



the urban clean energy revolution



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Climate Solutions[™]

PRACTICAL SOLUTIONS TO GLOBAL WARMING

Climate Solutions is a Northwest-based clean energy economy nonprofit whose mission is to accelerate practical and profitable solutions to global warming by galvanizing leadership, growing investment, and bridging divides. We pioneered the vision and cultivated the political leadership in the Northwest for the proposition that clean energy and broadly shared economic prosperity can go hand-in-hand. For 17 years, we have led successful initiatives to deliver climate and clean energy policies, models, and partnerships that accelerate the transition from fossil fuels to a clean energy economy.

The **Strategic Innovation Team** at Climate Solutions focuses on developing solutions to reduce greenhouse gas emissions and remove carbon pollution from the atmosphere at the scale required to address the climate crisis. We identify the pathways to a low carbon future and create replicable models for emission reduction and carbon storage that provide economic as well as climate benefits, through the following programs:

- **Pathways Project** identifies, analyzes, and publicizes the pathways to transition from a fossil fuel-based economy to a low carbon, clean energy economy, focusing on the technically and economically viable solutions that will move the states of Washington and Oregon off of oil and coal.
- **New Energy Cities** partners with small- and medium-sized communities to achieve significant greenhouse gas reductions by 2030. We are catalyzing replicable models of city-led clean energy innovation by working with communities to set and attain quantifiable carbon reduction targets for buildings, transportation, and energy supply.
- **Sustainable Advanced Fuels** accelerates low carbon alternatives to petroleum fuels in the Northwest. By supporting state clean fuels policies, driving awareness of advanced fuel technologies, and helping to build a viable advanced fuels market, we aim to achieve significant reduction in carbon emissions from transportation fuels.



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I. Executive Summary

The international climate talks in December 2015 are a clear milestone for the planet regarding whether and how we will stave off the worst impacts of climate change. For cities, the talks represent an opportunity to share the firsthand knowledge that deep carbon reduction is ambitious but achievable, and indeed that it is already underway.

The Urban Clean Energy Revolution, segments of which were published in an eight-part blog series from September 30-November 18, 2015, details the state of play of low-carbon cities and describes a rich array of best practices and examples of urban clean energy innovation and carbon reduction. The report serves as a guide for cities to achieve deep carbon reduction, based on the collective accumulation of knowledge from worldwide experience in urban climate planning and action.

Over the past decade, urban governments have set increasingly aggressive goals, such as 80% carbon reduction by 2050 (80x50), sourcing 100% of community energy with renewables, and carbon neutrality (achieving zero carbon emissions in electricity, heating, cooling, and transportation). These are not empty pledges, but targets that local officials from Greensburg, KS to Georgetown, TX are already implementing.

Local governments have become sophisticated about figuring out how to achieve their goals, and are developing clean energy transition plans to accomplish them. San Francisco, CA and Sydney, Australia are leading examples of this work, and supporting partners, such as Innovation Network for Communities, provide advice and lessons learned from early leaders so that local officials do not have to reinvent the wheel.

To meet these goals, mayors and local elected officials worldwide are taking advantage of the policy tools they already have, and experimenting with a diversity of new approaches. Tokyo, Japan and Shenzhen, China are among the cities pioneering local systems that put a cap and price on carbon emissions. Berlin, Germany and Minneapolis, MN are partnering with their energy utilities to meet carbon reduction commitments, while Sonoma County, CA and Westchester County, NY are negotiating for cleaner, cheaper electricity on behalf of their residents. Lancaster, CA is requiring that all new rooftops come equipped with solar panels or have access to solar energy.

Leading local governments do not travel this road alone: they partner with other jurisdictions and networks to get deeper and faster results. Over the past decade, the number and scale of organizations and initiatives helping cities to reduce their carbon footprints have expanded dramatically—including the Carbon Neutral Cities Alliance, the California-China Urban Climate Collaborative, and the Mississippi River Cities and Towns Initiative.

However, securing funding remains a persistent barrier for local governments in pursuing ambitious clean energy agendas. Few cities have the authority or political support to levy taxes and issue bonds—as Boulder, CO and Johannesburg, South Africa have done. In Japan and the European Union, localities have benefitted from national or multi-national funding sources, such as the Japanese Green New Deal fund, and the European Investment Bank’s European Local ENergy Assistance program. Public-private partnerships and philanthropic institutions can provide catalytic funding on a project basis. Overall, however, funding for urban clean energy and climate action is inconsistent and/or limited.

To overcome political obstacles and build strong coalitions for bolder action, urban leaders are increasingly aligning their climate agendas with other important community priorities, such as air quality, transportation, social equity, economic development, and climate change resilience. Buffalo, NY is experiencing an economic renaissance after state and local officials doubled down on clean energy economic development in the region. Cities ranging from Beijing, China to Salt Lake City, UT have focused on reducing air pollution and embraced strategies that also reduce greenhouse gas emissions.

The past decade has seen an explosion of local action to tackle carbon reduction, but much still remains to do. Urban leaders need a price on carbon emissions, as well as the continued support of private partners and other levels of government to unlock funding for bolder clean energy action. To transition to cleaner energy, cities must look beyond their traditional toolbox—experimenting with new approaches, and taking greater ownership over their energy futures.

The climate crisis requires that urban governments and their partners embrace these actions at a greater scale than ever before.

II. Introduction

Cities represent over 70% of global energy-related carbon emissions, and are home to 54% of the world's population (see *Figure 1 on page 4*).¹ Over the past decade, to chart the path to a low-carbon future, local officials have set bold climate and clean energy agendas, exerted political power to achieve those agendas, and worked individually and collectively on durable, meaningful carbon reduction solutions.

“Cities have a capability to execute,” Jules Kortenhorst, the CEO of the Rocky Mountain Institute, an energy think tank, told Time Magazine in September 2015. “Mayors are both powerful and grounded in reality.”

In the run-up to the 2015 global climate talks,² countries have updated their carbon reduction pledges,³ which are insufficient⁴ to hold global warming at two degrees Celsius, the limit that international experts consider to be necessary for avoiding dangerous climate change. This represents an ambition gap among national negotiators that the bold climate leadership of city officials around the world can help close.⁵

“Cities have a capability to execute,” Jules Kortenhorst, the CEO of the Rocky Mountain Institute, an energy think tank, told Time Magazine in September 2015. “Mayors are both powerful and grounded in reality.”⁶

Leading cities around the world have already made a significant dent in carbon emissions, even while their populations and economies grew:

- From 2005 to 2014, Copenhagen, Denmark's overall carbon emissions declined over 30%, while its population increased over 10%.⁷ Copenhagen's per capita emissions also decreased 40% in the past 10 years.⁸
- As of 2010, fast-growing Berlin, Germany reduced its energy-related carbon emissions 27% from 1990 levels.⁹
- Portland, Oregon reduced carbon emissions 14% since 1990, while its metropolitan area grew by 150,000 people and added 75,000 new jobs.¹⁰
- At least 17 U.S. cities—including large cities like Atlanta, New York City, San



New York City **photo: Anthony Quintano**

Francisco, and Philadelphia—reported measurable reductions in community-wide carbon emissions from 1990 to 2006, according to a 2014 report from the Center for Climate Protection.¹¹

These reductions are meaningful when tallied globally, and yield significant benefits beyond carbon reduction:

- In September 2014 Stockholm Environment Institute analysis found that cities can collectively reduce emissions by at least 10% beyond what national actions are on track to achieve by 2030.¹² (Former New York City Mayor Michael Bloomberg observed that this amount is roughly equivalent to reducing the world’s coal consumption by a quarter.)¹³
- The United Nations Environment Programme similarly concluded that city initiatives could help close the global emissions reduction gap between current levels and what is necessary to stop warming at two degrees Celsius.¹⁴
- World Wildlife Fund (WWF) and ICLEI found in *Measuring Up 2015* that 116 U.S. cities meeting their carbon reduction targets would equate to closing 86 coal-fired power plants each year.¹⁵
- A New Climate Economy 2015 report found that local climate actions in buildings, transportation, and waste management could save \$16.6 trillion in the period from now to 2050, concluding that investments “would pay for themselves within 16 years.”¹⁶ The same report found that with national support for city efforts, savings could reach \$22 trillion, and

the planet could avoid emissions on the scale of India’s current carbon footprint.¹⁷

Leading urban governments across the planet are showing how to reduce carbon emissions by:

1. Setting ambitious but achievable agendas and goals of carbon neutrality, 100% renewable energy, and beyond.
2. Developing expertise on how to transition to clean energy, with what partners, and in what sequence.
3. Identifying the authorities that local governments need to do the work, with existing tools as well as expanding beyond conventional roles.
4. Forming external partnerships, including collaborating with national and state governments, jurisdictions in geographic clusters, and peer-to-peer networks.
5. Securing dedicated funding, a critical ingredient for sustained, effective action, and perhaps the most persistent barrier that urban governments face today.
6. Aligning climate agendas with other community and political priorities, and developing diverse coalitions with a broader base of support.

