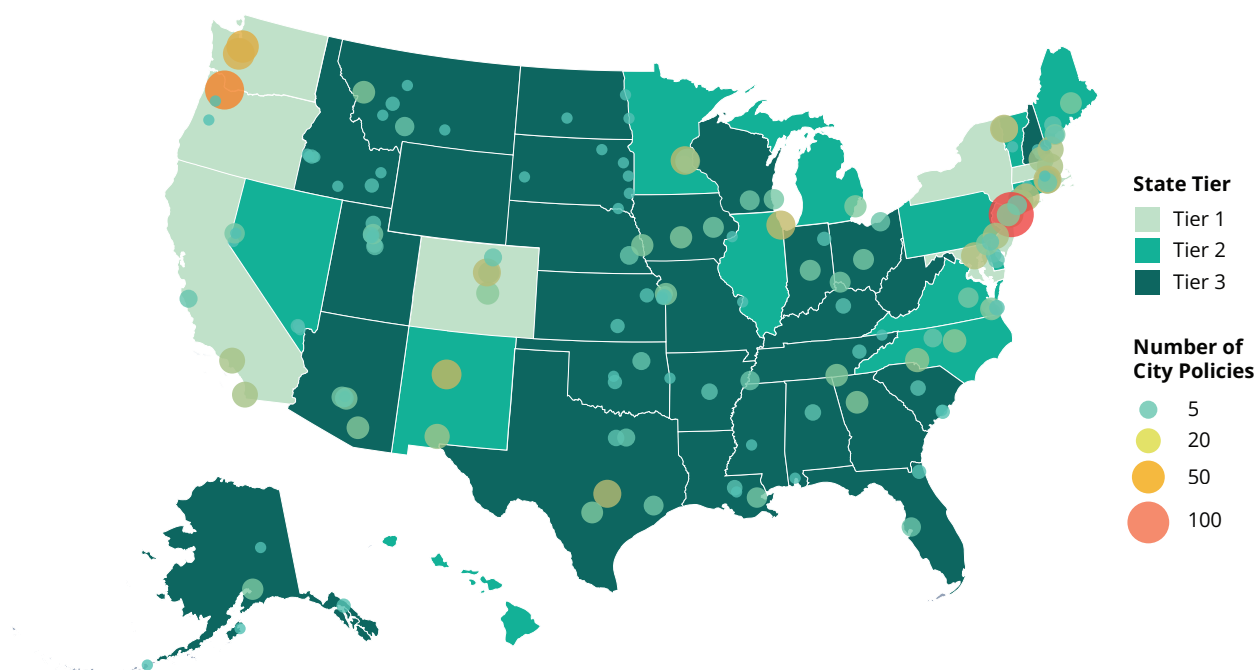


Figure 1. Map of cities included in this analysis. States are colored by their overall state tiering, while circle size and color represent the number of city-level policies identified in each city. Data were compiled by the authors. For state-tiering method and results see Zhao et al. (2025).

Results

Characterizing city actions across sectors and policy instruments

The 1,406 city-level policies are distributed unevenly across sectors (Table 1). The buildings (398 policies), transportation (388), and electricity (242) sectors have the highest number of city policies, followed by waste (135) and economy-wide^a (131) sector policies. Land-use planning and zoning decisions, which cities generally have large jurisdiction over,^{14,15} are classified within the transportation, building, and electricity sectors when they contribute to emissions reductions in those categories. Examples include reducing vehicle miles traveled through denser urban planning or allowing rooftop solar through zoning ordinances. Categorizing policies in this way illustrates that cities already possess built-in tools through land-use planning and zoning decisions to target emissions across sectors within their immediate jurisdiction.

Policies are also unevenly distributed across different policy instruments. Plans, such as climate action plans or sustainability plans, are by far the most common type of policy instrument (978 policies). The multitude of policies within this category can be attributed to how policies were split up within plans; one plan could include several policies within one sector and across sectors. After plans, ordinances (164), resolutions (114), and financial incentive programs (72) follow. Other policy instruments include administrative directives, executive orders, and non-financial incentive programs. Each of these policy instruments range in their ability to contribute to a city's level of climate action.

Policy Instrument	Buildings	Transportation	Electricity	Waste	Economy-Wide	Lands	Industry	Total (Policy Instrument)
Total (Sectors)	398	388	242	135	131	93	19	1,406
Plan	226	303	169	115	68	81	16	978
Ordinance	87	35	14	10	13	4	1	164
Resolution	25	13	37	1	35	2	1	114
Financial Incentive Program	30	20	18	3	1	0	0	72
Administrative Directive	13	7	2	2	6	0	0	30
Executive Order	5	9	1	2	8	1	0	26
Non-Financial Incentive Program	11	1	1	2	0	5	1	21



Table 1. Number of city policies in each sector by policy instrument. Cells shaded more darkly indicate a higher number of policies.

^a Economy-wide policies are those that target all or multiple sectors.

Given that policy instruments vary substantially in their level of regulatory power, we further evaluate each instrument's impact on city-level climate action by examining three core characteristics of local regulatory strength: scope, enforceability, and effectiveness (Table 2). Scope refers to the breadth of a policy instrument's application across a locality, enforceability to the extent it is binding by law, and effectiveness to its ability to produce an intended policy outcome. Each characteristic's rating was qualitatively determined by evaluating the existing literature on each policy instrument. Overall regulatory strength was then derived by averaging the rating across the three characteristics and comparing those averages across instruments. This approach provides a general approximation of each instrument's regulatory strength. The Technical Appendix provides additional details on the characteristics and classification of each policy instrument type.

While scope, enforceability, and effectiveness are not the only dimensions of regulatory strength, this analysis focuses on these characteristics because they can be assessed consistently across a broad set of policy instruments, while other characteristics such as stringency¹⁶ and legal authority and preemption¹⁷ are often more specific to state and local contexts. This methodological choice means that Table 2 captures the formal regulatory strength of local policy instruments, but does not fully reflect other characteristics or the institutional, economic, and political factors that create enabling conditions for durable climate policy. Many of these conditions are important precursors to enacting climate policy that carries regulatory weight. In practice, policymakers working within limited enabling conditions who focus on actions such as capacity building and cultivating political willingness may be advancing climate action in ways that are not captured by our classification of policy instruments. The intent of these classifications is to provide a comparable measure of the regulatory strength of the policy instruments cities have adopted, while recognizing that a fuller understanding of local climate impact requires analyzing additional dimensions.

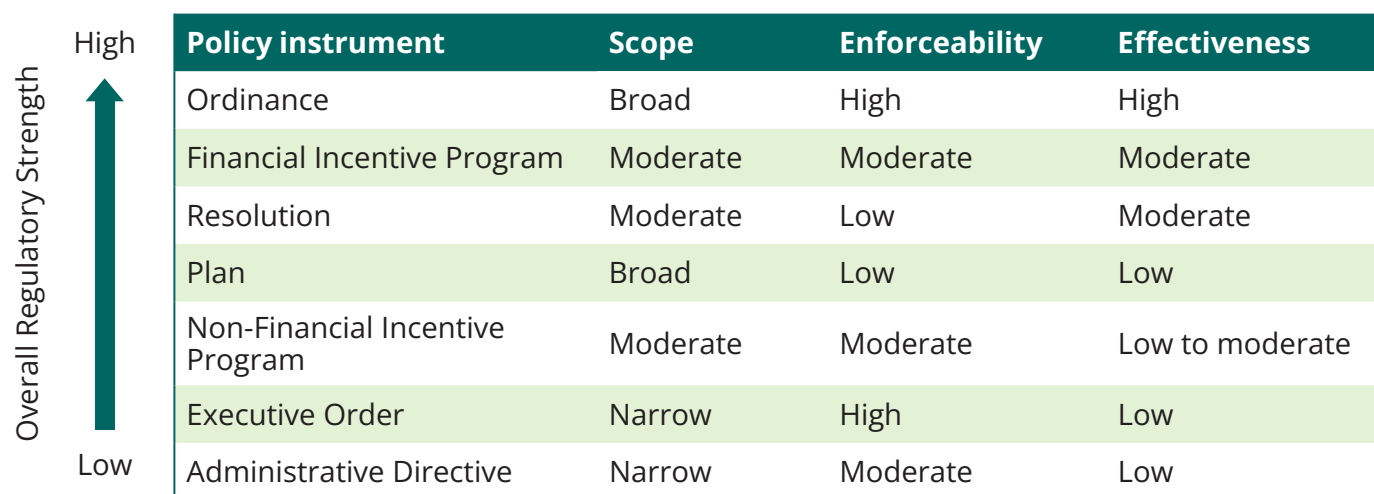
While plans are the most common policy instrument across sectors, they demonstrate lower regulatory strength within this framework. Plans are typically broad in scope,¹⁸ but are generally non-binding until codified through ordinances or other enforceable measures,^{19,20} and have limited ability to produce intended policy outcomes such as emissions reductions standalone.^{21,b} Despite these regulatory limitations, plans perform distinct functions in the policy process. They often serve as forerunners to durable climate action, and the planning process itself can generate institutional change,²² while also guiding budgetary decisions such as capital investments.²² In cities with limited legal authority to act on climate due to factors such as Dillon's Rule status^c or state-level preemption, plans are often the most strategic instrument available. In these contexts, adopting plans reflects a deliberate choice within structural constraints. In the presence of these constraints, plans do well to strengthen climate awareness and identify sources of emissions, but they are weakest at direct implementation of concrete actions.¹²

It is notable that the second most common policy instrument is ordinances, which carry significant regulatory strength, as cities exercise legislative authority primarily through the passage and enforcement of ordinances.²⁴ Resolutions are passed in a similar manner as ordinances, but they tend not to represent enforceable actions and are often temporary or guiding. Financial incentives are a moderately strong policy instrument, and while they are normally voluntary, they can help overcome implementation barriers that hinder progress toward climate goals. Other significant policy instruments that carry relatively less regulatory strength include non-financial incentive programs, which are non-monetary

b See Technical Appendix for more details on the levels of regulatory strength of the policy instruments.

c Dillon's Rule states allocate limited government authority to cities. While the powers allocated vary by state, cities in Dillon's Rule states can generally only act within the express powers granted to them by state law and in matters indispensable to municipal operations.²³

tools that offer benefits for a desired outcome; executive orders, which are directives issued by mayors or county executives that are typically limited to municipal operations; and administrative directives, which serve as internal management policies for city agencies.



