

What cities do best

How to maximize the role of cities in a low-carbon future



Key findings

Action by city governments is essential for achieving deep reductions in global greenhouse gas (GHG) emissions. Previous research has shown that cities – using policy levers already at their disposal – could reduce annual GHG emissions by up to 3.7 gigatonnes (Gt) CO₂e in 2030, and up to 8 Gt CO₂e in 2050.*

Many cities are already engaged in pioneering efforts to achieve these reductions. **Greater support from national governments could help realize this potential more fully, quickly, and cost effectively.** Maximizing GHG reductions in urban areas will require concerted actions at all levels of government. **With greater policy coordination, cities could focus on roles and actions for which they are highly capable and best positioned.** We find that under a coordinated approach designed to achieve deep GHG reductions:

- For approximately **20 percent** of urban GHG abatement potential, cities should be **policy leaders and architects**. The greatest opportunities here are in the

passenger transport sector, and include improved spatial planning, promotion of walking and bicycling, enhanced transit system development, and more efficient transportation management.

- For another **40 percent** of urban abatement potential, the ideal role for cities is to be **critical implementers** of nationally applied policies. Opportunities here are greatest in the residential and commercial buildings sectors.
- For the remaining **40 percent** of urban abatement, cities can be **strategic partners**, taking crucial independent actions to enhance the effectiveness of policies enacted at higher levels of government. For these diverse opportunities, cities could enhance national efforts through incentives, education, permitting, and infrastructure development.

A vital role for national governments will be to help coordinate and enable effective action by cities in all of these capacities.

* Erickson and Tempest 2014; see methodology section page 8 for details

Recent commitments by national governments to reduce GHG emissions represent a major step forward for global mitigation efforts, but fall well short of what is needed to limit global warming to less than 2°C. Many mayors and other leaders have called for subnational governments to help bridge the gap, and initiatives such as the Compact of Mayors are encouraging cities to make ambitious climate commitments.

Indeed, cities can contribute substantially to both global and national climate policy goals. Investments in urban energy efficiency, for example, not only reduce energy costs, but may reduce the need for costly energy supply investments. Data from prior analysis suggest that urban building efficiency measures could avoid the need for up to 260 GW of potentially costly power supply in 2030 (and up to 730 GW in 2050). Overall, urban mitigation actions – specifically, actions that most city governments have the power to undertake – could contribute up to 15% of the global GHG reductions required to stay on a 2°C pathway.*

Cities are already playing a crucial role in climate action. They are policy innovators, testing new approaches, demonstrating best practices, helping to build capacity and political support for ambitious national action, and achieving GHG reductions in their own right. It is thus important for national governments and the international community to foster local-level action and experimentation as a means of

advancing climate policy. The international community could help by establishing more effective frameworks for supporting and coordinating subnational climate action. National governments, in turn, could do much more to enable local government actions.

Even where cities have political will and resources, however, they may face realistic limits to their ambitions, especially if a majority of other cities are not similarly engaged and coordinated in pursuing GHG reductions. Lack of coordinated action amongst municipalities can lead to free-riding, where some cities refrain from action in expectation that they will benefit from the actions of others. Emissions “leakage” is another concern, since mitigation actions in some cities may simply cause economic activity to shift to other jurisdictions. And while there is much that cities can do to address climate change, it may be difficult for cities to achieve the economies of scale and transformative outcomes obtainable by national governments.

Achieving deep GHG reductions in urban areas is thus likely to require concerted actions at multiple levels of government. **As policymakers consider how to fully leverage urban mitigation potential, their goal should be achieve more comprehensive action and engage all levels of government, allowing cities to focus on actions for which they are best suited.**

Cities as policy leaders: Urban transportation in U.S. cities

Multiple U.S. cities are taking the lead to promote compact urban forms and transit-oriented development. Their efforts could be expanded with greater access to funding. Fully unlocking U.S. mitigation potential for urban passenger transport will require a vertically coordinated approach that focuses national funding priorities on public transit, provides greater funding overall for urban planning and transit development, and adopts national policies to encourage more private investment in sustainable urban infrastructure.