Since 2009 Climate Solutions’ New Energy Cities program has advised and partnered with communities across the U.S. Pacific Northwest on how to achieve deep carbon reduction, and in the course of that work has researched and written about leading global examples of urban carbon reduction.¹⁸

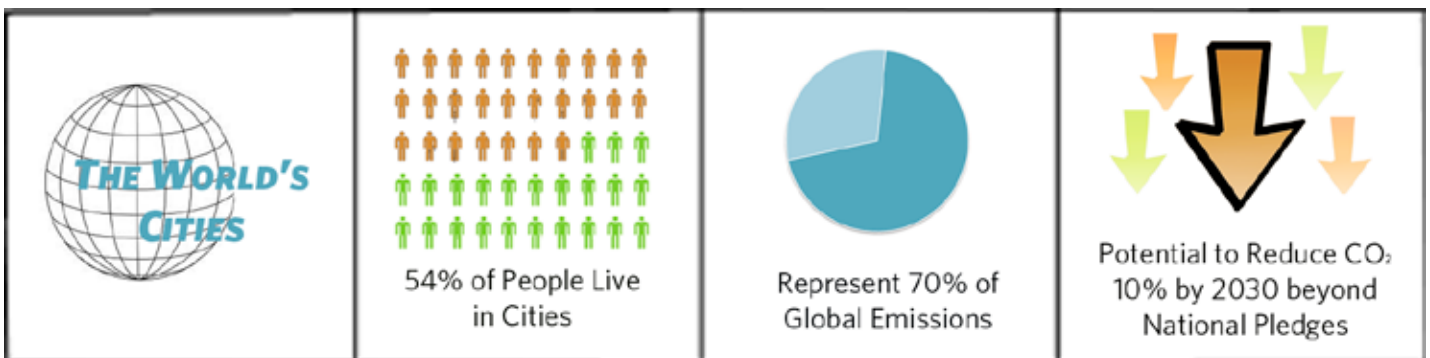


Figure 1: The Case for City Climate Action Whitney Fleming

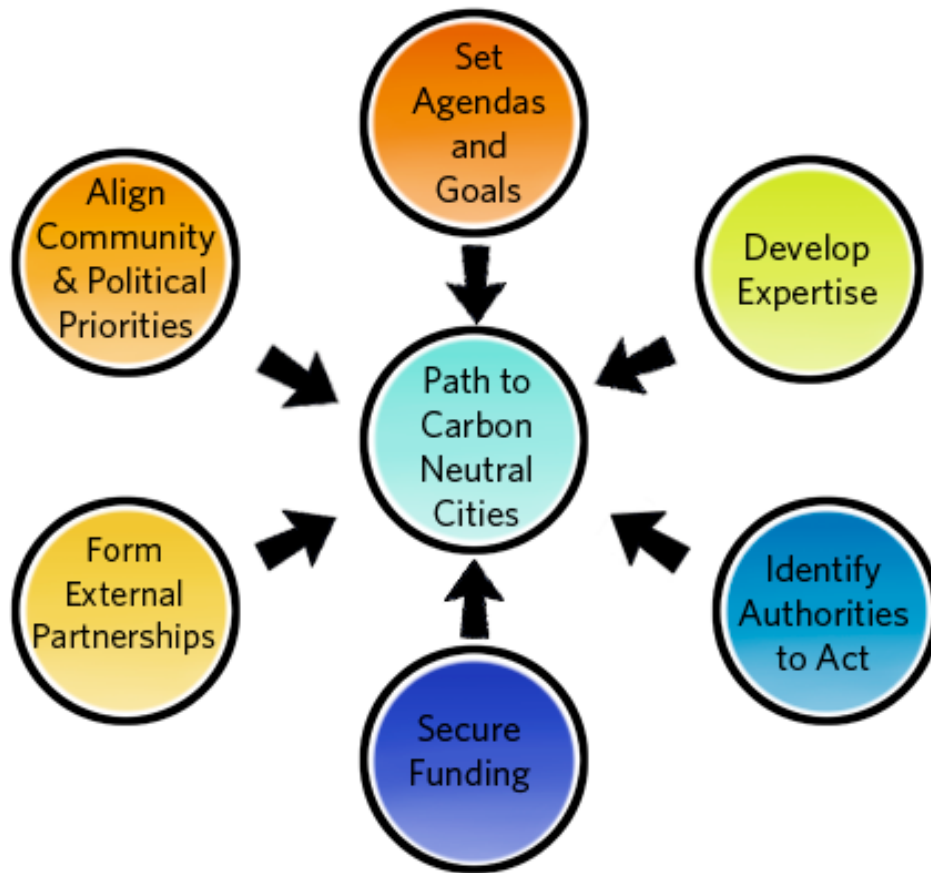


Figure 2: Elements of City Climate Leadership
 Whitney Fleming

The Urban Clean Energy Revolution, segments of which were published in an eight-part blog series from September 30-November 18, 2015, details the state of play of low-carbon cities and describes a rich array of best practices and examples in the above six areas. The report serves as a guide for cities to achieve deep carbon reduction, based on the collective accumulation of knowledge from worldwide experience in urban climate planning and action. Most importantly, it shows

that urban leaders are making an important contribution to global carbon reduction.

The international climate talks in December 2015 are a clear milestone for the planet regarding whether and how we will stave off the worst impacts of climate change. For cities, the talks represent an opportunity to share the firsthand knowledge that deep carbon reduction is ambitious but achievable, and indeed that it is already underway.

III. Setting the Pace

Ten years ago, when Seattle Mayor Greg Nickels launched the U.S. Mayors' Climate Protection Agreement, local governments were just awakening to the threat of climate change.¹⁹ Over 1,000 local elected officials ultimately committed to meet or beat the Kyoto Protocol's greenhouse gas emissions reduction target of 7% reduction below 1990 levels by 2012.²⁰

Since then, leading urban governments have set more aggressive goals, such as carbon neutrality (achieving zero carbon emissions in electricity, heating, cooling, and transportation), 80% carbon reduction by 2050 (80x50), and sourcing 100% of community energy with renewables by specific target dates.²¹ These are not empty pledges, but achievable targets that local officials are already implementing.

Carbon Neutrality

In March 2015, the Urban Sustainability Directors Network launched the Carbon Neutral Cities Alliance, comprised of 16 cities that had adopted carbon neutrality or 80x50 targets.²² **Seattle, WA, Copenhagen, Denmark, and Fort Collins, CO** are among the leading examples of communities that have mapped out how to achieve ambitious goals.

In May 2011, Seattle (pop. 652,000) commissioned an analysis²³ from Stockholm Environment Institute of what it would take for the city to achieve carbon neutrality by 2050, and adopted a climate plan²⁴ with proposed actions that add up to this goal. Because Seattle gets virtually carbon-neutral electricity from its municipal utility, Seattle City Light, its primary carbon liabilities are



Copenhagen *photo: Alyson Hurt*

natural gas use for heating in buildings and oil consumption from transportation.

Copenhagen, Denmark (pop. 562,000) set a goal of becoming carbon neutral by 2025, which would make it the first carbon-neutral capital in the world.²⁵ To achieve this, the city has determined that: all district heating and cooling must be carbon neutral by 2025; commercial buildings must reduce energy consumption by 20%, households by 10%, and public buildings by 40%; all of the city's electricity consumption must come from

renewable sources (including in-city wind turbines); and city residents must rely on bicycling, walking, or public transportation for 75% of trips.²⁶

In March 2015, the bipartisan Fort Collins, CO (pop. 152,000) city council adopted the goal of 80% carbon reduction by 2030, accelerating its original timeline by 20 years.²⁷ This revised

goal emerged from a conversation that the city facilitated among community leaders and experts, including municipally-run Fort Collins Utilities, local businesses, Colorado State University, and environmental advocates, with analysis and support from Rocky Mountain Institute's eLab initiative.²⁸ Specific sector-based targets include: reducing building emissions by 40% through efficiency and rooftop solar; reducing utility emissions 79%; and reducing transportation carbon emissions 57%.²⁹

100% Renewable Energy

In the past year, an increasing number of cities have committed to using 100% renewable energy. Numerous entities worldwide have embraced this target—as highlighted in the efforts of Global 100% RE,³⁰ Go 100%³¹ (which maintains a summary of entities that set targets and how they plan to achieve them), and Renewables 100 initiatives,³² as well as a World Future Council handbook.³³

Aspen, CO (pop. 6,700), **Greensburg, KS** (pop. 785), and **Burlington, VT** (pop.

42,000) have already met that goal. In 2004, Aspen, CO adopted a 100% renewable electricity target as part of its Canary Initiative climate agenda,³⁴ and sought advice from the U.S. Department of Energy's National Renewable Energy Laboratory on how to get there.³⁵ The city achieved that goal in August 2015 with the approval of new power purchase contracts for wind and landfill gas.

In 2007, after a tornado devastated the small farming town of Greensburg, KS, a community organization mobilized the town to rebuild green, relying on deep efficiency in buildings (many exceeding 50% savings) and a local 12.5 MW wind farm.³⁶ In 2014, Burlington, VT achieved 100% carbon-neutral electricity, using wind, biomass, and hydropower—including a 7.4-MW hydropower project near the city.³⁷

San Francisco, CA, Georgetown, TX, and Vancouver, BC, Canada are also working to become fully renewable.

In 2010, San Francisco Mayor Gavin Newsom set a goal for the city (pop. 837,000) to use 100% renewable energy within 10 years, and in 2011 Mayor Ed Lee convened an in-depth taskforce to figure out how to get there. In 2012, the task force recommended that the city: improve energy efficiency to reduce total electric demand; increase in-city renewable distributed generation to reduce the need for imported green power; and provide all customers with a 100% renewable power purchasing option.³⁸

In 2014, the municipal utility of Georgetown, TX (pop. 55,000) committed³⁹ to buy half of its community's power from a nearby wind farm, and in 2015 signed⁴⁰ up for the remaining half to come from a West Texas solar farm, making its electricity supply 100% renewable. As a result, Georgetown will become the first city in Texas to go completely renewable. According to the utility's general manager, "Georgetown isn't required to buy solar or other renewables. We did so because it will save on electricity costs and decrease our water usage."⁴¹

In 2015, the city council of Vancouver, BC (pop. 604,000) made a long-term pledge

"Georgetown isn't required to buy solar or other renewables. We did so because it will save on electricity costs and decrease our water usage."