Overall Regulatory Strength ↑ High Low	Policy instrument	Scope	Enforceability	Effectiveness
	Ordinance	Broad	High	High
	Financial Incentive Program	Moderate	Moderate	Moderate
	Resolution	Moderate	Low	Moderate
	Plan	Broad	Low	Low
	Non-Financial Incentive Program	Moderate	Moderate	Low to moderate
	Executive Order	Narrow	High	Low
	Administrative Directive	Narrow	Moderate	Low

Table 2. Regulatory strength of each policy instrument based on three characteristics: scope, enforceability, and effectiveness. See Technical Appendix for details.

Notably, the buildings sector has the highest number of policies in several policy instrument categories, including ordinances (87 policies) and financial incentive programs (30), see Table 1. Coupling these policy instruments can be a powerful policy sequence to drive climate action not only within municipal buildings, but also community-wide residential and commercial buildings. This suggests that cities have strong jurisdiction to govern the buildings sector using several different policy instruments, barring any preemption from the state.

The transportation sector follows a similar pattern to the buildings sector, but plans are more frequently used as a policy instrument (303 compared to 226, respectively). Transportation plans, bicycle plans, and master plans for land use and development are among the different types of plans included in the transportation sector. Planning is critical for how transportation methods, like public transit, are implemented within a city to ensure future needs are accounted for and people and goods are moving safely and efficiently. While plans are generally non-binding until codified through measures like ordinances, they are one of the first steps that cities take to set priorities for investments and projects and to continue implementing other policy types.²⁵

The electricity sector and the economy-wide category include the highest number of resolutions (37 and 35, respectively). These resolutions often touch on renewable or clean energy targets and GHG reduction targets within the city. While resolutions are generally non-binding and often require additional policies to operationalize, they make city priorities clear to residents and to other subnational governments such as cities and states.

Cities focus on policy areas complementary to states

Given the United States' multi-level governance structure, states and cities both play critical roles in sustaining climate action and can leverage their strengths to target policy areas suited to their jurisdictions.⁵ In this section, we utilize Climate XChange's State Climate Policy Dashboard to characterize the type of policies at the state level, comparing them to the policies collected at the city level.²⁶ Based

on this comparison, our results show notable, yet complementary, differences across the buildings, transportation, and electricity sectors (Figure 2). In the buildings sector, cities exhibit a higher share of policies focused on building efficiency and building standards, whereas states place greater emphasis on building codes. In the transportation sector, cities show a higher concentration of policies related to mode shifting, whereas states focus more strongly on electric vehicle adoption and charging infrastructure deployment. In the electricity sector, cities focus more heavily on clean and renewable energy initiatives, while states prioritize grid stability.

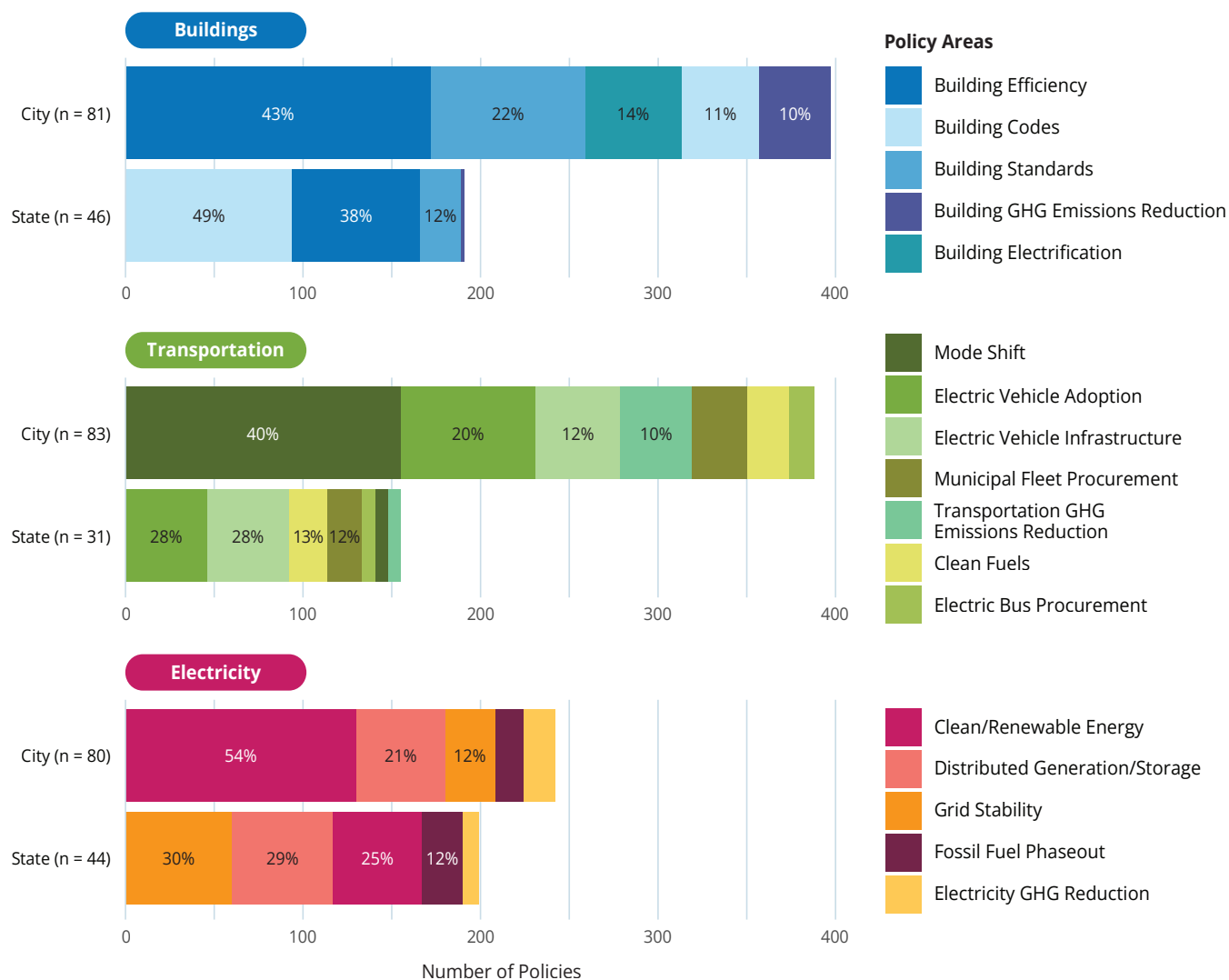


Figure 2. Comparison of the number of city climate policies to state climate policies across sectors, using data compiled by the authors and the State Climate Policy Dashboard from Climate XChange.²⁶ State policies were grouped into comparable policy areas to facilitate comparison with city policies. A policy area that does not exist as a category in city policies is Low NO_x Omnibus Rules.

In the buildings sector, 43% of city policies collected were related to energy efficiency, compared to 38% of state policies. While states must grant cities the ability to pass and enforce building codes that are more stringent than the state-level, cities still have the ability to incentivize building energy efficiency improvements through financial or non-financial methods. These initiatives can be framed as a benefit to residents to increase energy savings and promote affordability. Some of the oldest city policies found were building efficiency programs from cities in Tier 3 states, including Austin, Texas,

and Tallahassee, Florida. Building standards represent 22% of city policies in the buildings sector and only 12% of state policies. Standards, such as the use of LEED certification for new buildings, are less stringent than building codes and act as the baseline and guidance for best practices. Building standards allow cities to encourage greener building practices without overstepping state building codes, which are the minimum criteria that buildings must be constructed within. Some states provide local stretch codes that are more stringent than the state's building code.

In the transportation sector, 40% of policies passed were related to mode shifting, compared to only 4% at the state level. Mode shift policies can be easier to target than more concrete goals to electrify community or municipal fleet vehicles, since they do not rely on the availability of electric vehicle models and often focus on providing incentives to switch transportation modes rather than enforcing a transition. Mode shift policies, such as smart growth strategies encouraging denser building development or mixed-use development, are also directly related to land use and urban planning, a lever that cities have strong jurisdiction over. States mainly focused on electric vehicle adoption and installing related infrastructure (a combined 56% compared to a combined 32% at the city-level), which requires large upfront capital costs that cities may not have access to.

In the electricity sector, 54% of policies collected were related to clean and renewable energy goals, compared to 25% at the state level. Many cities have resolutions and ordinances establishing renewable portfolio standards or goals to reach a certain percentage of clean or renewable energy for community-wide or municipal operations. While cities are still connected to the wider grid and are subject to decisions made at the state and federal level, these clean and renewable energy standards and goals are a significant indicator of a city's priorities. States also have policies focused on procuring more clean and renewable energy, but their policies focus more on grid stability (30%, compared to 12% at the city-level), including those related to transmission, interconnection standards, and grid capacity technologies. This is likely because these policies often need state-wide or regional approaches to be effective.