Photo: SounderBruce/Flickr

* Erickson and Tempest 2014

Cities as implementers: Energy savings targets in China

In China, cities are tasked with implementing national and provincial energy and carbon intensity targets. There are many actions that cities can take – from developing local industrial energy plans and targets, to providing technical assistance and incentives – to help meet these targets. A key role for cities is ensuring compliance with national building energy codes. The national government provides resources to local jurisdictions to assist with building code enforcement and improve oversight of industrial energy management programs. More could be done to bolster local capacities, however, including development of energy auditing capacity.

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An ideal action plan: leveraging what cities do best

Under an ideal policy scenario to achieve deep GHG reductions, national, state, and local governments would coordinate policies for maximum ambition, efficiency and effectiveness.

In this scenario, city governments would still be essential actors. Although countries differ greatly in their delegation of authority to lower levels of government, there are many areas where local governments are likely to have a

comparative advantage in the design, development, implementation, enforcement, and evaluation of climate change policies. Action by city governments is particularly valuable where policies need to be tailored to local circumstances and responsive to local constituencies, and where policies relate to already-existing city government responsibilities and goals. Higher levels of government are best positioned to act where economies of scale are possible, where cross-jurisdictional coordination is necessary, and where standardized approaches are needed to avoid free-riding and leakage of emissions between cities. These differences are illustrated in Table 1.

Table 1. When is city or national involvement in climate policy most appropriate?

City government involvement in climate policy is appropriate where success depends on...	National or state involvement in climate policy is appropriate where success depends on...
<ul style="list-style-type: none"> • Pre-existing local government capacities (e.g., in spatial planning, transit system development, urban infrastructure, etc.) • Access to local data and information • Mobilization of local resources • Responsiveness and tailorization to local needs and circumstances • Communication and engagement with local stakeholders • Adaptability to changing (local) conditions • Integration with other local policy objectives (e.g., reduced pollution; economic development; etc.) • Targeted mitigation measures (contained within city boundaries) with low leakage risks 	<ul style="list-style-type: none"> • Achieving economies of scale (e.g., to reduce administrative costs, or transaction costs incurred by regulated parties) • Economy-wide market transformation effects (e.g., for energy efficiency measures) • Coordinating actions across multiple jurisdictions (e.g., cross-jurisdictional infrastructure projects) • Avoiding in-country leakage of emissions • Avoiding free-riding or “race to the bottom” behavior among subnational jurisdictions

Coordinating roles for maximum ambition

In a coordinated and “vertically integrated” approach to urban GHG abatement, city governments will exercise different roles depending on the types of policies and actions required.

In some cases, city governments should be the **primary policy architects and leaders**. Spatial planning, transit systems, and waste management, for example, are areas where city governments are likely to have existing technical capacity, where knowledge of local circumstances and stakeholders is paramount, and where emissions leakage risks are minimal. These areas are prime candidates for city government-led action, and where enabling support from national or state governments is still valuable and necessary.

In other cases, city governments are **critical implementers** of policies developed and enacted at higher levels of government. Energy efficiency standards for buildings, appliances, and vehicles, for example, have the greatest impact when they are applied nationally. An ideal strategy would be for national governments to lead policy development by enacting uniform energy efficiency policy frameworks and standards. In a vertically integrated approach city governments still have an important role to play. Cities are ideally positioned to enforce building energy codes, for example, since they already have responsibility for

other types of building inspections. City governments can also tailor national standards to local conditions.

Finally, city governments can be important **strategic partners**, pursuing separate, locally targeted actions that help to maximize the impact of policies enacted at higher levels of government. Policies to promote adoption of new technologies, for example, often require coordinated actions at multiple levels of government to be successful. Maximizing adoption of technologies like rooftop solar panels or electric vehicles may depend on a policy suite of national subsidies, incentives, and tax reforms; national-or state-level reform of electricity tariffs and rate structures; and local build-out of electrical distribution and/or charging infrastructure. In these situations, city governments may have important complementary roles involving education and outreach, incentive programs, and permitting and zoning related to local infrastructure.