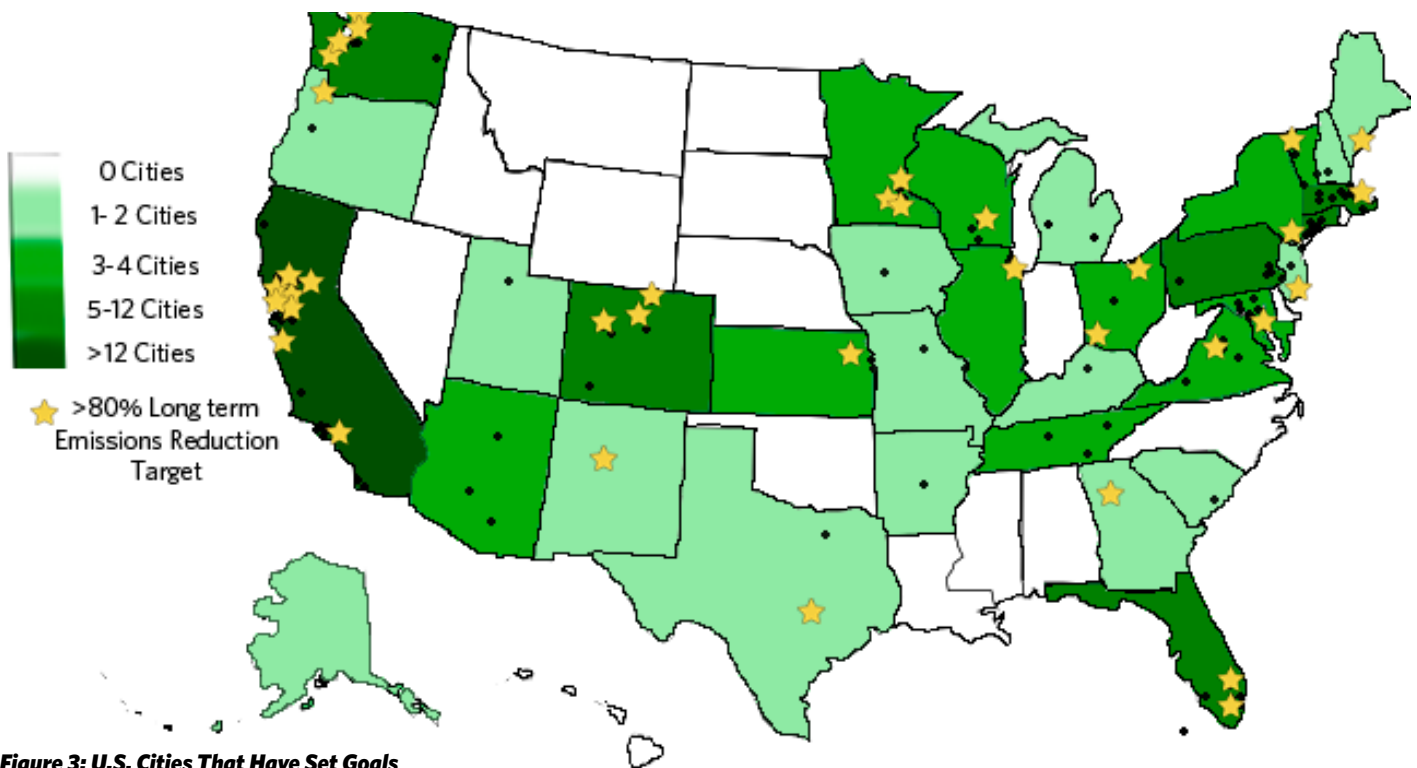


Figure 3: U.S. Cities That Have Set Goals

Based on data from WWF and ICLEI, *Measuring Up 2015*.⁵⁰ Black dots represent cities that have set carbon reduction targets.

to source all of its energy—for electricity, heating, cooling, and transportation—from renewable energy. Vancouver, BC already sources 90% of its electricity from hydro-power, and the city co-convoked the Renewable Cities Global Learning Forum in May 2015 to invite ideas from international experts on how to achieve its goal in the other sectors.⁴² In October 2015, Vancouver produced a Renewable City Strategy outlining the city staff’s recommended approach to achieve the goal.⁴³

These aggressive goals are not without challenges. Seattle and Vancouver will face a tough road on reducing natural gas use in buildings and oil in transportation. Environmentalists have criticized⁴⁴ Copenhagen’s plan for relying heavily on biomass, which has potentially negative social and environmental effects. Burlington is sourcing

much of its energy from large-scale dams in Canada that have drawn the ire of social and environmental activists.

But as urban climate plans have evolved, so have public reporting and accountability, as well as an understanding of the most effective ways to achieve ambitious goals. In 2015, 162 cities worldwide voluntarily reported⁴⁵ to the Carbon Disclosure Project (CDP) on their sources of electricity, and CDP is using its findings⁴⁶ to help influence future urban infrastructure investments. Registries such as CDP and carbonn Climate Registry⁴⁷ and pledges such as the Compact of Mayors,⁴⁸ which now spans six continents, are leading the way to greater transparency and learning. (See Figure 3 above for cities that have set goals and registered their carbon emissions inventories—representing at least 14% of the U.S. population.)⁴⁹

IV. Carbon Reduction Know-How

In the early days of climate action, urban plans to reduce carbon frequently suffered from the laundry list syndrome: outlining catalogs of potential strategies without any evidence of how those actions would add up to meeting long-term carbon reduction goals. Since then, cities and counties have become increasingly sophisticated about figuring out how to achieve their goals, and are developing clean energy transition plans to do it.

The first step is to map out—and show stakeholders—how potential actions can collectively meet an overall carbon reduction goal, as **Santa Monica, CA** and **King County, WA** have done.

In 2013, Santa Monica, CA (pop. 92,000) produced a 15x15 Climate Action Plan—15 action items to make a 15% reduction below 1990 levels by 2015—that outlined a simple, clear checklist of climate actions for the city to take that would collectively meet the community-wide reduction goal.⁵¹ City staff focused the plan on short-term strategies that would help the community limit anticipated growth in emissions and get on a path to deeper reductions in 2030 and 2050.⁵²

In 2014, the King County-Cities Climate Collaboration⁵³ (pop. 1,500,000) commissioned a carbon wedge analysis⁵⁴ from Climate Solutions' New Energy Cities program to depict what it would take for King County to cut carbon in half by 2030 (50x30). This analysis formed the basis of the K4C's joint county-city climate commitments, which are specific, time-based pathways that add up to the 50x30 goal—including a target of sourcing 90% of its electricity countywide from renewables by 2030.⁵⁵

Next, a community needs to plan its transition to clean energy, with specific partners and projects. **Bristol, UK, San Francisco, CA, and Sydney, Australia** are leading examples of this work.

In 2010, Bristol, UK (pop. 442,500) developed a Climate Change and Energy Security Framework⁵⁶ to translate carbon emissions reduction goals into energy efficiency and renewables targets for 2020 and 2050, which earned Bristol the European Union Green Capital award in 2015.⁵⁷ In July 2015, Bristol approved a proposal⁵⁸ for the city to expand its energy service company community-wide to residents and businesses—a

groundbreaking move in the U.K., where private utilities provide the lion's share of energy. City control over energy has enabled Bristol to operate its own 2.5-MW wind farm on city land; install rooftop solar on over 30 schools; and establish district heating networks. The city further plans to generate 1 GW of solar by 2020 through purchase agreements with community organizations that operate in municipal buildings.⁵⁹

In response to Mayor Gavin Newsom's 2010 call for 100% renewable energy, San Francisco (pop. 837,000) convened a Renewable Energy Task Force of



Sydney Opera House photo: **Marc Dalmuder**

expert staff and citizens for a year and a half to study in-depth what it would take for the city to achieve its goal.⁶⁰ The city's Renewable Energy Program Manager and the C40 Climate Leadership Group (C40) Director of City Programs co-led the task force, with a diverse group of utility and clean energy experts, environmental and community advocates, and labor, with philanthropic support from the Sidney E. Frank Foundation.⁶¹

The task force found that, in addition to energy efficiency and local renewable installations, San Francisco needed community choice aggregation—a local program to purchase power outside of the typical private

utility—to meet its clean energy goal.⁶² (The San Francisco Public Utilities Commission now runs that program, CleanPowerSF.)⁶³

In 2013, Sydney, Australia's (pop. 4,300,000) Chief Development Officer of Energy and Climate Change Allan Jones developed the city's Decentralized Energy Master Plan for Renewable Energy, one of five interconnected blueprints for infrastructure planning with a target year of 2030.⁶⁴ Jones aims to use 100% renewable

energy for power, heating, and cooling, with conventional renewables providing 30% of the city's electricity, and the other 70% coming from biomass-based combined heat, power, and cooling.⁶⁵

Notably, the city's plan found that renewable gas available from within 250 kilometers

(155 miles) of the city limits could replace 100% of the natural gas used to supply the city's planned network, producing virtually carbon-free energy.

Jones commented, "It's important to start off with a 100% renewable energy policy to discipline you, to force you, to work out what components of the different sorts of renewable energy... to do the correct calculations... and you cannot do that with a random selection of solar, wind, or other technologies. They have to work together."⁶⁶

Jurisdictions new to carbon reduction and clean energy don't have to reinvent the wheel. In 2014, the Innovation Network for Communities (IN4C) produced *The Road to 2050: 80x50 Strategy Maps for Carbon-Neutral Cities*, a report that summarizes the most common carbon reduction strategies of U.S. communities committed to 80% reduction by 2050 (80x50), and recommends how to structure the strategies over time.⁶⁷ (See *Figure 4 on page 11 for an adaptation of IN4C's 80x50 carbon reduction strategy table.*)

Canada's Getting to Implementation initiative⁶⁸—a partnership of the Community Energy Association,⁶⁹ Quality Energy Systems of Tomorrow (QUEST),⁷⁰ and Sustainable Prosperity⁷¹—helps communities to execute their energy plans, including: defining barriers and opportunities for community energy planning; identifying business models for community energy stakeholders, such as government agencies, utilities, and the real estate industry; and developing capacity among practitioners to implement community energy plans. QUEST also advocates for greater Canadian national and provincial support for local government clean energy action.