Cities across different state policy environments emphasize similar policy areas but utilize different policy instruments

In this section, we examine city-level actions based on policy area and instrument selection to describe variations across state policy environments. Our results indicate that cities in Tier 1 states generally exhibit the highest levels of policy activity, followed by cities in Tier 2 states and then Tier 3 states (Figure 3). The different number of policies across these state contexts could be attributed to more conducive state-level political environments and resources that allow cities in Tier 1 states to pass a higher number of policies. Despite differences in the overall number, the primary policy areas that cities focus on do not vary across state tiers (Figure 3): building efficiency and building standards remain the top policy areas in the buildings sector; mode shifting and electric vehicle adoption are the top policy areas in the transportation sector; and clean and renewable energy along with distributed generation and storage are the top policy areas in the electricity sector. These similarities across cities in all state contexts may point to policy areas where cities have the strongest jurisdictional power.

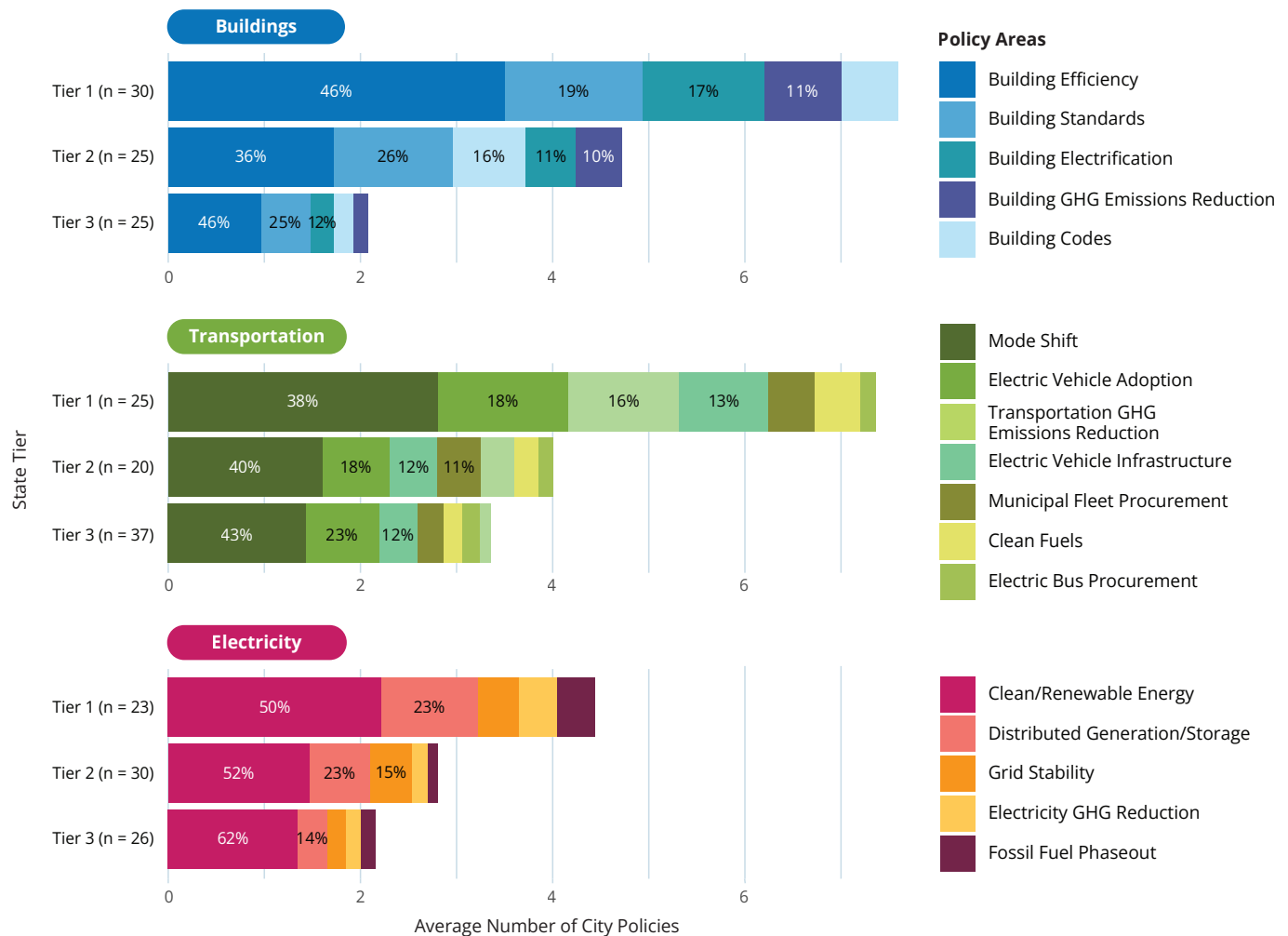


Figure 3. Comparison of the average number of city policies in certain policy areas across Tier 1, 2, and 3 states. Each sectoral tier includes a varying number of states within it and thus a varying number of cities. Average number of city policies for each sector and tier were found by dividing the absolute number of city policies by the number of cities within that sectoral tier.

Beyond these top policy areas, subtle policy area variations across tiers could highlight potential pathways for cities in Tier 2 and 3 states to pursue when their state contexts allow. Overall, cities in Tier 1 states have a higher share of building electrification policies (17% of total policies in the sector, compared to 11% in Tier 2 and 12% in Tier 3). Electrification is generally considered a more ambitious policy area than building energy efficiency because it explicitly calls for the elimination of fossil fuel use in building appliances and systems, therefore enabling deeper emissions reductions. Additionally, cities in Tier 1 states have a significantly higher proportion of transportation GHG emissions reduction policies (16% compared to 9% in Tier 2 and 3% in Tier 3), signaling more concrete and explicit commitments to decarbonizing the transportation sector. Again, these variations could be attributed to differences in state political contexts across state tiers, but they could also indicate potential areas that cities in Tier 2 and 3 states could pursue after accounting for political, financial, and institutional contexts.

Buildings

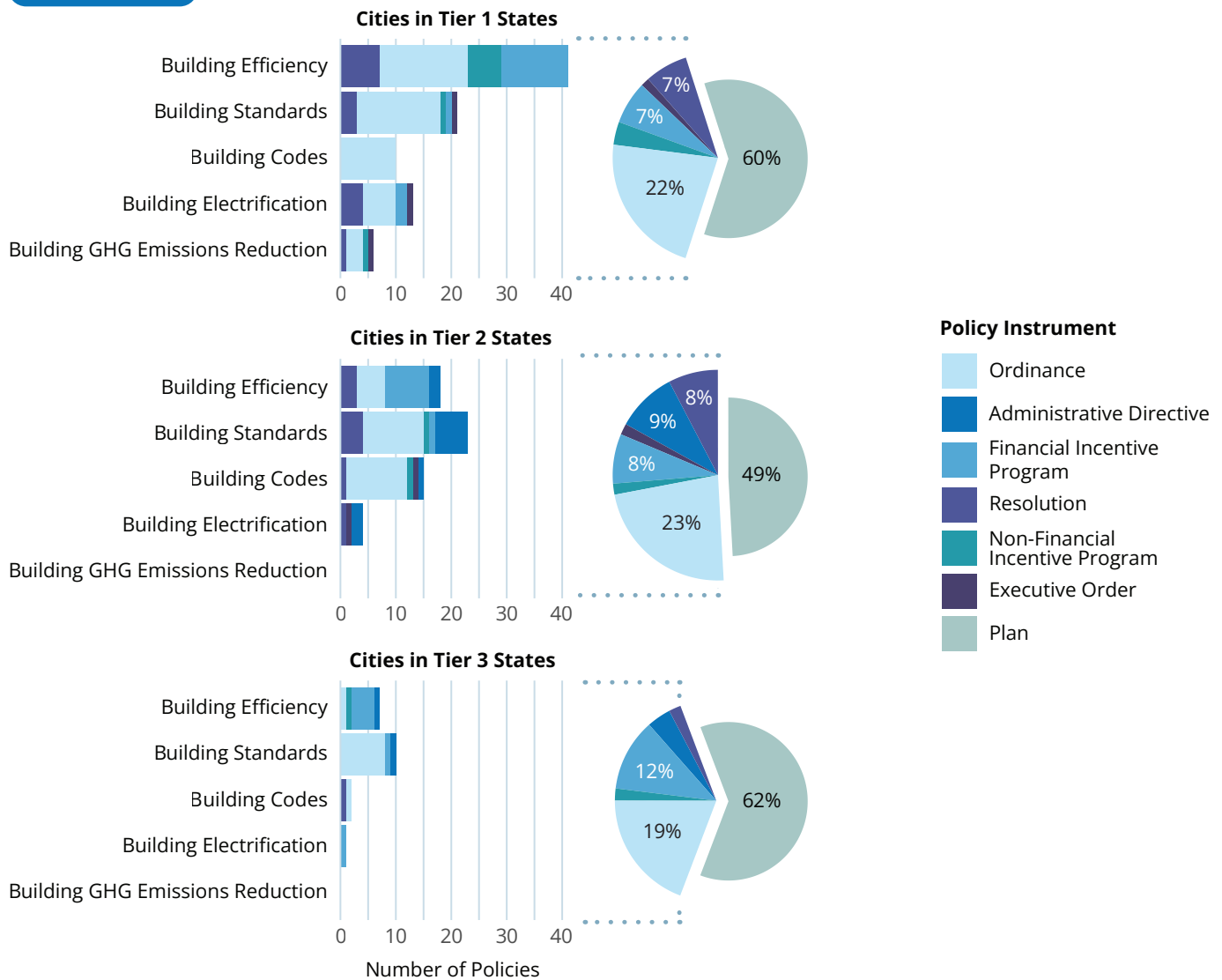


Figure 4a. Building sector comparison between city policy instruments used for certain policy areas by cities in different state contexts. Plans are removed as a policy instrument in the bar charts to show more detail.