The respective roles of national governments under a vertically integrated approach will vary in a similar manner. Depending on the type of action required, national governments may serve as policy architects, as implementers and enforcers of policies, and as coordinators of action where application of a policy is required across multiple subnational jurisdictions. Some examples are presented in Table 2. To maximize total GHG reductions in all urban areas, national governments should adopt stringent and ambitious national standards. This means cities could avoid having to “raise the bar” on national standards and instead focus on effective local implementation and complementary action.

Table 2. Government Roles in a Vertically Integrated Approach to Urban GHG Mitigation

City Government Role	City Role Examples	Corresponding National Government Role
<p>Policy Architect & Leader <i>City government is the primary body responsible for policy design, formulation, application, implementation, and enforcement</i></p>	<ul style="list-style-type: none"> • Urban spatial planning • Design/development of transit systems or transportation policies • Development of urban infrastructure projects • Waste management regulations 	<ul style="list-style-type: none"> • Establish national policy frameworks • Enable city government action through: <ul style="list-style-type: none"> • Capacity building & information sharing • Access to funding • Legal & policy alignment
<p>Critical Implementer <i>City government is responsible for key application, implementation, or enforcement actions related to a policy</i></p>	<ul style="list-style-type: none"> • Building code implementation & compliance-checking • Implementation of regionally coordinated, cross-jurisdictional infrastructure projects or transportation policies 	<ul style="list-style-type: none"> • Policy design and/or standard setting • Regional coordination • Enabling city government implementation role (through capacity building, funding, or legal reform)
<p>Complementary Partner <i>City government undertakes separate, complementary actions that contribute to the effectiveness, uptake, penetration, or success of a policy led by higher levels of government</i></p>	<ul style="list-style-type: none"> • Complementary information & outreach, certification, and incentive programs for improved building energy efficiency • Permitting or active installation of electric vehicle charging stations • Permitting, tax incentives, and/or subsidies for commercial & residential distributed energy resources (incl. solar PV) 	<ul style="list-style-type: none"> • Policy design and/or standard setting • Primary implementation and enforcement • Coordination/integration of actions within and across different levels of government • Enabling city government complementary actions (through capacity building, funding, or legal reform)

A key role for national governments: enabling city action

In nearly all cases a vital role for national governments is to help coordinate and enable effective action at lower levels of government. Even where cities are best positioned to act, they often face constraints in terms of budgets, technical capacity, or even legal authority. National governments can help to remove these constraints. They can also provide general policy direction and establish incentives that promote and enhance city-level action. Some key “enabling actions” that may be effective under a vertically integrated approach include:

- **Establishing national policy frameworks and incentive structures.** National political and policy direction is often a strong enabler of urban GHG mitigation, especially when accompanied by efforts to coordinate policy formulation at multiple levels of government (see box, below).. Fiscal and political incentive mechanisms can also be effective for enabling city-level action.
- **Providing, or improving access to, financial resources.** In many cases city governments are best positioned to undertake mitigation measures, but they are budget constrained. Relative to national governments, cities often have limited revenues and lack

access to affordable financing. National governments can address both these shortcomings by providing direct funding support and enacting reforms to improve cities’ access to private capital.

- **Strengthening capacity and improving governance structures.** City government staff may lack skills, expertise, or information that would allow them to effectively undertake specific kinds of mitigation actions. Often, these deficits will be most acute for actions that fall outside a city’s typical governing roles and responsibilities. Through training and outreach programs, national governments can assist local governments in obtaining the technical capacity they need. In addition, national governments can promote better sharing of information and expertise among different levels of government to enable “smarter” policy design and implementation. Establishing integrated institutional structures and new coordinating bodies can also improve governance related to urban-scale GHG emissions.
- **Aligning policies and eliminating conflicts.** In some cases, national or state policies may actively conflict with city government priorities, or otherwise inhibit city-level actions. For example, cities may lack the ability to adopt building codes, vehicle standards, or other kinds of mandates that go beyond national requirements. Aligning policies and properly delegating authority can enable cities to pursue urban mitigation more effectively.