"It's important to start off with a 100% renewable energy policy to discipline you, to force you, to work out what components of the different sorts of renewable energy...to do the correct calculations... and you cannot do that with a random selection of solar, wind, or other technologies. They have to work together."

<p>Achieve net zero emissions in 100% of new buildings by 2030</p> <ul style="list-style-type: none"> • Net zero building codes • Mandatory building benchmarking and commissioning • Geothermal heat pumps • Solar ready roof requirements 	<p>Achieve 30-50 percent reductions in 100% of existing buildings</p> <ul style="list-style-type: none"> • Mandatory building commissioning • Required retrofitting upgrades at transaction • Appliance/equipment energy upgrades 	<p>Achieve 3% or more annual improvements in energy efficiency of industrial processes, and reduce building energy use by at least 15%</p> <ul style="list-style-type: none"> • Equipment upgrades and process/product redesign • Mandatory retro-commissioning and retrofitting
<p>Achieve annual net decreases in total vehicle miles traveled</p> <ul style="list-style-type: none"> • Bike and pedestrian-friendly streets • Bike sharing and car sharing • Increased access to transit • Congestion pricing and parking fees • Commute trip reduction • Transit-oriented development 	<p>Decrease emissions per VMT by 50-75%</p> <ul style="list-style-type: none"> • Increased vehicle mileage standards • Low carbon fuels standard • Clean vehicle partnerships • Electric vehicle charging station deployment 	<p>Eliminate 100% of solid waste disposed of via landfill or incinerator</p> <ul style="list-style-type: none"> • Mandatory recycling • Construction/demolition recycling & reuse • Organics composting and waste-to-energy
<p>Achieve 80-90% renewable electricity and heating supply</p> <ul style="list-style-type: none"> • Replacement of coal power with renewables • On-site energy generation in all eligible structures • District energy in all eligible densely built areas • Adoption of 50+% renewable portfolio standards 	<p>Implement efficient land-use planning</p> <ul style="list-style-type: none"> • Increased residential density through urban growth boundaries and promotion of infill development 	<p>Design municipal infrastructure for low-carbon performance</p> <ul style="list-style-type: none"> • Smart grids and high efficiency transmission lines city-wide • Smart infrastructure for all city needs • Green infrastructure to reduce the need for gray infrastructure

Figure 4: 80 x 50 Roadmap—Common Carbon Reduction Strategies

Adapted from Innovation Network for Communities, *The Road to 2050: 80x50 Strategy Maps for Carbon-Neutral Cities.*⁷⁵

Whitney Fleming

V. Tools of the Trade

Former New York City Mayor Michael Bloomberg proclaimed in the September 2015 issue of *Foreign Affairs*, “Mayors are turning their city halls into policy labs, conducting experiments on a grand scale and implementing large-scale ideas to address problems, such as climate change, that often divide and paralyze national governments.”⁷⁶

Indeed, even when local governments don’t control their energy supply, local leaders can exert influence in other ways.⁷⁷ In recent years, leading cities have taken the reins to clean up their carbon footprints by using policy tools they already have, or creating new ones outside of their conventional roles.

Capping Emissions

In 2010, the Governor of **Tokyo, Japan** (pop. 3.7 million) passed a Metropolitan Environmental Security Ordinance to launch “the world’s first urban cap-and-trade program, requiring carbon dioxide reductions from large commercial, government, and industrial buildings through on-site energy efficiency

measures or participation in the [city’s] emissions trading scheme.”⁷⁸ From 2010 to 2012, the 1,300 covered buildings reduced emissions 22% below the base year, beyond the program’s mandatory reduction range of 6 to 8%.⁷⁹ The World Bank published a case study of Tokyo’s system in June 2010.⁸⁰

Starting in 2013, **Shenzhen, China** (pop. 7 million) was the first of five Chinese cities—also including Beijing, Chongqing, Shanghai, and Tianjin—to pilot cap-and-trade systems to limit carbon emissions.⁸¹ In September 2015, the Chinese national government announced that it would implement a national program based on these pilots.

Energy Supply

Copenhagen, Denmark (pop. 562,000) co-owns a cooperative wind farm⁸² that provides 4% of the city’s electricity, which the mayor plans to increase to half by 2020, and has allocated over \$1 billion to achieve.

Boulder, CO (pop. 103,000) is working to establish its own municipal energy utility,⁸³

based on Energy Future Goals that the city and community set.⁸⁴ But for the cities that do not provide energy directly—or do not want to travel the hard road of establishing municipal utilities—a middle road is necessary.

From 2011 to 2015, the mayor of **London** (pop. 8.6 million) directed a time-limited program⁸⁵ with funding from the European Investment Bank to help the city’s boroughs create locally-run heat networks across the city—including waste heat from the London Underground—toward a goal⁸⁶ of sourcing 25% of energy from zero-carbon, decentralized sources by 2025. A number of projects that the



Tokyo photo: [Matt Henry](#)

mayor's team helped to organize were underway as of late 2014,⁸⁷ including a waste-to-energy facility that will provide 5,000 homes with heat and hot water.⁸⁸

One U.S. approach is community choice aggregation (CCA), a model that allows communities and governments to negotiate for combined purchase of clean energy at competitive prices on behalf of their residents and businesses.⁸⁹ As SF Gate described of Sonoma Clean Power's⁹⁰ community choice program in **Sonoma County, CA** (pop. 484,000), established in 2012, "[It] isn't a utility in the traditional sense. It acts as a kind of buyers' club for energy, purchasing electricity on behalf of residents and businesses in participating communities. Pacific Gas and Electric still owns the wires and transformers delivering that electricity... [and] also handles billing... But the system gives participating governments more control over where their electricity comes from and how much it costs."⁹¹

Seven states in the U.S. currently authorize CCA, with New York the most recent to join as a result of advocacy from Sustainable Westchester, a group of **Westchester County, NY** (pop. 969,000) communities.⁹² (CCA is possible—but very challenging—in regulated markets. As the U.S. Department of Energy National Renewable Energy Laboratory reports, "CCAs change the nature of existing suppliers—in regulated states, it challenges the monopoly granted to incumbent utilities, and in deregulated states, CCA changes the role of retail suppliers.")⁹³

Other cities are taking their carbon reduction agendas to the negotiating table with their utility partners. **Berlin, Germany** (pop. 3.4 million) secured a commitment from its energy provider to halve the utility's carbon emissions in Berlin by 2020, which the Berlin Energy Agency monitors and verifies.⁹⁴ In May 2015, **Minneapolis, MN** (pop. 400,000) issued the first work plan of its Clean Energy Partnership with Xcel Energy and CenterPoint Energy, the city's two private energy utilities.⁹⁵ This work plan resulted from two years of community dialogue and political pressure regarding how to meet

the city's clean energy and carbon reduction commitments, which had included the threat of Minneapolis forming a municipal energy utility.⁹⁶

In 2013, **Lancaster, CA** (pop. 160,000) took a straightforward approach: using the city's building code authority to require that all new rooftops "either come equipped with solar panels or be in subdivisions that produce one kilowatt of solar energy per house."⁹⁷

Building Energy Efficiency

Leading cities are also pioneering approaches to building energy efficiency.

As of October 2015, 15 U.S. cities and one county have adopted ordinances that require large commercial building owners and managers to report their energy consumption annually, either to the city or publicly.⁹⁸ The City Energy Project, a collaboration of the Institute for Market Transformation and the Natural Resources Defense Council, supports U.S. cities in developing these policies and related programs to improve building energy efficiency.⁹⁹ Building energy knowledge is valuable for business owners, tenants, and potential buyers, and also helps city policymakers understand how to tailor incentives and other upgrade efforts.¹⁰⁰ (See *Figure 5 on page 14 for a map of U.S. jurisdictions that have adopted commercial building energy benchmarking requirements.*)

Washington, DC (pop. 659,000), one of the 15 benchmarking cities, and one of the first to disclose building energy use publicly, may go even further to establish minimum energy performance standards for existing buildings and beyond codes for new buildings, as a mayoral task force recommended. The task force also recommended exploring carbon pricing to "give building owners greater incentive to reduce their energy use."¹⁰¹

In parallel with Seattle, WA's (pop. 650,000) benchmarking ordinance, the Seattle 2030 District, a high-performance building district of more than 80 downtown properties, fosters collaboration and education among

building owners and managers about the benefits of building energy benchmarking.¹⁰² Although private sector-led and independent of the city, the District reportedly formed in anticipation of the city’s ordinance, and has been a valuable partner in communicating about and setting the pace on commercial building energy information-sharing.¹⁰³ The 2030 District model has now spread to 10 cities across North America, including Cleveland, OH, Pittsburgh, PA, Dallas, TX, and Toronto, Ontario.¹⁰⁴

Boulder, CO (pop. 103,000) and **Austin, TX** (pop. 885,400) both require existing homes to achieve a specific level of energy efficiency. Boulder’s SmartRegs are a suite of regulations that direct rental housing landlords to upgrade their properties to a specific energy performance level by 2019, focusing on the quality of rental housing as well as on carbon reduction.¹⁰⁶ Austin’s Energy Conservation Audit and Disclosure Ordinance requires all building owners to report their energy use publicly, and mandates that high energy use properties (i.e., those that use 150% greater energy than similar properties) must reduce

energy use 20% and provide an energy use report to their current and potential residents.¹⁰⁷

Deep home efficiency goals are daunting for cities to achieve in the absence of such requirements, as New Energy Cities found in *Breaking Down Barriers to Residential Energy Efficiency in King County, WA*.¹⁰⁸

Clean Transportation

Many local governments already directly operate public transit services and oversee land use planning—two critical levers of change in reducing transportation carbon emissions. Well-designed housing near good public transit can be a powerful climate solution by reducing urban sprawl, protecting rural open space, and providing infrastructure efficiently, all of which reduce regional carbon emissions, particularly from transportation.¹¹⁵ Along these lines, a full complement of “carrots and sticks”¹¹⁶—transit-oriented development,¹¹⁷ support of active transportation modes such as walking and cycling,¹¹⁸ and congestion pricing¹¹⁹—are essential to reduce fossil fuel-based car travel.