The policy instruments cities use within policy areas also vary across state tiers (Figures 4a-c). In the buildings sector, cities in Tier 1, 2, and 3 states use a comparable amount of ordinances across the sector overall (22%, 23%, and 19%, respectively). Yet, cities in Tier 1 states use ordinances across all policy areas, while cities in Tier 2 states use them only for building standards, building codes, and building efficiency, and cities in Tier 3 states use them primarily for building standards. A more narrow application of ordinances suggests that cities in Tier 2 and Tier 3 states may have to work within more restrictive state governance structures that limit their use of ordinances. Whereas, cities in Tier 1 states could have wider jurisdiction, as their states may not preempt local action and grant them the power of self-governance. To navigate these potential constraints, cities in Tier 2 and 3 states use an additional policy instrument, administrative directives, across many policy areas in the buildings sector (9% and 4% overall, respectively, compared to none in cities in Tier 1 states). This distribution of administrative directives may be due to cities in Tier 2 and 3 states having a more limited jurisdiction within their state contexts or needing to lead by example through their municipal buildings first as a proof of concept to build public understanding and support.

Transportation

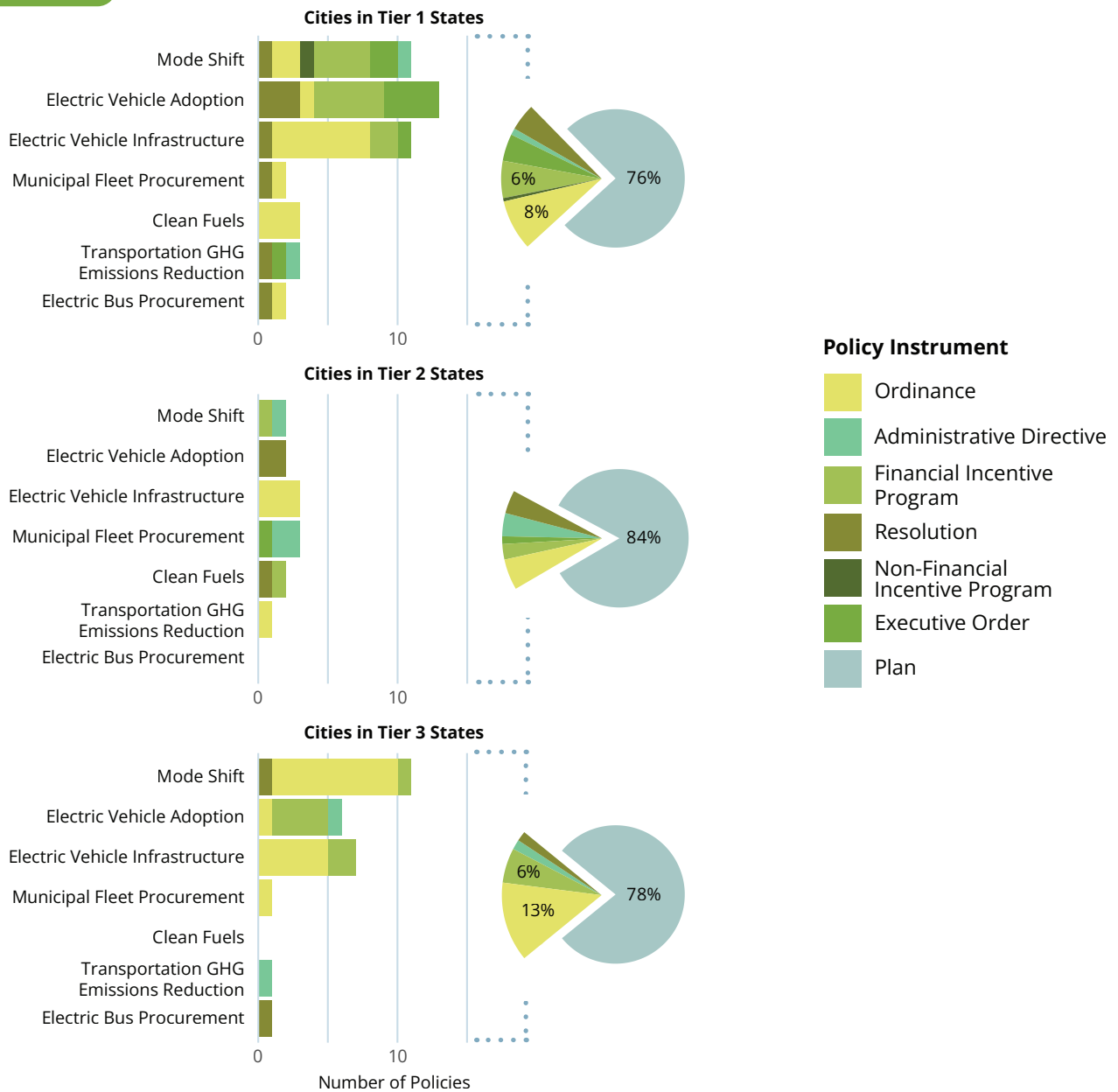


Figure 4b. Transportation sector comparison between city policy instruments used for certain policy areas by cities in different state contexts. Plans are removed as a policy instrument in the bar charts to show more detail.

In the transportation sector, not accounting for plans, cities in Tier 3 states use a higher fraction of ordinances for mode shifting policies (82%, compared to 18% in Tier 1 and none in Tier 2), and cities in Tier 2 states utilize a higher proportion of ordinances for electric vehicle infrastructure (100%, compared to 64% in Tier 1 and 71% in Tier 3). However, cities in Tier 1 states utilize more policy instruments than other cities in each of these same subsectors. Additionally, cities in Tier 1 states employ more executive orders overall in the transportation sector (4% compared to 1% in cities in Tier 2 states and none in cities in Tier 3 states), particularly in those policy areas they emphasize the most: mode shift, electric vehicle adoption, and electric vehicle infrastructure. Higher usage of executive orders in Tier 1 cities suggests that these cities have a more favorable political environment for mayoral action, and there may be less political risk involved in enacting executive orders.²⁷

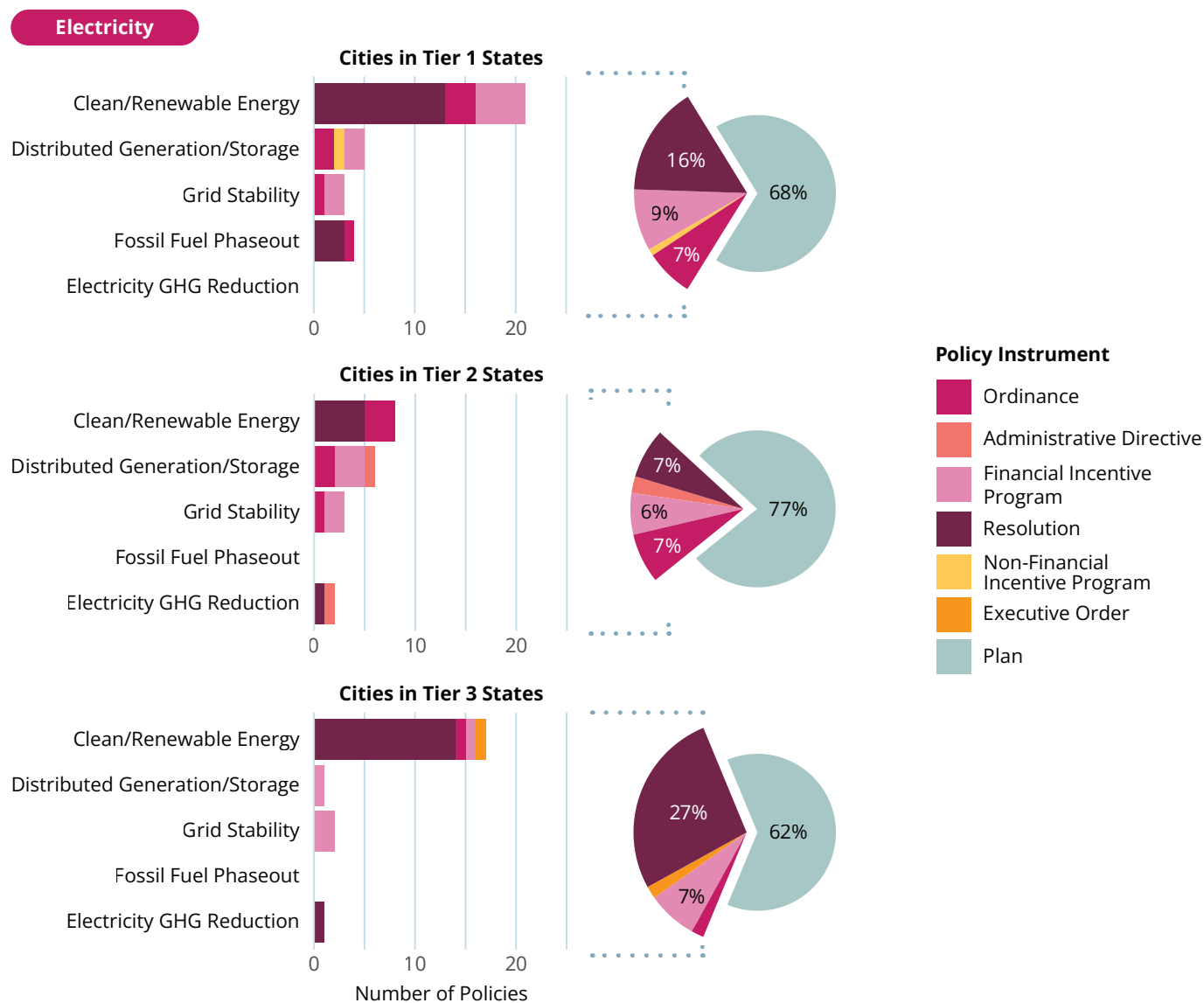


Figure 4c. Electricity sector comparison between city policy instruments used for certain policy areas by cities in different state contexts. Plans are removed as a policy instrument in the bar charts to show more detail.