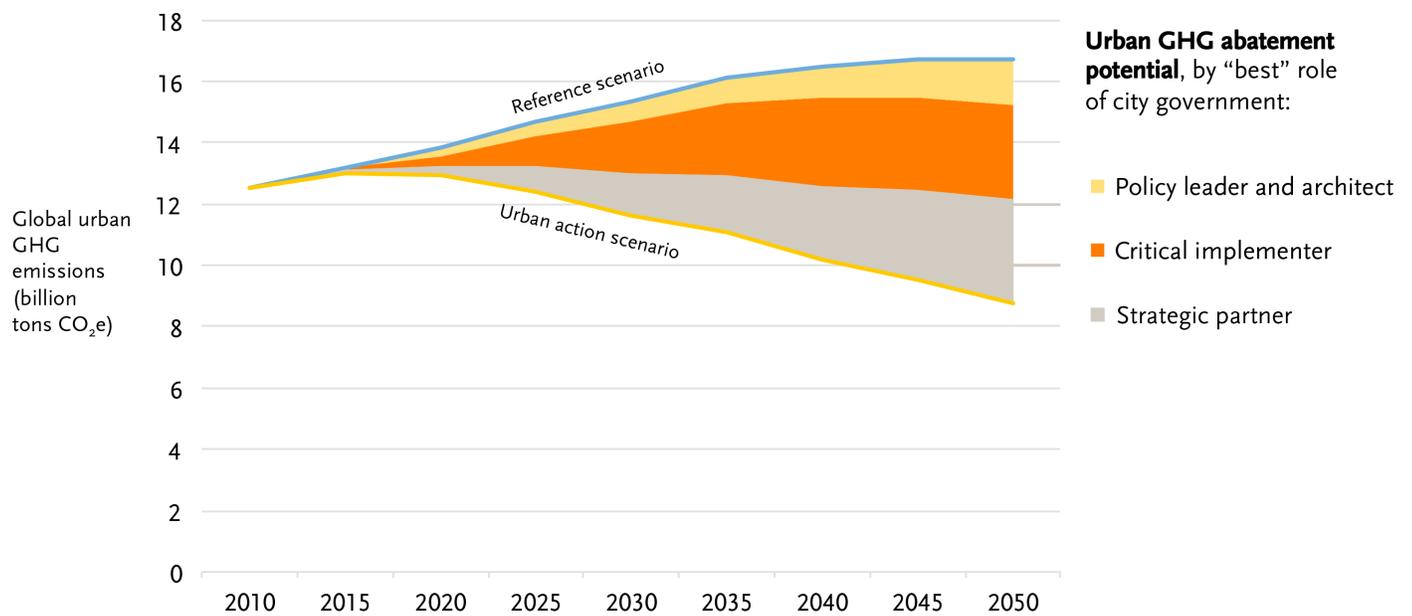
Cities as strategic partners: Enabling distributed renewables in Brazil

In 2012, the Brazilian federal government passed legislation authorizing net metering for residential and commercial solar installations up to 1 MW in capacity. Local governments can enhance the effect of this legislation through regulation, incentives, and education. Specific opportunities include facilitating permitting of rooftop solar installations and providing property tax incentives. Cities could further promote distributed solar through effective communication and outreach to households, as well as convening municipal corporations and builders, developers, and architects.