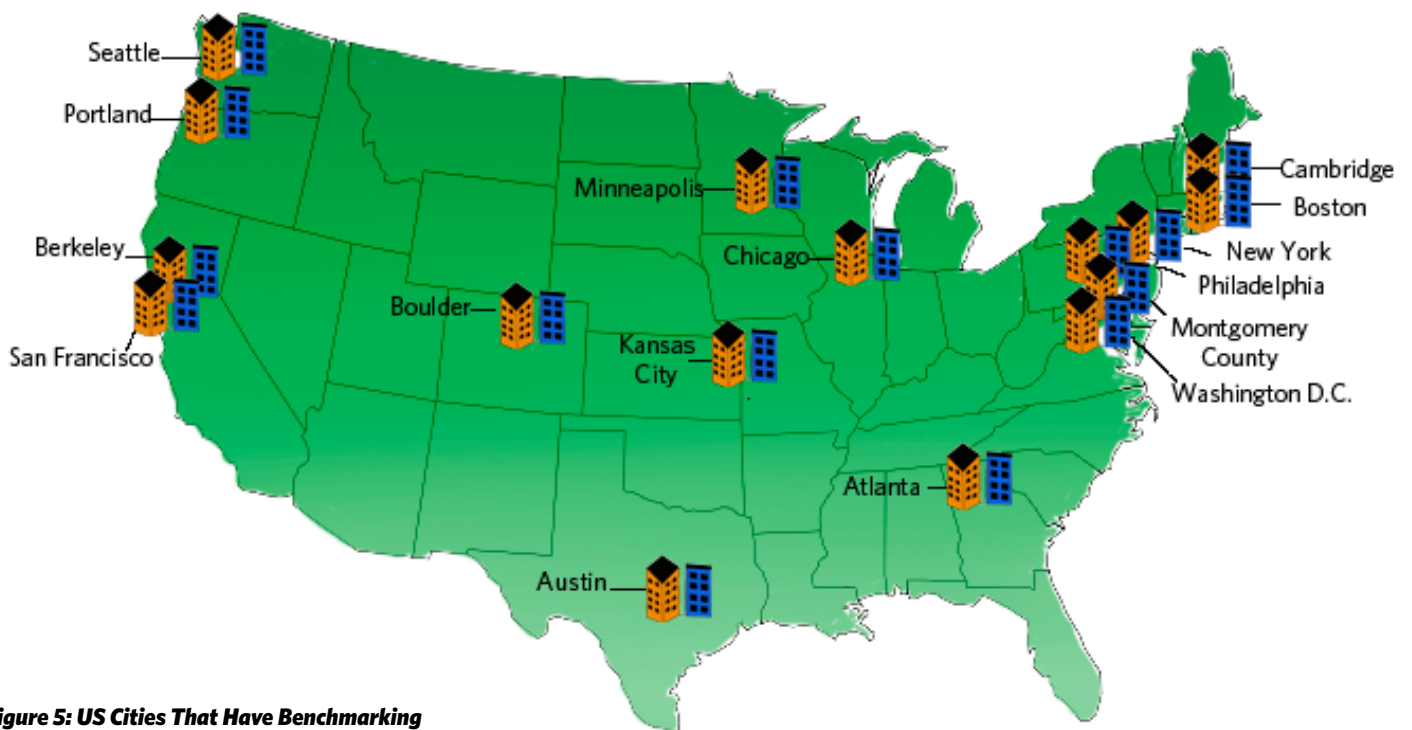


Figure 5: US Cities That Have Benchmarking
Adapted from BuildingRating U.S. Benchmarking Policy Landscape.¹⁰⁵
Whitney Fleming

Some local governments are also experimenting with the less conventional role of promoting clean vehicles and fuels. In 2006, Portland, OR (pop. 610,000) enacted a city-wide renewable fuels standard¹²⁰ by revising its city code to require that all diesel fuel sold in the city limits contain a minimum blend of 5% biodiesel, and that all gasoline fuel contain a minimum of 10% ethanol.¹²¹ The ordinance was enforceable with penalties of \$5,000 to \$10,000, and reportedly inspired the Oregon state legislature to pass a state-wide renewable fuel standard.¹²²

In June 2014, the metropolitan government of Vancouver, BC (pop. 603,000) launched Emotive, a campaign to raise awareness about electric vehicles (EVs) by focusing on the enjoyment of driving an EV.¹²³ Focusing on the emotional component of a car purchase decision, the campaign hosts ride-and-drive events to allow the public to sit in EVs, and enables curious residents to talk with EV ambassadors—owners who love their EVs.

In 2014, Berkeley, CA (pop. 117,000) launched a pilot program to enable residents to install charging stations when they do not have their own land to do so.¹²⁴ With support from the 11th Hour Foundation,¹²⁵ the city will cover permit fees for up to 25 applicants in

the first year of the pilot; fund ramps and other accessibility features for three applicants to make their charging stations publicly available;¹²⁶ and expand neighborhood outreach and guidance about the pilot.¹²⁷

In December 2014, the Chicago, IL (pop. 2.7 million) city council finance committee passed the Chicago Clean With E15 proposal,¹²⁸ also known as the Chicago Clean Air Ordinance,¹²⁹ which would require that a blend of 85% gasoline and 15% ethanol be available at all gasoline retail stations. (Chicago Mayor Rahm Emanuel subsequently blocked the bill,¹³⁰ and a local councilmember attempted unsuccessfully to resurrect it in May 2015.)¹³¹ The campaign for the change referred to Chicago's past leadership in banning leaded gasoline in 1984, and toxic gasoline additives in 2000.¹³² A city fund would have helped alleviate costs of the requirement to fuel station owners.

In June 2015, Amsterdam, Netherlands (pop. 780,000) announced plans to expand its public EV charging network from 1,300 stations to 4,000 by 2018.¹³³ This effort is part of the Agenda Sustainable Amsterdam that the city council adopted unanimously in March 2015, including having as much emission-free traffic as possible by 2025.¹³⁴

VI. Partnering for Powerful Action

Leading local governments do not travel this road alone: they partner with other jurisdictions and networks to get deeper and faster results. These collaborations have turned low-carbon city efforts into a movement.

“By sharing best practices through C40 – and shamelessly appropriating other cities’ best ideas – we take on climate change and improve the quality of life for our residents,” said London Mayor Boris Johnson.

Over the past decade and more, the number and scale of international organizations and initiatives helping cities to reduce their carbon footprints have expanded dramatically. (See Figure 6 for a timeline of key milestones below.)

By disseminating knowledge, building capacity, and accelerating the adoption of best practices on a large scale, the following efforts have transformed the playing field for urban carbon reduction.

International Networks

C40, former New York Mayor Michael Bloomberg (now the UN Secretary-General’s Special Envoy for Cities and Climate Change¹³⁵), ICLEI, United Cities and Local Governments, and UN-HABITAT are actively promoting city adoption of the Compact of Mayors, the world’s largest coalition of city officials committed to track and reduce urban carbon emissions and increase resilience to climate change.¹³⁶ “By sharing best practice through C40—and shamelessly appropriating other cities’ best ideas—we take on climate change and improve the quality of life for our residents,” said London Mayor Boris Johnson.¹³⁷

In May 2015, ICLEI-Local Governments for Sustainability launched a 10-year Transformative Actions Program¹³⁸ to help bold city and sub-national climate strategies gain greater access to capital by promoting them at high-visibility events with potential funders and/or partners.¹³⁹