In the electricity sector, cities in Tier 3 states use a higher percentage of resolutions overall (27% compared to 16% in Tier 1 and 7% in Tier 2). Resolutions are mainly used for clean and renewable energy policies across all tiers (82% in Tier 3, 63% in Tier 2, and 62% in Tier 1), not taking into account plans. However, in the same policy area, cities in Tier 1 states utilize more financial incentives than cities in other tiers (24% compared to 6% in Tier 3 and none in Tier 2), which may support implementation within those cities. Cities in Tier 1 states are also the only cities that employ both ordinances and resolutions for fossil fuel phase-out, while other tiers use plans. This indicates that cities in Tier 1 states likely have the political and financial mechanisms to support stronger regulatory policies in this area, while cities in Tier 2 and Tier 3 states are likely taking the first steps or setting policy priorities through plans which can help set the foundation for fossil fuel phase-out.

Case Studies

Given the scale of climate action underway in U.S. cities, we highlight three exemplary cases of localities working strategically within varied state contexts to implement ambitious policies and programs. Each case demonstrates how local governments deploy different policy instruments, including plans, ordinances, resolutions, financial incentives, and implementation programs, to drive emissions reductions. In the first case study, we examine how Philadelphia (Pennsylvania) leverages its home rule authority to advance buildings sector decarbonization and improve building energy performance. In the second case study, we study how the City of Miami and Miami-Dade County (Florida) are leading transportation sector emissions reductions through a suite of measures, including EV infrastructure buildout and bus electrification. In the third case study, we explore how Atlanta (Georgia) is advancing its clean energy goals through clean electricity procurement, rooftop solar deployment, and other community-focused energy programs. Together, these case studies underscore our findings about the policy areas and instruments cities are using to drive climate action forward, and they offer pragmatic, sector-specific strategies that peer cities can replicate to accelerate local climate action and strengthen state-level policy ambition.

Enhancing Building Energy Performance in Philadelphia, Pennsylvania – A City in a Tier 2 State in the Buildings Sector

Philadelphia has demonstrated leadership in the state of Pennsylvania by leveraging its jurisdictional power to address the buildings sector, which makes up 72% of the city's carbon emissions.²⁸ In the last legislative session, Pennsylvania (a Tier 2 state in the buildings sector) faced a stalemate with its split state government, which failed to pass several ambitious climate policies in the governor's proposed "Lightning Plan".²⁹ Philadelphia has stepped up as a critical driver and role model for high-ambition building policies in the state, enabled by Pennsylvania's home rule status, which grants municipalities the power to adopt more stringent building codes.^{30,17} Although the state has guiding goals to reduce statewide energy consumption and minimum energy conservation codes that all cities must meet,³¹ home rule grants wider authority to Philadelphia, which has spearheaded strong climate policies.

Philadelphia has leveraged its home rule authority by taking ambitious actions in the buildings sector. The city's Municipal Energy Master Plan sets guiding building targets to halve GHG emissions from 2006 levels by 2030 and reduce energy usage by 20% from 2016 levels by 2030.³² Moreover, Philadelphia established a Building Energy Performance Program (BEPP) in 2019 to achieve more efficient energy usage in large, non-residential buildings across the city.³³ The program requires building owners to regularly review their building's energy systems and controls, then tune-up the building's systems to meet performance standards. At the state level, Pennsylvania has not enacted building energy performance standards, so it is significant that Philadelphia has promulgated its own. In its state climate action plan, Pennsylvania cites Philadelphia's BEPP as an example of comprehensive building performance policies that can help reduce electricity and gas usage.³⁴ Philadelphia is also well positioned to achieve its buildings sector targets due to its ownership of Philadelphia Gas Works, the largest municipal gas utility in the United States.³⁵

Philadelphia also has ordinances that encourage energy and water use benchmarking (§9-3402. Benchmarking Energy and Water Use)³⁶ and provide rebates for solar panels (§9-3403. Solar Panel Incentives).³⁷ The combination of ordinances with financial incentives is an effective strategy to advance climate action, as it provides the legislative foundation to drive change while providing monetary incentives to encourage and scale out action. These policies apply community-wide, demonstrating

Philadelphia's ambition to move beyond solely regulating in-house municipal activities to regulating residential and commercial buildings across the city.

Other cities in Pennsylvania can follow Philadelphia's lead, particularly by using a mix of plans, ordinances, and financial incentive programs to drive emissions reductions in the buildings sector. By strategically leveraging home rule authority and an array of policy levers, cities can drive emission reductions tailored to their local building stock. While vertical policy diffusion literature contains mixed findings regarding the influence of cities on state policy adoption,³⁸ horizontal diffusion across cities could lead to a larger coalition of cities that would help lower entry barriers and provide proof-of-concepts that potentially lead to tipping points and durable change.^{39,40}

Advancing Electric Vehicle Adoption in the City of Miami and Miami-Dade County, Florida – Localities in a Tier 3 State in the Transportation Sector

The City of Miami and Miami-Dade County have made consistent strides toward electrifying vehicles and setting up EV infrastructure, despite prohibitive actions at the state level. Local policymakers have taken a multi-pronged approach to advance these efforts, pairing early regulatory action with long-term planning and EV infrastructure expansion. From 2015-2019, Miami attained one of the highest annual public charger growth rates in the country at just above 50%.⁴¹ In 2020, the city took the opportunity to build on the trend by adopting an ordinance that requires 20% of newly constructed off-street parking spaces to support EV charging.⁴² Miami formalized its transportation sector goals in its 2021 Forever Carbon Neutral Plan, which provides a roadmap for reducing transportation sector emissions and sets targets to ensure that 40% of registered passenger vehicles are electric and that private vehicle trips are reduced by 5% by 2030.⁴³ The plan also includes concrete measures to support continued build out of EV charging infrastructure.

At the county-level, the Miami-Dade Climate Action Plan sets goals to shift 10% of residents' modes of transportation away from single-occupancy vehicles by 2030 and electrify 80% of light-duty vehicles and 50% of buses by 2030.⁴⁴ The county has supported this rapid shift toward electrification by passing an EV Capability Ordinance, requiring 20% of parking spaces in new developments to be ready to support Level 2 EV Chargers.⁴⁵ The County has made additional strides towards its electrification goals by kicking off its Electric Bus Rapid Transit (BRT) in 2025—the longest, fully electric corridor in the nation, connecting over 20 miles of municipalities in South Florida.⁴⁶ The Miami-Dade County Public School District has also added 85 electric school buses to its fleet since 2023.⁴⁷ The most recent data show that Miami-Dade County has the highest number of registered electric vehicles out of all Florida counties, with a total of 86,730 fully electric vehicles.⁴⁸

Local progress faced a setback in 2024, when Florida (a Tier 3 state in the transportation sector) passed a bill preventing local governments from requiring EV charging stations, effectively making the city and county's EV ordinances unenforceable.^{49,50} Furthermore, local governments are no longer allowed to set climate goals and use public funds to support initiatives related to net-zero policies and GHG emissions, as outlined in a house bill that was passed in the 2026 legislative session.⁵¹ Florida itself does not currently have any statewide programs to incentivize EV adoption or infrastructure. Despite many state barriers restricting local climate action, Florida still has one of the highest shares of EV registrations in the country, with over 334,800 registrations in 2024.⁵² This demonstrates that Florida cities can maintain momentum in the transportation sector by continuing to work strategically within the limits of state law.

Miami and Miami-Dade County exemplify perseverance in advancing transportation decarbonization despite state-level preemption. Local governments can prepare for a future shaped by rapidly growing EV markets by setting strong targets in plans, increasing access to EV charging stations, and transitioning their own municipal and county fleets. Although Florida localities now face greater limits in enacting binding EV regulations, they can still formulate a long-term vision and utilize market momentum to support EV rollout and electrification from the ground up.

Charting A Path to Clean and Renewable Energy in Atlanta, Georgia – A City in a Tier 3 State in the Electricity Sector

Atlanta has implemented several policies and programs to activate clean energy in the city, despite a lack of policy alignment with the state of Georgia (a Tier 3 state in the electricity sector). Through its 2017 Clean Energy Resolution, the city adopted a target of 100% clean energy by 2035, both for municipal operations and for community-wide electricity.⁵³ To achieve this clean energy target, Atlanta developed a comprehensive strategy through its Clean Energy Atlanta Plan, which focuses on clean electricity procurement, rooftop solar deployment, and other community-focused energy programs.⁵⁴ The plan frames the energy transition not only as a matter of emissions reductions, but also through the lens of affordability, community resilience, and equity. Additionally, Atlanta passed its pivotal Solar Energy Procurement Agreement (SEPA) Resolution in 2017, which awarded a contract to a third-party developer for the installation of solar panels around the city.⁵⁵ Since its enactment, the city has installed 40 solar photovoltaic systems totaling 2.8 MW of capacity. In 2021, to promote community-wide solar, the city partnered with several community-based organizations to launch Solarize Atlanta 2.0, a group-purchasing program for solar panels, battery storage, and other clean energy technologies.⁵⁶

In contrast, Georgia has not prioritized electricity sector emissions reductions or climate action to the same scale as Atlanta. The state does not have GHG reduction targets for the electricity sector or a renewable portfolio standard. Furthermore, while Georgia Power's 2025 Integrated Resource Plan allows for new procurement of renewable energy (up to 4,000 MW by 2035), it also permits the expansion of fossil fuels to meet growing energy demand.⁵⁷ Despite these state-level limitations, Georgia's clean energy workforce is growing five times faster than the state's overall employment due to significant investments in local manufacturing over the past few years.⁵⁸ This growth points to opportunities to leverage economic and workforce benefits generated by the energy transition.

In the meantime, Atlanta's energy policies and programs continue to provide a blueprint for how cities in Georgia can decarbonize the electricity sector and lead on local climate action. The combination of ambitious clean energy targets set via city resolution, a clean energy action plan, and implementation initiatives such as a Solar Energy Procurement Agreement and solar group purchasing program, provide a foundation for comprehensive energy-sector action that other cities can emulate. In doing so, cities have the opportunity to make clean energy goals accessible for both municipal operations and local residents.