Photo: © Diego Torres Silvestre/Flickr

Figure 1. Urban GHG Abatement Potential by City Government Role under a Vertically Integrated Approach



Maximizing coordination to achieve maximum abatement

For this analysis, we considered how best to align government action at all levels to maximize the breadth and efficiency of urban GHG abatement (estimated in prior studies – see methodology section for further detail, p. 8). For each segment of urban mitigation potential, we identified the most appropriate roles for city government (Figure 1). We then assessed their needs with respect to funding (“Financial Support”), technical capacity and information sharing (“Capacity”), and policy coordination or legal authorization (“Policy Alignment”) using a high (●), medium (◐), or low (○) rating.

For approximately 20 percent of urban GHG abatement potential, cities should be policy leaders and architects, with supporting actions from national governments as appropriate. **Here, effective vertical integration will require national governments to enable cities to take action.** These city-led reduction opportunities are concentrated in the passenger transport sector, and include improved spatial planning, promotion of walking and bicycling, enhanced transit system development, and more efficient transportation management (Figure 2). The largest near-term reduction opportunity in transportation (0.4 Gt CO₂e in 2030) involves deployment of efficient public transit systems. Here, city governments’ primary need is access to funding and financing. For other passenger transport opportunities, important roles for national governments will be to build up city government capacity and expertise, share information, coordinate regional planning, and adopt legal reforms (where necessary) to enable city actions. Finally, although city governments may be the primary actors, national governments can help to direct city actions by establishing national policy frameworks with clear goals for urban transportation development.

For another 40 percent of urban abatement potential, cities could act as critically important policy implementers. **For effective vertical integration in these areas, national and state governments should establish robust standards or model rules, and delegate aspects of implementation and enforcement to cities.**

Opportunities here are greatest in the residential and commercial buildings sectors. Cities are ideally suited to oversee compliance with building codes and retrofit requirements, especially since this can be combined with standard building inspections. However, as noted above and in Figure 3, national enabling actions are strongly needed for success. In most countries, support is needed to ensure that city governments have sufficient resources and technical capacity to oversee compliance. For building codes in particular, national governments may need to align standards with other energy policies and requirements to avoid conflicting directives.

For the remaining 40 percent of urban abatement, cities can take crucial actions to enhance the effectiveness of policies enacted at higher levels of government. **Here, effective vertical integration will require coordinated, independent actions at multiple levels of government, with local governments strategically complementing and going beyond national actions.**

Relevant policies in this category are as diverse as aggressive appliance, lighting, and vehicle efficiency standards, promoting distributed energy systems in buildings, expanding adoption of electric vehicles, and requiring methane capture and utilization at landfills (Figure 4). City-led complementary actions related to these policies will be similarly diverse, including incentives, education, permitting, and development of relevant infrastructure. Cities frequently have sufficient resources and capacities for these kinds of actions, but steps to build city technical capacity, maintain staffing levels, and authorize action may be necessary in some cases.

Figure 2. Abatement potentials and priority enabling actions where cities are policy leads