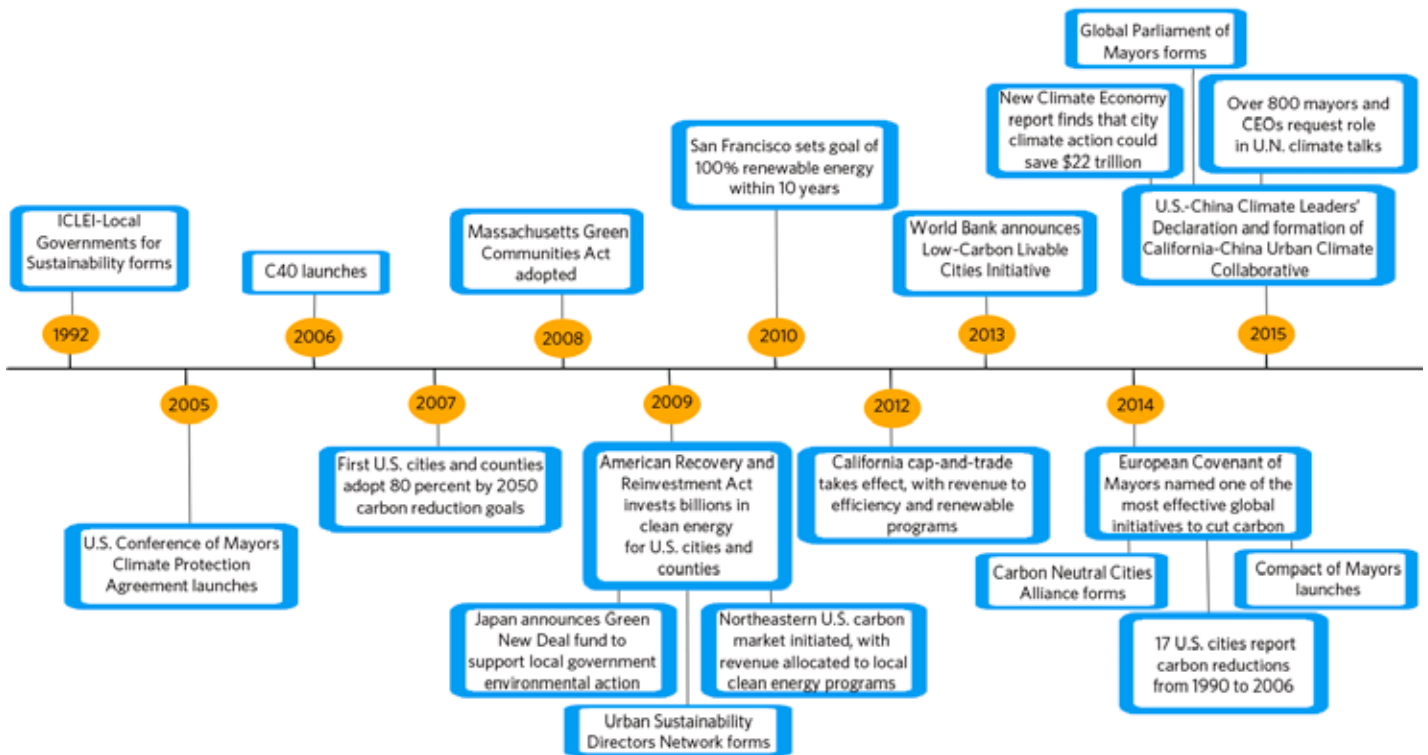


Figure 6: Key Milestones in the Low Carbon City Movement Whitney Fleming

The Carbon Neutral Cities Alliance,¹⁴⁰ a signature initiative of the Urban Sustainability Directors Network,¹⁴¹ is a partnership of officials from across the world whose cities are committed to deep carbon reduction. The Alliance commissioned the Innovation Network for Communities to develop a carbon neutrality planning framework, based on a scan of 17 cities from across the world, which will be available publicly in late 2015.¹⁴² (See *Figure 7 for a map of C40 and Carbon Neutral Cities Alliance members.*) Based on data from C40 and Carbon Neutral Cities Alliance.

In September 2015, at the U.S. - China Climate Leaders Summit, a range of U.S. and Chinese cities committed to take parallel steps to reduce carbon emissions.¹⁴³ In support of these pledges, entities and cities in California and China formed the California-China Urban Climate Collaborative,¹⁴⁴ to support policy-makers in climate action planning, develop capacity, and connect cities with clean energy providers. Shenzhen, China (pop. 7. million) and Los Angeles, CA (pop. 3.9 million) have also signed a memorandum of understanding to share best practices and lessons learned on how to reduce emissions, and Beijing will explore how to adapt California's zero-emission vehicle credit trading mechanism, as well as carbon pricing.¹⁴⁵

A number of international collaborations support cities in developing countries. The World Resources Institute Ross Center for Sustainable Cities partners with large financial institutions such as the World Bank and Regional Development Banks, as well as with city networks such as C40, ICLEI, and UN-HABITAT to provide analysis and advice to cities and national governments on sustainable urban development, including energy, transportation, and land use planning.¹⁴⁶ WWF has a Low Carbon Cities Initiative with the Chinese cities of Shanghai (pop. 14.4 million) and Baoding (pop. 902,000) to decouple rapid economic growth from energy consumption as a way to reduce urban development climate impacts.¹⁴⁷

National and State Government Partnerships

Though far from the scale necessary for dramatic carbon reduction, federal agencies and state governments in the U.S. are also fostering local carbon reduction and clean energy innovation, primarily through technical assistance.

The U.S. Environmental Protection Agency's State and Local Climate and Energy Program¹⁴⁹ (home of the Climate Showcase Communities program¹⁵⁰) provides technical



Figure 7: Global Members of C40 & CNCA. Based on data from C40 and Carbon Neutral Cities Alliance. *Whitney Fleming*

assistance to cities and counties on reducing carbon emissions and monitoring energy use, drawing on lessons from past grantees. Since American Recovery and Reinvestment Act funds ended, the U.S. Department of Energy's Better Buildings program now offers peer exchange calls for local entities working toward energy efficiency.¹⁵¹ The Partnership for Sustainable Communities, a collaboration of the U.S. Department of Housing and Urban Development, U.S. Department of Transportation, and the U.S. Environmental Protection Agency, coordinates to improve access to affordable housing, increase transportation options, and lower transportation carbon emissions.¹⁵²

The U.S. Department of Energy's Cities Leading through Energy Analysis and Planning project aims to provide standardized, localized energy data and analysis to cities to support clean energy advancement.¹⁵³ The agency's State, Local, and Tribal Technical Assistance Gateway also offers support to communities on topics ranging from energy efficiency policies and programs to local solar analysis.¹⁵⁴

Thanks to carbon pricing revenue from the Regional Greenhouse Gas Initiative, the Massachusetts Green Communities Division¹⁵⁵ and New York's Cleaner, Greener Communities program¹⁵⁶ both encourage cities and towns to increase energy efficiency and renewable energy use through planning and implementation grants.

Geographic Clusters

Local leaders are also organizing themselves, banding together with neighboring jurisdictions that represent not only friendly competition among elected officials but also shared capacity and technical assistance on topics that are common to geographic regions. Local governments in the same region typically share energy utilities, regional transportation providers, and state laws. As a result, these partnerships are more efficient and also have political power in numbers.

The San Diego Regional Climate Collaborative is a network for public agencies, nonprofit organizations, academia, and businesses in the **San Diego, CA** (pop. 1.4 million) region to facilitate climate change planning by sharing expertise and leveraging resources.¹⁵⁷ In 2014, the Collaborative provided capacity to local governments for updating greenhouse gas inventories and implementing climate action plan initiatives, such as expanding regional electric vehicle infrastructure; partnered with the local energy utility to promote energy efficiency funding and related city strategies; and provided grant application support on planning for sea level rise. In partnership with the Collaborative, in 2015 the San Diego Foundation is issuing \$200,000 in grants to help local governments prepare for climate change.

The King County-Cities Climate Collaboration (K4C-pop. 1.5 million) is a voluntary partnership of **King County, WA** and 13 cities to coordinate local government climate actions.¹⁵⁸ Eleven of the member cities have formally committed to a regional carbon reduction work program, including actions to move toward the K4C's goals of 90% renewable electricity countywide by 2030, 25% reduction in building energy use, and 15% cleaner vehicles by 2030.

In addition to this voluntary coalition of leading cities, the K4C also helped King County's Growth Management Planning Council in 2014 to adopt voluntary countywide carbon reduction goals of 80% by 2050 and 50% by 2030. As King County Executive Dow Constantine said, "To move the needle on



Shenzhen **photo: Jo.Sau**

“To move the needle on climate change, we must have a coordinated approach that includes all levels of government working with businesses, nonprofits, and community partners,” King County Executive Dow Constantine said.

climate change, we must have a coordinated approach that includes all levels of government working with businesses, nonprofits, and community partners.”¹⁵⁹

Neighboring jurisdictions also find it valuable to collaborate on energy and climate plans. In 2008, all of the cities and towns of **Boulder County, CO** (pop. 310,000) adopted a

community-wide sustainable energy plan.¹⁶⁰ As early as 2009, **Portland and Multnomah County, OR** (pop. 766,000) issued a joint climate plan.¹⁶¹ In 2012, the Southeast Florida Regional Climate Change Compact established a climate plan across **Palm Beach, Broward, Miami-Dade, and Monroe Counties, FL** (cumulative pop. 6,578,000).¹⁶²

More than ever, cities see that they have the collective power to get results on bold climate action agendas, and are learning from each other instead of reinventing the wheel.

VII. Unlocking Funding

Dedicated funding is a critical ingredient for urban clean energy action, but securing it is one of the most persistent challenges that local governments face today.

Some leading communities are marching ahead on their own: in 2006, **Boulder, CO** (pop. 103,000) residents approved the first carbon tax in the U.S., both to reduce emissions and to help pay for the city's climate action plan.¹⁶³ In June 2014, **Johannesburg, South Africa** (pop. 752,000) issued green bonds for low-carbon energy and transportation projects,¹⁶⁴ including a biogas-to-energy project, a solar geyser (low-cost hot water heating) initiative, and dual-fuel buses.¹⁶⁵

But not all urban leaders have the authority or political support to levy taxes and issue bonds at the scale necessary to implement their climate and clean energy plans.

Global Financial Institutions

Global finance leaders recognize this problem—especially acute in developing countries—and are joining forces to solve it. In September 2013, the World Bank announced a Low-Carbon Livable Cities Initiative to encourage 300 of the largest cities in developing countries to plan for low-carbon, climate-smart investment.¹⁷⁰ Recognizing that many cities in developing countries lack credit ratings necessary to borrow money in capital markets, the Bank is aiming to help cities become more attractive to private investors by increasing their creditworthiness. One example is **Lima, Peru** (pop. 8.5 million), which the World Bank assisted to secure an improved credit rating to raise \$130 million to improve the city's bus rapid transit system.¹⁷¹



Madrid photo: **Luc Mercells**

In 2014, nongovernmental organizations, international financial institutions, and commercial banks formed the Cities Climate Finance Leadership Alliance to identify barriers to cities in accessing capital and accelerate new approaches to unlock capital flows for low-carbon investment in cities.¹⁷²

In 2015, the Global Commission on the Economy and Climate—a group of former heads of state, national finance ministers, and leading global economists—recommended that international institutions, city networks, and banks develop an integrated package of \$1 billion over five years to support the world's largest 500 cities in reducing carbon emissions and building urban resilience.¹⁷³ The Commission estimated that such a package could leverage at least \$20 billion in private investment for low-carbon cities.