Strategic Pathways for Cities

We recognize that institutional, economic, political, and social factors such as budgets, staff capacity, political willingness, co-benefits framing, and sustained leadership across election cycles are also important drivers of climate action in cities.⁵⁹ Such enabling conditions are often more accessible to larger cities or those located in Tier 1 states. For cities that lack enabling conditions or face inhibiting factors, climate action can still be integrated into many existing municipal processes and authorities, and identifying these opportunities allows cities to continue to make steady progress toward local climate goals. Miami and Miami-Dade County are model cases, but other instances exist as well. For example, Utah code does not allow cities to establish more stringent energy efficiency standards than its state building code. In response, West Valley City developed a Residential Sustainability Zone, which incentivizes, rather than requires, developers to build homes with more sustainable features, like EV chargers, rooftop solar, and energy efficient appliances.⁶⁰

With those examples and context in mind, cities have several avenues to move their climate action forward. One of the first steps cities can take is to adopt climate action plans or resolutions that establish targets or commitments for local climate action, which is a step many of the cities we analyzed are doing. While these policy instruments alone do not often achieve the goals they set out, they are foundational for further local action. Many cities treat climate action plans as living documents, updating them over time with increasingly ambitious targets and clearer sector-specific decarbonization pathways.

To overcome budgetary or capacity constraints, cities can leverage technical support during the initial planning stages as well as throughout policy implementation. The U.S. Environmental Protection Agency's *Local Climate Action Framework* is an implementation guide that is particularly useful for small- to medium-sized cities that may be capacity-constrained in the near term.⁶¹ Cities can also utilize networks such as C40 Cities, ICLEI, and Climate Mayors to access planning and implementation resources and engage in knowledge sharing with other cities. Local climate leadership through governance networks and coalitions strengthens the durability of national climate action,⁶² while signaling continued U.S. engagement in global climate efforts.

Framing climate and mitigation policies in terms of co-benefits and other priorities can also help cities overcome implementation barriers.⁶³ When setting goals and developing plans to achieve emissions reductions, cities are not limited to framing actions solely around climate mitigation. They can take a more integrated approach, linking climate goals with broader priorities such as economic development, job creation, public health, adaptation, water quality, equity, affordability, and community wellbeing. By utilizing this approach, cities can secure more buy-in from stakeholders and residents while helping align climate initiatives with other municipal priorities. Framing can give cities access to a wider range of funding sources for climate initiatives, including the funding and financing associated with local capital improvement plans. While this analysis does not closely examine how cities frame their policies, several examples can be found, such as Chicago's 2022 Climate Action Plan, which frames climate action not just through the lens of environmental progress, but also economic savings and community health benefits.⁶⁴

Although structural barriers persist, these strategic steps demonstrate that cities possess viable pathways to advance climate action. By initiating foundational plans, engaging with peer networks, and aligning mitigation goals with community co-benefits, local governments can take steps to overcome capacity constraints and drive impactful policy implementation. In pursuing these avenues, cities can catalyze broader change, empowering neighboring jurisdictions to act and steadily expand the repository of successful local climate policies.

Conclusion & Future Research

In this analysis, we map how cities are pursuing efforts to reduce GHG emissions within their specific jurisdictional boundaries, expanding on previous work examining the emissions reduction potential of subnational action and characterizing state policy environments.⁶⁵ We capture a snapshot of current municipal climate policies, demonstrating that despite varying state contexts, cities are not only setting long-term strategic frameworks, but are also deploying high-impact tools to drive community-wide decarbonization, particularly in the building, transportation, and electricity sectors. We also find that by deploying diverse regulatory tools, these local efforts actively complement state-level measures in alignment with the United States' multi-level governance framework.

These findings underscore the pivotal role that cities can play in U.S. climate mitigation pathways. While state-level ambition and policy contexts vary across the country, cities have the potential to sustain momentum and catalyze ambitious actions within their jurisdictional authority. This observation supports a growing body of research demonstrating that cities can still continue to decarbonize through emphasizing co-benefits, adopting climate action plans with increasingly ambitious targets, and joining municipal networks, among other actions.

However, this analysis is only the first step toward a broader research agenda to better understand the varying degrees to which cities can continue to support state and national climate pathways. Future research will continue to build upon this work to evaluate the efficacy of city policies in achieving their targeted outcomes, moving away from tracking number of policies as a metric to evaluate existing city climate action. Fully evaluating local climate success and impact requires analyzing other dimensions of policy output,¹¹ as well as a deeper understanding of available resources and the environment within which cities are situated. The vertical and horizontal causal relationships needed for a robust national emissions pathway should also be examined.⁶⁶ In doing so, this approach can illuminate the specific mechanisms through which localized actions can drive the energy transition and emissions reductions necessary to fulfill broader state and national goals.

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Mapping the Landscape of City Climate and Energy Policies in the United States

Technical Appendix

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A. Sectors and Policy Areas

For each economic sector and for economy-wide initiatives, we identify and define key policy areas. Each definition includes an example.

Electricity

- **Electricity GHG Reduction:** Policies related to reducing emissions in the electricity sector. For example: “A goal to reduce electricity emissions by 25% by 2030 using a base year of 2015.”
- **Clean/Renewable Energy:** Policies related to the procurement of clean or renewable electricity. For example: “A goal to secure 15% of all City-owned facilities’ power from renewable sources within 7 years.”
- **Fossil Fuel Phaseout:** Policies related to the decreased use of fossil fuels in community-wide operations. For example: “A goal to develop a fossil-fuel transition strategy by 2026.”
- **Distributed Generation/Storage:** Policies related to increasing the capacity and/or local uptake of distributed technologies, like solar panels or battery storage. For example: “A plan to increase cumulative total megawatts (MW) of energy storage capacity to at least 1,750 MW by 2030.”
- **Grid Stability:** Policies related to increasing the reliability and reach of the local energy grid through the integration of clean sources into the local energy matrix. For example: “A plan to develop a Microgrid Strategy to enhance energy resilience in critical areas.”

Buildings

- **Building GHG Reduction:** Policies related to reducing GHG emissions in the buildings sector. For example: “An ordinance to set a GHG emissions reduction target of 40% by 2030 from 2005 levels in commercial and residential buildings.”
- **Building Efficiency:** Policies related to decreasing energy consumption and associated GHG emissions through efficiency measures such as heating and cooling upgrades, insulation, or smart controls in buildings. For example: “A plan to reduce building energy consumption by 50% by 2050,” or “A goal to promote access to incentive programs for energy efficiency improvements.”
- **Building Electrification:** Policies related to increasing the share of electric systems and appliances in buildings to transition buildings away from direct-use of fossil fuel sources. For example: “A resolution to replace 80% of natural gas and heating oil use in residences with electric heating and cooling systems by 2050.”
- **Building Codes:** Policies that mandate minimum compliance requirements for the design and retrofitting of buildings. For example: “An ordinance to require that all commercial buildings shall comply with the 2021 IECC.”
- **Building Standards:** Policies that establish energy and/or emissions performance targets for new or existing buildings and appliances, often through certification requirements. For example: “An ordinance that requires LEED certification for all public buildings at a level of ‘Silver’ or higher.”

Transportation

- **Transportation GHG Reduction:** Policies related to reducing emissions in the transportation sector. For example: “A goal to reduce transportation emissions by 25% by 2030 using a base year of 2015.”
- **Mode Shift:** Policies related to shifting transportation demand from higher-emission modes, such as internal combustion engine-powered vehicles, to lower emission modes, such as public transit, walking, or cycling. For example: “A target to increase the share of trips made by public transit by 50%.”
- **Electric Vehicle Adoption:** Policies related to increasing the use of electric vehicles (EVs) by residents and businesses. For example: “Facilitate an increase of clean vehicle ownership in the city to 25% through financial and regulatory incentives.”
- **Electric Vehicle Infrastructure:** Policies related to the deployment and expansion of infrastructure needed to support EV uptake. For example: “A plan to install 150 public EV charging stations across the city by 2030.”
- **Municipal Fleet Procurement:** Policies related to purchasing and transitioning municipal government fleets to lower or zero-emission vehicles. For example: “A commitment that 100% of new municipal fleet purchases will be zero-emission vehicles by 2030.”
- **Electric Bus Procurement:** Policies related to the purchase and deployment of electric buses to replace diesel- or natural gas-powered buses. For example: “A target to convert the entire city bus fleet to electric buses by 2035.”
- **Clean Fuels:** Policies related to promoting the use of lower-carbon or zero-carbon fuels, such as hydrogen, sustainable biofuels, or advanced synthetic fuels. For example: “A goal to convert 75% of the public transit fleet to clean natural gas.”

Industry

- **Industrial GHG Reduction:** Policies related to reducing emissions in the industry sector. For example: “A goal to reduce industrial emissions by 25% by 2030 using a base year of 2015.”
- **Industrial Energy Efficiency:** Policies related to improving energy efficiency in industrial processes in order to reduce energy consumption. For example: “A goal to reduce energy consumption in industrial facilities by 10% by improving energy efficiency.”
- **Industrial Waste Reduction:** Policies related to minimizing the waste generated in industrial processes, through improved production, recycling, material reuse, and resource efficiency, and less pollutive practices. For example: “A target to reduce industrial waste generation by 25% by 2030, through recycling and improved manufacturing practices.”

Waste

- **Waste Reduction & Diversion:** Policies related to reducing and diverting waste from landfills through recycling, composting, reuse, and circular economy initiatives. For example: “A goal to compost 50% of biodegradable waste by 2030.”

- **Brownfield Redevelopment:** Policies related to the cleanup and redevelopment of previously contaminated or underutilized industrial and commercial sites. For example: “A program to redevelop 12 brownfield sites by 2028 for commercial, residential, and mixed-use purposes.”