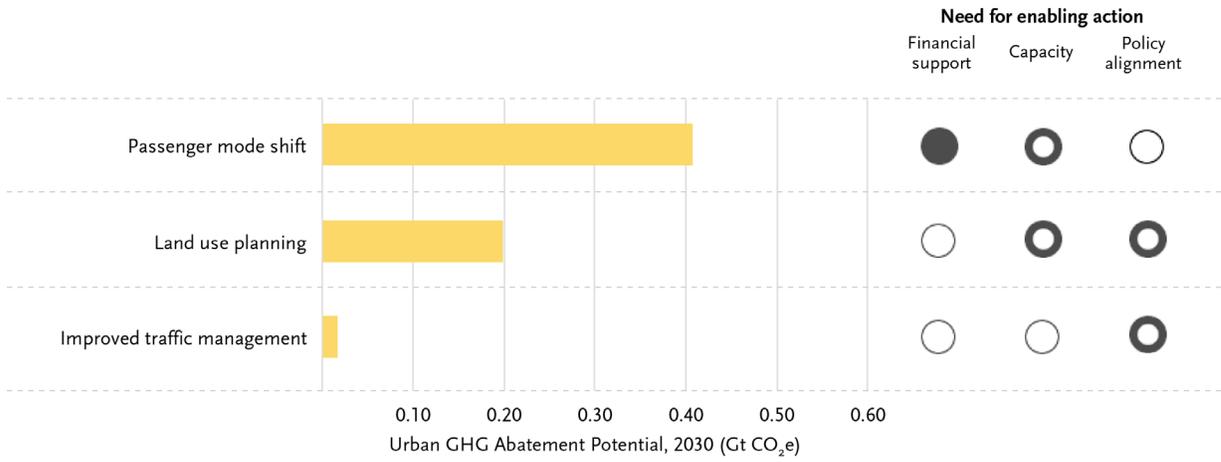


Figure 3. Abatement potentials and priority enabling actions where cities are critical implementers

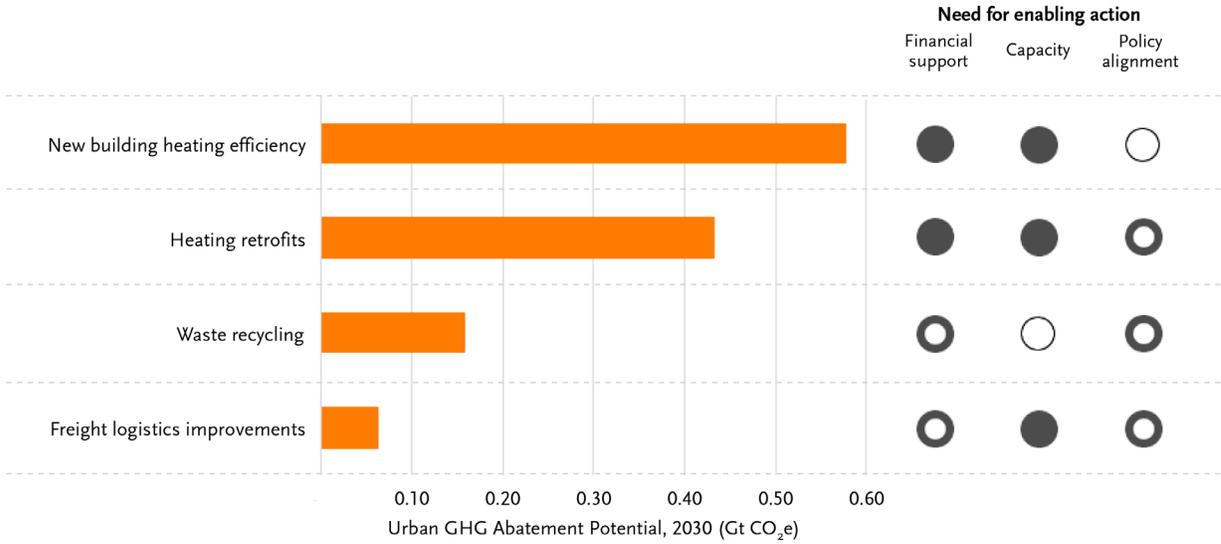
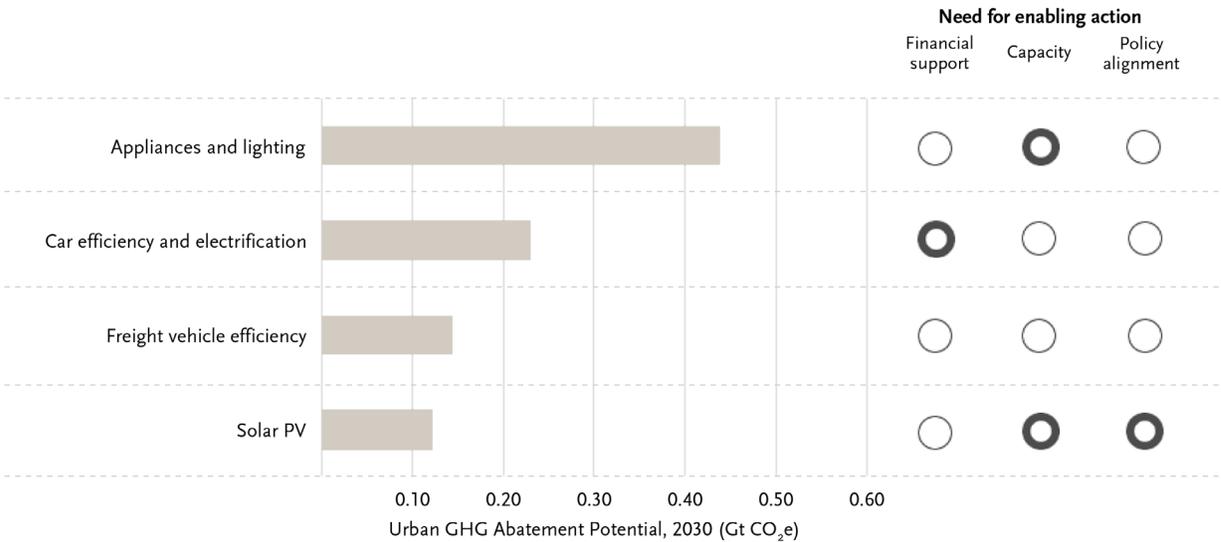