National and State Governments

National and state governments are also stepping in.

In 2009, Japan's Ministry of the Environment announced a Green New Deal fund of 55 billion yen (equivalent to \$567 million) to support local governments on environmental initiatives such as home energy efficiency programs, residential solar installation, and environmentally friendly energy infrastructure projects.¹⁷⁴ One recipient, **Kawasaki City** (pop. 1.5 million), announced in 2014 that it would direct 500 million yen (approximately \$4.1 million) from this program to smart city improvements and distributed renewable energy, as part of a joint emergency preparedness and carbon reduction effort.¹⁷⁵ The city of **Yokohama** (pop. 3.7 million) also cited this fund as a resource to promote energy resilience and carbon reduction.¹⁷⁶ Forty locations nationwide will reportedly receive funding by the end of 2015.

From 2009 to 2011, the U.S. federal stimulus funds provided an important jumpstart in the form of \$3.2 billion for the Energy Efficiency and Conservation Block Grant program,¹⁷⁷ which funded clean energy projects and programs in cities, towns, and states across

the U.S. While this funding was a one-time opportunity, and there is no prospect for community-focused energy funding from the U.S. federal government in the foreseeable future, it enabled a significant amount of clean energy innovation, and serves as a model to revive or replicate should the U.S. get serious about addressing climate change at the federal level.¹⁷⁸

From 2008 through 2013, over \$1 billion in Regional Greenhouse Gas Initiative (RGGI) revenue supported energy efficiency and clean energy programs in participating New England and Mid-Atlantic U.S. states, with 15% on average going directly to municipal, state, and community programs.¹⁷⁹ The **Massachusetts** Green Communities Division,¹⁸⁰ for example, has provided direct support to all 351 Massachusetts cities and towns (as New Energy Cities described in 2012¹⁸¹ and 2013¹⁸²), including grants for energy efficiency and renewable energy to 110 communities that earned the Green Communities designation. **New York State's** Cleaner, Greener Communities program has also funded development of regional sustainability plans, and allocated \$90 million in competitive funding to implement market-transforming sustainability initiatives.¹⁸³

Since 2010, the European Investment Bank's European Local Energy Assistance (ELENA), has directly benefited over 30 local government projects—including **London's** expansion of district heating networks; **Bristol, UK's** Energy Service; and a large-scale investment in electric vehicles and charging infrastructure in **Madrid, Spain**.¹⁸⁴ By covering up to 90% of technical assistance costs for a local government to scope and finance an energy investment program, ELENA aims to help local governments—many without the capacity and expertise to implement large energy projects—attract funding from private banks and other entities. (With this support, the city of London has also formed its own small finance/project development team to propose and structure projects for district heating.)

In September 2015, the state of South Australia announced its aim to attract \$10 billion

in low-carbon investment,¹⁸⁵ with the specific purpose of supporting the city of Adelaide to become the first carbon-neutral city in the world.¹⁸⁶

Public-Private Partnerships

Public-private partnerships are critical to large-scale climate action. In 2010, Siemens and private utility AÜW chose¹⁸⁸ **Wildpoldsreid, Germany** (pop. 2,600) as the testbed for a \$6 million experiment¹⁸⁹ in grid automation to balance supply and demand in real time, using batteries and electric vehicles to store the community's excess renewable energy. The project capitalized on the fact that the community was producing 500% more energy than it consumed, and addressed challenges of grid operators in integrating that power and maintaining network stability.

In 2011, **Asheville, NC** (pop. 87,000) adopted a policy to guide renewable energy public-private partnerships.¹⁹⁰ As Asheville's Chief Sustainability Officer Maggie Ullman said, "The incentive structure in North Carolina is great, but the city government can't get any of the tax credits, which means we are going to leave 65 to 80 percent of the money on the table. That makes it hard to finance some of the systems. If we want solar, then we really need to look at public and private partnerships and utilize public land where it is available."¹⁹¹

Philanthropic Funding

Philanthropic funding has been another catalytic source of support for community clean energy innovation.

In **Boston, MA** (pop. 646,000), the Barr Foundation and former Mayor Menino partnered to convene the Boston Green Ribbon Commission, a group of representatives from the city's leading economic sectors to develop shared approaches to addressing climate change. In 2015, the Commission created a Renewable Energy Leadership Prize (with \$100,000 from the Barr Foundation) that will go to the organization or consortium of organizations that "develops the most compelling strategy for large-scale renew-

able energy generation from either on-site or off-site sources."¹⁹² The Commission issued a Request for Proposals, and will select a winner through a competitive process by early 2016. The Commission has also published four reports to influence Boston's energy future and inform the public about the costs and carbon implications of different energy choices.¹⁹³

The Carbon Neutral Cities Alliance facilitates the allocation of an Innovation Fund—supported by Bloomberg Philanthropies, Garfield Foundation, the JPB Foundation, Summit Foundation, and Surdna Foundation—through a competitive process in which the Alliance's members submit proposals to advance best practices among member cities.¹⁹⁴

In July 2015, the Alliance announced \$702,000 for eight projects, including: new financial and delivery models for retrofitting buildings; acceleration of the transition to next-generation district heating systems; analysis of how to reduce natural gas use in heating; advancement of green vehicle infrastructure; a blueprint for development approvals of hydrogen re-fueling stations; accelerating net-zero energy high-rise buildings; a model for district-scale low-carbon energy system transition; and market transformation toward high-performing building envelopes. **London, Copenhagen, Sydney, Boulder, and Vancouver, BC** are leading these projects, with participation from a range of other Alliance member cities.

In 2012, the community-based San Diego Foundation¹⁹⁵ and San Diego Gas and Electric's Local Government Partnerships Program¹⁹⁶ provided critical funding to establish the San Diego Climate Collaborative,¹⁹⁷ a network of public agencies that share expertise and collaborate on comprehensive climate change planning. (See Section V for more information.)

The Georgetown University Energy Prize is a competition that will award \$5 million to the community that reduces the most per capita energy consumption in its homes and schools over the course of two years.¹⁹⁸

In addition to learning from collaboration between local governments, utilities, and businesses, the 50 semifinalists are also learning from one another's community energy efficiency plans, and providing models for other cities across the country. Sponsors of the prize include: Georgetown University; the U.S. Department of Energy; private sec-

tor energy efficiency service companies; the American Gas Association and the American Public Power Association; the Joyce Foundation, a foundation that serves the Great Lakes region of the U.S.; and numerous non-governmental organizations.¹⁹⁹ Semifinalist cities range from Winter Park, FL to Bellingham, WA.

VIII. Building Diverse Coalitions beyond Climate

Urban leaders are increasingly aligning their carbon reduction and clean energy agendas with other important community priorities—such as air quality, transportation, social equity, economic development, and climate change resilience. In doing so, they forge stronger and more diverse coalitions for climate action.

In the winter of 2008-2009, **Salt Lake City, UT** (pop. 191,000) convened stakeholders from state and local government, business, and nonprofit and faith-based organizations to tackle the region's serious air quality problem.²⁰⁰ The city was in violation of federal air quality regulations for several days of the year, and the problem of air pollution was visible to residents, public officials, and businesses.

The Chamber of Commerce gathered over 100 business leaders to discuss the eco-

nomie case for clean air, citing challenges to business recruitment, health care costs, and regulatory burdens. The coalition acted quickly to focus on transportation solutions, with an emphasis on reducing single-occupancy vehicle trips, and a social media campaign to promote less driving.²⁰¹

The city subsequently adopted greenhouse gas emissions goals as part of a U.S. EPA Climate Showcase Communities grant. In 2012, the effort contributed to a statewide victory: the U.S. EPA found that Utah was in compliance with more stringent ozone standards, which air quality regulators attributed to the City's reduction of car trips during at-risk days.

After years of decline, **Buffalo, NY** (pop. 259,000) is experiencing an economic renaissance as a result of cheap, carbon-free hydropower from Niagara Falls and signifi-



St. Louis photo: **Tim Hamilton**

cant new renewable energy investment.²⁰² Fourteen wind turbines on the shore of Lake Erie provide enough power for 15,000 homes. A former steel plant²⁰³ will be the home of SolarCity's 1.2 million square-foot facility to produce high-efficiency solar panels.²⁰⁴

Buffalo's state tax breaks and incentives totaling \$750 million have drawn criticism, but the region's clean energy economic development strategy proponents point to success in reducing the area's unemployment rate to a current low of 5.3%. Moreover, SolarCity's \$5 billion investment in the site is expected to create 1,500 on-site jobs and 1,500 more jobs among suppliers in the area.

Portland, OR's (pop. 609,000) 2015 climate plan process established an equity working group of six local environmental justice and health organizations to incorporate social justice systematically into the plan's activities.²⁰⁵ Philanthropic grants from the Bullitt Foundation and the Local Sustainability Matching Fund (now Partners for Places) allowed Portland to pay staff from those stakeholder organizations to spend time commenting on the plan, and to work with a Portland State University professor to review the prior plan with a social justice lens. Resulting priorities included increases in the urban forest canopy in disadvantaged neighborhoods, and expansion of public transit options.