Lands

- **Tree Canopy & Vegetation:** Policies related to increasing or maintaining tree and/or other vegetation cover in the city. For example: “A goal to increase tree canopy to 35% by 2030.”
- **Agriculture:** Policies related to mitigating emissions-intensive agricultural practices, such as through land management practices and sustainable food procurement. For example: “An objective to sequester carbon through local land management practices.”

Economy-wide

- **GHG Emissions Reduction:** Policies related to reducing emissions across all economic sectors. For example, “A plan to achieve community-wide net zero emissions by 2050.”
- **Sustainable Procurement:** Policies related to the purchase of sustainable and green alternatives. For example: “An executive order to propose purchasing policies that prioritize sustainable, non-toxic, and circular economy-aligned goods and services.”
- **Funding/Financing:** Policies or programs that establish revenue sources for funding or financing for climate-related projects. For example: “A fund that invests in projects that reduce carbon emissions, such as implementing energy efficiency upgrades or expanding green workforce careers, across the community”.

B. Policy Instruments

Given that policy instruments vary substantially in their levels of authority and enforcement power, we evaluate each instrument’s contribution to city-level climate action by examining three core characteristics of local regulatory strength: **scope, enforceability, and effectiveness**. Scope refers to the breadth of a policy instrument’s application across a locality, enforceability to the extent it is binding by law, and effectiveness to its ability to produce an intended policy outcome. The rating for each characteristic was determined by qualitatively evaluating the existing literature on each policy instrument. Overall regulatory strength was then derived by averaging the rating across the three characteristics and comparing those averages across instruments. This assessment approach provides a general approximation of each instrument’s regulatory strength.

Ordinance: a local law incorporated into the local government’s municipal code, enacted by a city authority and typically requiring a public hearing and a voting process.¹ Ordinances are treated as permanent legislative actions and can only be amended or repealed through local legislative action.² Examples include building energy codes, solar-ready mandates, and electric vehicle infrastructure zoning requirements.

- **Relative regulatory strength: High**
 - *Broad Scope:* Ordinances are local laws that apply community-wide and can be wide-ranging in the issues they address,³ although state law can create limitations.⁴

- *High Enforceability:* Cities have the legal authority to enforce ordinances, although state and local law determines what type of enforcement is allowed (i.e., civil, administrative, criminal, or citizen enforcement). Ordinances also typically contain enforcement and implementation clauses.⁵
- *High Effectiveness:* Ordinances can directly require action through implementation clauses and are a powerful regulatory tool for cities to use.⁶

Financial Incentive Program: a monetary tool that indirectly or directly encourages a desired practice. Examples include rebates for qualifying new electric vehicle owners, tax benefits for residential building upgrades, or discounted or no-cost public transportation passes.

- **Relative regulatory strength: Medium**

- *Moderate Scope:* Often subsector-specific with qualification criteria.
- *Moderate Enforceability:* Program participation is often voluntary, but incentives can be binding via tax liens (e.g., PACE),⁷ grant contracts, and regulations.⁸
- *Moderate Effectiveness:* Drives short-term action by mitigating financial barriers and can be scaled up with increased funding, but effectiveness is highly dependent on scale, amount, and pairing with city mandates.^{9,10,11}

Resolution: a formal, non-legislative expression of a stance or intention that may direct a city's internal operations and is typically effective immediately; generally addresses temporary or special matters.²

- **Relative regulatory strength: Medium**

- *Moderate Scope:* Can apply community-wide or focus primarily on municipal operations.
- *Low Enforceability:* Generally not legally enforceable unless the resolution is internal, administrative, or incorporated into an enforceable ordinance.¹²
- *Moderate Effectiveness:* Resolutions signal local political commitment and can lay the groundwork for more durable policies, but on their own, they carry minimal legal weight and limited capacity to drive change.¹³

Plan: a comprehensive document outlining a city's goals for a specified period and intended strategies to achieve it. Examples include climate action plans, comprehensive plans, and waste management plans.

- **Relative regulatory strength: Low-to-Medium**

- *Broad Scope:* Sector-wide and/or economy-wide, with municipal and/or community-wide climate action goals.¹⁴
- *Low Enforceability:* Guides action but are typically not enforceable unless adopted into municipal law.^{15,16}
- *Low Effectiveness:* Enable climate action but require implementing policies and continued monitoring in order to have an impact; few achieve targets standalone.¹⁷

Non-Financial Incentive Program: a non-monetary tool that offers benefits or advantages for a desired outcome. Examples include expedited permitting for new buildings with rooftop solar, technical assistance for heat pump installations, and public recognition for green sustainable businesses.

- **Relative regulatory strength: Low-to-Medium**

- *Moderate Scope:* Often subsector-specific with qualification criteria.
- *Moderate Enforceability:* Program participation is often voluntary, but nonfinancial incentives can be binding when backed by an ordinance or implementing rule.
- *Low to Moderate Effectiveness:* Effective as a short-term enabling tool,¹⁸ but long-term effectiveness requires pairing with city mandates. Effectiveness also requires successfully tailoring to existing barriers within locality-specific contexts.¹⁹

Executive Order: directive issued by the mayor or county executive that manages operations of the local government.

- **Relative regulatory strength: Low**

- *Narrow Scope:* Generally mayoral power can only direct municipal operations.²⁰
- *High Enforceability:* They carry legal weight and are enforceable.
- *Low Effectiveness:* Although mayoral powers vary by city, mayoral executive orders are limited in scope and can be reversed by a future mayor or constrained by city or state law, making them minimally effective tools for long-term action.²¹

Administrative Directive: an internal management policy or procedure adopted by a city agency or department.

- **Relative regulatory strength: Low**

- *Narrow Scope:* Only affects municipal operations.
- *Moderate Enforceability:* Directives can be internally binding, but practical enforcement depends on statutory authority,²² the chosen enforcement mechanism, and agency capacity.²³
- *Low Effectiveness:* While city directives can be useful for improving operational efficiency, limited scope and enforceability reduce long-term effectiveness.²⁴

Guidelines: a non-binding, recommended set of best practices outlined by a government to influence the decisions of individuals and organizations toward a desired outcome. Examples include urban design guidelines and climate resilience guidelines.²⁵ Only two policies using guidelines were found; they are included in the database, but were not included in the analysis.

- **Relative regulatory strength: Low**

- *Moderate Scope:* May be city-wide or sector-specific, and can apply to the public and/or private sectors.
- *Low Enforceability:* Guidelines are generally nonbinding, advisory documents.
- *Low Effectiveness:* Can gain force through ordinance adoption, but have limited standalone impact.

C. Policy Collection Methodology

The database contains over 1,700 policies and programs collected from localities across the United States. Our analysis then examines the Census-defined incorporated places in each state that contribute at least 2.5% of their respective state's fossil fuel carbon emissions.²⁶ The 2.5% floor maximizes the number of states included while also ensuring the incorporated places with meaningful emissions percentages are represented. In total, this resulted in the analysis of 1,406 policies from 157 cities across 48 states. Wyoming is excluded because no cities meet the emissions threshold, and Hawaii is excluded because it does not have any incorporated places recognized by the Census Bureau.

The 48 states are divided into three tiers according to a novel state tiering index, created by Zhao et al. (2025), which categorizes states based on their propensity to adopt high-ambition climate action.²⁷ The index includes four weighted metrics: state climate policy score (60%), emissions trend (20%), local climate policy score (10%), and climate commitment score (10%). Tier 1 states represent the highest-ambition states that have led the way on climate action. Tier 2 states have a moderate level of climate ambition, though not at the same scale or pace as Tier 1 states. Tier 3 states have the lowest relative level of climate ambition, having taken limited steps to advance climate action.

The 1,406 policies and programs collected span across six economic sectors in addition to economy-wide: electricity, buildings, transportation, industry, waste, and lands. To capture the breadth of climate action within each sector, we divided each into subsectors, or policy areas. Policy collection involved manual searches through policy databases, city websites and publications, newspapers, and utility websites. Each policy was categorized into one of the following instrument types: ordinance, financial incentive program, resolution, plan, non-financial incentive program, executive order, administrative directive, or guidelines. The database clearly identifies the sector and subsector of city climate actions and the policy instruments through which cities are enabling action.

The database intentionally excludes specific projects, as these fall under the implementation side of climate action. It also excludes funding applications, which are not considered to be explicit policy decisions. However, if a city passed legislation supporting a relevant project or funding application, that legislation was included in the database. In addition, while zoning is sometimes classified as a land-use regulation, the database categorizes zoning and land use planning policies under the sector in which they are intended to achieve emissions reductions (e.g., electric vehicle infrastructure ordinances are classified as transportation sector policies).

It is important to note that this database is not intended to represent an exhaustive collection of city policies, as cities continually revise, update, and implement new measures and climate action plans. Nevertheless, this compilation can serve as a policy toolkit for municipal and county policymakers and practitioners, illustrating the range of strategies local governments can pursue to reduce greenhouse gas emissions. Cities should continue the iterative work required to achieve the collective goal of limiting global warming to 1.5 degrees.

D. State Subsector Mapping

In order to compare city policies with state policies, the subsectors used to categorize city policies were mapped against the policy categories used in Climate XChange's State Climate Policy Dashboard.²⁸ All state policy categories were matched to existing city policy subsectors, with Low NO_x Omnibus Rules being the only category that was added because it did not fit into an existing subsector.

Table D1. Categorization of State Policy Categories from Climate XChange's State Climate Policy Dashboard.