Figure 4. Abatement potentials and priority enabling actions where cities are complementary partners



Rating key:
 high ● medium ◐ low ○

Conclusions

Many cities are already taking aggressive actions to reduce GHG emissions. Under transnational initiatives like the Compact of Mayors, cities are playing the role of policy innovators, helping to build capacity and political support for more ambitious national action, demonstrate best practices, and achieve GHG reductions in their own right.

National governments, in pursuing more vertically integrated policy frameworks, can build on cities existing efforts and help harness the potential for urban GHG abatement. Our survey of opportunities in China, the United States, and Brazil (see page 9) indicates that, while there are elements of vertically integrated policy approaches in all three countries, the greatest need is for greater national ambition to expand the scope of urban policy action and to better enable city governments to be effective. This could include engaging cities in efforts to control additional sources of emissions, as Chinese cities are doing with respect to industrial energy-use targets.

As progressive cities engage with each other and with state and national governments on climate policy, it will be important to work towards integrated policies that achieve deep GHG reductions from urban activities. The assessment presented here can be used as a starting point for prioritizing enabling actions by national governments – or the international community – aimed at enhancing cities' resources, capacities, and authorities related to GHG mitigation. Greater policy coordination will allow cities to focus on what they do best, undertaking roles and actions for which they are highly capable and best positioned.



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Methodology

For this analysis, we took prior estimates of the GHG abatement potential that could be achieved *through city government action** and assessed how best to achieve them if government actions were vertically integrated. Thus, for each segment of potential GHG reductions – in buildings, passenger and freight transport, and waste management – we assigned policy roles to city governments based on their comparative advantage as governing bodies. We also broadly characterized the kinds of enabling actions needed for city governments around the world to play these roles. National policy frameworks and incentive structures would be important in nearly all cases. However, city government needs with respect to funding (“Financial Support”), technical capacity and information sharing (“Capacity”), and policy coordination or legal authorization (“Policy Alignment”) were each assigned a high, medium, or low rating depending on required policy actions. Ratings were applied based on general conclusions in existing literature and the authors' own judgment.

This is a global-level assessment; there could be significant regional variations from the general characterizations presented here. Specific needs will depend on local circumstances, each city's individual capacities and resources, and the national governing environment in which they operate. The overview presented here, however, can help to inform general advocacy and policymaking efforts directed towards promoting more vertically integrated approaches to urban GHG mitigation.