Poor air quality due to coal-fired power plants has long been a public health, eco-

nomc, and political liability for **Beijing** (pop. 11,510,000) and other Chinese cities. In September 2014, the Global Commission on the Economy and Climate found that air pollution was associated with 1.23 million premature deaths and economic loss representing 13% of the country's gross domestic product.²⁰⁶ In early 2015, Beijing announced it would close its last coal-fired electricity plant in 2016.²⁰⁷ The issue is deeply political: the Chinese government banned a recent documentary chronicling the country's air pollution problems,²⁰⁸ and authorities in the northern city of Xi'an detained protestors in an effort to quell related unrest.²⁰⁹

In September 2015, based on concern²¹⁰ about climate change impacts to their communities, 14 mayors of a diverse range of cities in the **Mississippi River Basin** committed to promote clean energy and carbon reduction solutions.²¹¹ The pledge was a collaboration of the Mississippi River Cities and Towns Initiative,²¹² an effort to make the Mississippi River more sustainable through regional cooperation, and the Path to Positive Communities, a national coalition of community leaders and organizations focused on advancing climate solutions.

Many local officials see climate action as mutually reinforcing economic prosperity and other priorities, and are taking steps to reduce carbon emissions for reasons other than climate action. These efforts not only address community needs but also build broader, more powerful political coalitions beyond traditional climate alliances.

IX. What's Next for the Low-Carbon City Movement

The past decade has seen an explosion of local action to tackle carbon reduction. However, much still remains to do. For cities to help national governments reduce emissions, the agenda for the next 5-10 years must include:

Funding. Lack of funding is one of the most significant barriers for bold urban climate action. Though cities in developing countries have the greatest need, the majority of U.S. cities need financing as well—especially in the 40 states that lack carbon pricing as a dedicated revenue stream. Urban leaders cannot shoulder this burden alone, and need a carbon price and the support of private partners and other levels of government to unlock funding.

Expertise and partnerships in clean energy transition planning. To phase out fossil fuels and meet future energy needs with energy efficiency and renewable energy represents an enormous challenge, especially for urban governments that do not control their power supply. City officials and staff must increasingly roll up their sleeves—and partner with trusted institutions and experts—to develop in-depth knowledge of how current energy decisions do (or do not) add up to a long-term carbon reduction goal.

Tools to act. Leading cities must look beyond their typical toolbox of policies, programs, and partnerships, and experiment with new approaches to achieve carbon reduction through cleaner energy supply, building energy efficiency, and low-carbon transportation.

Accountability to goals. Cities must demonstrate transparency and accountability to their commitments through annual carbon reporting. Cities can register with well-established carbon reporting organizations such as carbonn Climate Registry and the Carbon Disclosure Project, in addition to issuing their own annual reports and regular inventories. Cities can also join the world's largest coalition of local leaders addressing climate change—the Compact of Mayors—which requires commitment to reduce greenhouse gas emissions, track progress, and prepare for climate change impacts.

The climate crisis requires that cities and their partners embrace these actions at a greater scale than ever before.



London
photo: Sam Carpenter

X. Appendices

A. Related Reports and Resources

Title	Author	Date	Summary/Highlights
<i>Innovations in Voluntary Renewable Energy Procurement: Methods for Expanding Access and Lowering Cost for Communities, Governments, and Businesses</i> ²¹³	National Renewable Energy Laboratory	Sept. 2012	Options for communities, governments, and businesses to procure renewable energy include community choice aggregation, community wind and solar, green power challenges, bulk purchasing, and reverse auctions.
<i>The Road to 2050: 80x50 Strategy Maps for Carbon-Neutral Cities</i> ²¹⁴	Innovation Network for Communities (IN4C)	March 2013	IN4C reviewed top U.S. city climate plans and created a roadmap of best practices for U.S. cities to reach carbon neutrality.
<i>City Energy: A New Powerhouse for Britain</i> ²¹⁵	Institute for Public Policy Research (IPPR)	July 2014	IPPR argues that more British cities should get into the business of delivering energy directly or partnering on a joint venture with an experienced energy supply entity. It also makes the case for cities to: add low-carbon investment criteria to local pension funds; issue green bonds; and collaborate with the United Kingdom's Green Investment Bank on low-carbon infrastructure projects.
<i>Better Growth Better Climate</i> ²¹⁶	The New Climate Economy	Sept. 2014	The Global Commission on the Economy and Climate—a group of former heads of state, national finance ministers, and leading economists—found that denser, more transit-oriented, and lower-carbon urban development could reduce urban infrastructure capital needs by \$3 trillion over the next 15 years.

<i>Global Aggregation of City Climate Commitments</i> ²¹⁷	Arup and C40, in partnership with ICLEI, United Cities and Local Governments, UN Habitat, the UN Secretary General's Special Envoy for Cities and Climate Change, and the World Resources Institute	Sept. 2014	Over 200 cities worldwide have committed to carbon reduction goals that together amount to the combined current annual emissions of China and India.
<i>Advancing Climate Ambition: Cities as Partners in Global Climate Action</i> ²¹⁸	C40 Cities Climate Leadership Group	Sept. 2014	Cities can collectively reduce emissions by at least 10% beyond what national actions are on track to achieve by 2030. Separately, former New York City Mayor Bloomberg wrote that this amount is roughly equivalent to reducing the world's coal consumption by a quarter. ²¹⁹
<i>Powering Climate Action: Cities as Global Changemakers</i> ²²⁰	Arup & C40: Working Together	June 2015	Cities have the tools they need to achieve meaningful carbon reduction, and cities that collaborate with other entities to achieve climate goals are more effective than those that do not.
<i>Climate Commitments of Subnational Actors and Business</i> ²²¹	United Nations Environment Programme	June 2015	Initiatives involving cities, businesses, and industrial sectors have significant potential to reduce global carbon emissions.
<i>Seizing the Global Opportunity: Partnerships for Better Growth and a Better Climate</i> ²²²	The New Climate Economy	July 2015	The Global Commission on the Economy and Climate found that investment in low-carbon urban infrastructure is critical for the global climate and also leads to healthier, more livable, and more economically productive cities.
<i>City-Level Energy Decision Making: Data Use in Energy Planning, Implementation, and Evaluation in U.S. Cities</i> ²²³	U.S. Department of Energy National Renewable Energy Laboratory	July 2015	Cities employ the use of energy data in planning to reduce greenhouse gas emissions, especially in the building, transportation, and energy sectors. However, many cities are unable to quantify how specific strategies add up to their goals.

<i>Measuring Up 2015</i> ²²⁴	World Wildlife Fund and ICLEI-Local Governments for Sustainability	August 2015	The authors reviewed the commitments of 116 U.S. cities that have reported their greenhouse gas emissions data, and found that all of those cities reaching their existing carbon reduction targets would equate to closing 86 coal-fired power plants per year.
<i>Non-State Actors in a Paris Agreement</i> ²²⁵	Fores & University of Amsterdam	August 2015	Non-state actors such as cities and companies will be crucial in influencing upcoming climate negotiations to bridge the ambition gap between current national pledges and what we need to keep global warming at two degrees Celsius.
<i>Keeping Cities Green: Avoiding Carbon Lock-In Due to Urban Development</i> ²²⁶	Stockholm Environment Institute	Oct. 2015	Inefficient new urban development could lock in significant future carbon emissions, whereas aggressive urban actions could avoid them.

B. City Activity Leading Up to the 21st Conference of Parties in December 2015

In advance of the 21st Conference of Parties (COP21) in Paris, cities and nongovernmental organizations organized a drumbeat of events and announcements to demonstrate the collective emissions reduction potential and political power of urban leaders:

- Over 800 mayors, corporate heads, and trade organizations met in Lyon, France in July 2015 to request greater participation in United Nations climate negotiations, where subnational entities have no official role.²²⁷
- Los Angeles hosted a U.S.-China Climate Smart/Low-Carbon Cities Summit on September 15-16, 2015.²²⁸
- City-focused events packed Climate Week NYC on September 21-28, 2015.²²⁹
- An inaugural Global Parliament of Mayors convened in October 2015, with a focus on how mayors can use their political power to create cross-border solutions to global challenges such as climate change.²³⁰
- Member officials of the U.S. National League of Cities' (NLC) Local Climate Leaders Circle met at the NLC Congress of Cities in November 2015 to prepare to convey their message of local climate leadership at the COP21.²³¹

Recent pledges have also served as important organizing vehicles to show that cities together can meet or exceed national-level commitments:

- The Compact of Mayors is a coalition of city officials—spanning six continents—who commit to track and reduce urban carbon emissions and increase resilience to climate change.²³² The primary goals of the Compact are to: demonstrate the extent of city climate action to national governments and private investors; advocate for inclusion of cities in national and international carbon reduction strategies; encourage greater funding and finance of city climate action; and establish a strong accountability framework by which cities can hold themselves responsible for their carbon reduction commitments.
- Signatories to the European Covenant of Mayors commit to 28% reduction by 2020 (8% greater than the European Union target).²³³ *The Economist* in 2014 called²³⁴ the Covenant, which over 6,000 European cities have signed, one of the most effective global initiatives to cut carbon.²³⁵

In parallel to this groundswell of subnational action, the Peruvian leaders of the 20th Conference of Parties (COP20) created the Non-State Actor Zone for Climate Action (NAZCA), a website to “give governments the confidence to sign an ambitious agreement at the Paris climate negotiations” by showcasing the collective commitments of companies, cities, states, and investors.²³⁶ In conjunction with French authorities, the COP20 leadership also established the Lima-Paris Action Agenda, a plan for action between the 20th and 21st Conference of Parties that emphasized the importance of cities and other subnational entities in meeting and exceeding national climate pledges.²³⁷

Cities are also looking ahead to the urban-focused United Nations Habitat conference in Quito, Ecuador in 2016 as an official platform for expressing their concern about climate change.²³⁸

To help make sense of these numerous engagement opportunities, the U.S. Climate Action Network has coordinated communications among U.S. city officials and stakeholder groups to identify how to participate in advance of and at the COP21.²³⁹ Similar networks, such as Energy Cities, are advising European cities on how to engage.²⁴⁰

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