Sector	State Subsector Included in CGS Analysis	State Policy Categories from the State Climate Policy Dashboard
Building	Building Codes	Residential Energy Codes
Building	Building Codes	Commercial Energy Codes
Building	Building Codes	Stretch Building Energy Codes
Building	Building Standards	Building Performance Standards
Building	Building Standards	Appliance Standards
Building	Building Standards	Clean Heat Standards
Building	Building Efficiency	Energy Efficiency Resource Standards (EERS)
Building	Building Efficiency	Weatherization Funding
Building	Building Efficiency	Property Assessed Clean Energy (PACE)
Building	Building Electrification	All-Electric Buildings
Electricity	Distributed Generation/Storage	Distributed Generation Carve-out
Electricity	Clean/Renewable Energy	Clean Energy Plans
Electricity	Electricity GHG Reduction	Electricity Greenhouse Gas Emissions Reduction Targets
Electricity	Distributed Generation/Storage	Community Choice Aggregation
Electricity	Distributed Generation/Storage	Energy Storage Targets
Electricity	Grid Stability	Interconnection Standards
Electricity	Fossil Fuel Phaseout	Coal Phaseouts
Electricity	Fossil Fuel Phaseout	Coal Plant Securitization
Electricity	Clean/Renewable Energy	Clean Energy and Renewable Portfolio Standards
Electricity	Distributed Generation/Storage	Shared Renewables

Sector	State Subsector Included in CGS Analysis	State Policy Categories from the State Climate Policy Dashboard
Electricity	Distributed Generation/Storage	Net Metering
Electricity	Grid Stability	Enabling ATTs and GETs
Electricity	Distributed Generation/Storage	Consolidated State Siting and Permitting Authority
Electricity	Grid Stability	Promoting Transmission in Existing Rights-of-Way
Transportation	Clean Fuels	Low-Emission Vehicle (LEV) Standards"
Transportation	Electric Vehicle Adoption	Zero-Emission Vehicle (ZEV) Mandates
Transportation	Electric Vehicle Adoption	Electric Vehicle Rebates
Transportation	Low NO _x Omnibus Rules	Low NO _x Omnibus Rules
Transportation	Electric Vehicle Adoption	Medium- and Heavy-Duty (MHD) Zero-Emission Vehicle (ZEV) Mandates
Transportation	Electric Vehicle Adoption	Medium- and Heavy-Duty Electric Vehicle (EV) Rebates
Transportation	Municipal Fleet Procurement	Public Fleet Electric Vehicle (EV) Procurement Targets
Transportation	Electric Bus Procurement	Electric Bus Procurement Targets
Transportation	Electric Vehicle Infrastructure	Electric Vehicle (EV) Charging Infrastructure Rebates
Transportation	Electric Vehicle Infrastructure	Electric Vehicle (EV) Charging Infrastructure Requirements
Transportation	Electric Vehicle Infrastructure	Electric Vehicle (EV) and EV Charging Infrastructure Plans
Transportation	Clean Fuels	Low Carbon Fuel Standards
Transportation	Transportation GHG Reduction	Transportation Greenhouse Gas Emissions Reduction Targets
Transportation	Mode Shift	Bicycle Friendly States

E. Incorporated Places

The list of Census-defined incorporated places that contribute to greater than 2.5% of their state's fossil fuel carbon emissions, based on data from the Vulcan Project.²⁹ The associated analysis examines only localities listed in Table E1, while additional cities and counties included in the database are present.

Table E1. List of Census-defined incorporated places and the percentage of their state's fossil fuel carbon emissions. These incorporated places met the 2.5% threshold and were included in the analysis.

State	Name of Incorporated Place ³⁰	Percentage of State's Emission	State	Name of Incorporated Place ³⁰	Percentage of State's Emission
AK	Anchorage municipality	13.3%	AZ	Tempe city	3.2%
AK	Fairbanks city	12.8%	AZ	Tucson city	8.9%
AK	Juneau city and borough	2.7%	CA	Los Angeles city	8.8%
AK	Kodiak city	7.6%	CA	Monterey city	4.5%
AK	Unalaska city	5.0%	CA	San Diego city	3.1%
AL	Birmingham city	4.8%	CO	Aurora city	5.0%
AL	Mobile city	3.8%	CO	Colorado Springs city	6.5%
AR	Fort Smith city	3.3%	CO	Denver city	16.9%
AR	Little Rock city	5.4%	CO	Greeley city	2.8%
AZ	Chandler city	2.7%	CT	Bridgeport city	2.6%
AZ	Mesa city	5.2%	CT	Danbury city	2.7%
AZ	Phoenix city	17.6%	CT	Hartford city	2.8%
AZ	Scottsdale city	3.2%	CT	New Haven city	2.8%

State	Name of Incorporated Place ³⁰	Percentage of State's Emission	State	Name of Incorporated Place ³⁰	Percentage of State's Emission
CT	Stamford city	2.5%	ID	Nampa city	6.4%
DE	Dover city	6.3%	ID	Pocatello city	3.5%
DE	Milford city	5.2%	ID	Twin Falls city	2.7%
DE	Newark city	4.7%	IL	Chicago city	14.5%
DE	Wilmington city	10.5%	IN	Fort Wayne city	2.6%
FL	Jacksonville city	6.8%	IN	Indianapolis city (balance)	10.2%
FL	Tampa city	2.9%	KS	Kansas City	6.0%
GA	Atlanta city	6.4%	KS	Lenexa city	3.2%
GA	Augusta-Richmond County consolidated government (balance)	3.0%	KS	Olathe city	4.0%
IA	Cedar Rapids city	4.4%	KS	Overland Park city	4.6%
IA	Davenport city	3.1%	KS	Topeka city	3.4%
IA	Des Moines city	4.3%	KS	Wichita city	12.0%
ID	Boise city	15.8%	KY	Lexington-Fayette urban county	6.1%
ID	Caldwell city	3.4%	KY	Louisville/Jefferson County metro government (balance)	11.4%
ID	Idaho Falls city	4.0%	LA	Baton Rouge city	5.4%
ID	Meridian city	5.1%	LA	New Orleans city	4.1%

State	Name of Incorporated Place ³⁰	Percentage of State's Emission	State	Name of Incorporated Place ³⁰	Percentage of State's Emission
LA	St. Gabriel city	2.7%	MT	Helena city	2.5%
MA	Boston city	10.0%	MT	Missoula city	4.0%
MD	Baltimore city	13.1%	NC	Charlotte city	7.6%
ME	Auburn city	4.9%	NC	Greensboro city	2.7%
ME	Bangor city	2.8%	NC	Raleigh city	3.1%
ME	Portland city	5.6%	ND	Bismarck city	3.4%
ME	South Portland city	3.0%	ND	Fargo city	10.5%
MI	Detroit city	6.6%	ND	Grand Forks city	4.1%
MN	Bloomington city	2.6%	NE	Lincoln city	8.3%
MN	Minneapolis city	6.9%	NE	Omaha city	16.5%
MN	St. Paul city	4.5%	NH	Concord city	4.2%
MO	Kansas City	7.2%	NH	Manchester city	9.0%
MO	St. Louis city	5.1%	NH	Nashua city	6.2%
MS	Jackson city	4.9%	NH	Portsmouth city	2.6%
MT	Billings city	4.6%	NH	Rochester city	2.5%
MT	Bozeman city	2.6%	NJ	Elizabeth city	2.7%
MT	Butte-Silver Bow (balance)	3.7%	NJ	Jersey City	3.3%
MT	Great Falls city	3.3%	NJ	Newark city	5.0%

State	Name of Incorporated Place ³⁰	Percentage of State's Emission	State	Name of Incorporated Place ³⁰	Percentage of State's Emission
NM	Albuquerque city	20.4%	PA	Philadelphia city	7.0%
NM	Las Cruces city	3.3%	RI	Cranston city	7.2%
NV	Carson City	3.3%	RI	East Providence city	4.7%
NV	Henderson city	8.3%	RI	Pawtucket city	4.7%
NV	Las Vegas city	15.4%	RI	Providence city	13.2%
NV	North Las Vegas city	7.4%	RI	Warwick city	8.2%
NV	Reno city	11.2%	RI	Woonsocket city	2.6%
NV	Sparks city	4.6%	SC	Charleston city	3.4%
NY	New York city	31.8%	SC	Columbia city	3.5%
OH	Cincinnati city	2.7%	SC	North Charleston city	4.0%
OH	Cleveland city	3.6%	SD	Aberdeen city	3.1%
OH	Columbus city	5.8%	SD	Brookings city	3.3%
OK	Norman city	2.7%	SD	Rapid City	10.9%
OK	Oklahoma City	18.8%	SD	Sioux Falls city	18.5%
OK	Tulsa city	11.1%	SD	Watertown city	3.5%
OR	Eugene city	2.6%	SD	Yankton city	2.5%
OR	Portland city	15.1%	TN	Chattanooga city	7.0%
OR	Salem city	2.9%	TN	Kingsport city	6.4%

State	Name of Incorporated Place ³⁰	Percentage of State's Emission	State	Name of Incorporated Place ³⁰	Percentage of State's Emission
TN	Knoxville city	4.4%	UT	West Valley City	5.7%
TN	Memphis city	11.0%	VA	Chesapeake city	3.1%
TN	Nashville-Davidson metropolitan government (balance)	11.4%	VA	Newport News city	3.2%
TX	Austin city	2.7%	VA	Norfolk city	3.5%
TX	Dallas city	5.0%	VA	Richmond city	3.4%
TX	Fort Worth city	3.2%	VA	Virginia Beach city	4.1%
TX	Houston city	11.1%	VT	Burlington city	5.5%
TX	San Antonio city	4.2%	VT	Rutland city	3.1%
UT	Ogden city	3.1%	VT	South Burlington city	7.0%
UT	Orem city	2.7%	WA	Seattle city	7.8%
UT	Provo city	2.8%	WA	Tacoma city	2.5%
UT	Salt Lake City	11.6%	WI	Madison city	3.5%
UT	South Salt Lake city	2.5%	WI	Milwaukee city	6.5%
UT	West Jordan city	2.9%			

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