* Erickson, P. and Tempest, K. (2014). *Advancing Climate Ambition: Cities as Partners in Global Climate Action*. A report to the UN Secretary-General from the UN Secretary General's Special Envoy for Cities and Climate Change, in partnership with the C40 Cities Climate Leadership Group, New York. <http://enenvoy.mikebloomberg.com/>

About this report

This report was written by Derik Broekhoff with contributions by Peter Erickson and Carrie Lee of the Stockholm Environment Institute – U.S. Centre, in support of the work program of the UN Secretary General's Special Envoy for Cities and Climate Change. It draws from a longer report, published as SEI Working Paper No. 2015-15, titled *What cities do best: piecing together an efficient global climate governance*. Readers interested in further details of the analysis may wish to consult that report as well as the prior analysis upon which it builds, SEI Working Paper No. 2014-06, *Advancing Climate Ambition: How City-Scale Actions Can Contribute to Global Climate Goals*.

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A survey of priorities in specific countries

Nearly all countries are pursuing climate policies in some form at multiple levels of government. The challenge is to identify major gaps and strengthen institutional arrangements in a way that can support greater ambition for reducing city-related GHG emissions. As part of our study, we examined what such efforts might look like in three selected countries: China, the United States, and Brazil. A common theme is that more national ambition is needed to expand the scope of urban policy action and to better enable city governments to play effective roles.

China – deepening national ambition



China's system of government is officially centralized and unitary – i.e., highly “vertically integrated” to begin with – but the reality of Chinese governance is more complicated; in practice, significant autonomy and responsibility have been delegated to subnational levels of government, including cities. China is unique in the extent to which industry dominates GHG emissions in urban areas – and the extent to which cities are responsible for administering industrial energy policies. This creates additional opportunities for vertically integrated urban-scale GHG mitigation. New national policies or reforms could help better allocate roles and achieve deeper GHG reductions. Some possible improvements include:

- Providing more resources and capacity to cities for new building energy code enforcement
- Providing more financial resources to cities to oversee and enable building retrofits
- Enacting power sector reforms to promote energy efficiency and greater penetration of distributed renewable power, with cities playing complementary roles*
- Improving financing for urban planning and transit infrastructure
- Further enhancing city-government capacities to regulate industrial GHG emissions

Looking forward, achieving deeper energy savings and GHG reductions will require a consolidation of capacities and lessons learned, and a move towards more ambitious, comprehensive national standards.

The United States – greater national policy coordination



U.S. jurisdictions at multiple levels are pursuing a wide range of policies that are helping to contain urban-scale GHG emissions. The greatest challenge is a lack of policy direction and coordination at the national level, leading to significant variation in effort among different states and cities. Opportunities for vertical policy coordination include:



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- Establishing stronger national policy frameworks for urban GHG mitigation
- Expanding adoption and improving enforcement of building energy efficiency codes
- Expanding and improving federal funding for urban transportation planning and infrastructure
- Expanding utility rate reform to promote more energy efficiency and distributed renewable power
- Expanding the adoption of policies at all government levels to promote electric vehicles
- Providing better coordination of freight transport systems

Urban actions could greatly assist the United States in meeting its overall climate policy goals, including targets under the U.S. EPA's Clean Power Plan, which regulates CO₂ emissions from power plants.

Brazil – engaging cities to implement new guidelines



Cities play a key role in Brazil. States and cities have significant legal authority to implement emission reduction policies, despite calls for greater national centralization. Recently adopted national guidelines related to urban climate and energy policy have provided direction for local and state governments; the critical next step is to ensure that cities are engaged to implement them. Some opportunities for vertically integrated policy reforms include:

- Reforms at multiple levels of government to enable greater penetration of distributed renewables
- Expanding city government roles in energy efficiency labelling and outreach programs
- Diversifying and integrating transportation systems
- Promoting vehicle electrification and transportation biofuels

Beyond these measures, achieving full urban mitigation potential in Brazil will require ratcheting up national standards, including adoption of mandatory building energy codes.

* For example, reforms that change revenue rules for utilities, direct utilities to acquire more energy efficiency, and evaluate their performance based on delivery of energy savings could channel significant new resources to energy efficiency measures. City governments could be important strategic partners in helping to identify and coordinate investments.