Where

Local governments are taking climate action plans to a new level.

California Air Resources Board

Don't hold your breath waiting for a new global climate agreement and federal legislation to reduce greenhouse gas emissions. Both may still be stalled, given the lack of progress at the Copenhagen negotiations and in the U.S. Congress. The outlook is more promising at the local level, however, as city and county governments continue to ramp up their own climate action plans.

By the end of 2009, at least 141 local jurisdictions had developed climate action plans, according to the international nonprofit ICLEI—Local Governments for Sustainability. More than 600 governments had joined ICLEI's Cities for Climate Protection Campaign, which commits them to implementing such a plan as well as conducting a greenhouse gas emissions inventory and adopting an emissions reduction target.

Also by the end of last year, more than 1,000 mayors had signed on to the U.S. Mayors Climate Protection Agreement—a pledge to meet or beat the nation's assigned target, under the Kyoto Protocol, of reducing emissions seven percent below 1990 levels by 2012. Some mayors signed as part of an effort to generate bottom-up pressure for federal action, following former President George W. Bush's decision to abandon the Kyoto Protocol.

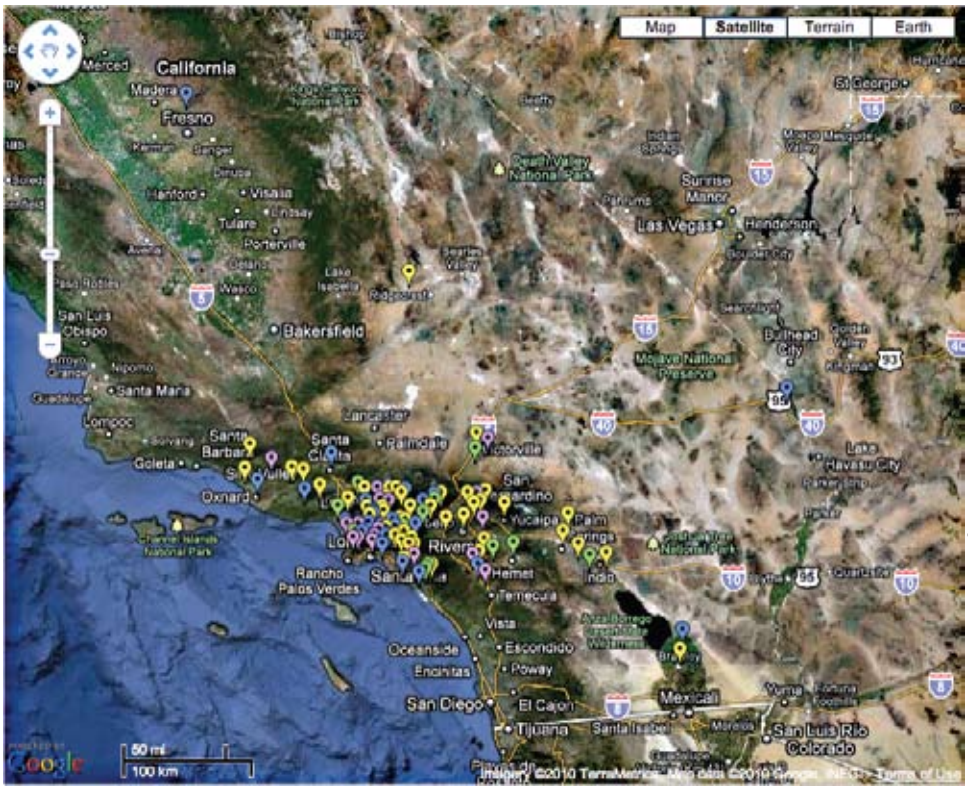
In part, the local planning efforts are the result of healthy competition. Every place wants to become "the greenest city in the state or nation," says Juan Matute, director of the Program on Local Government Climate Action Policies at the University of California-Los Angeles.

Where climate planning is taking place is also notable. "It's not just a Left Coast activity," says Amy Malick, ICLEI's climate protection program manager. She points to Kansas City as one "unsung hero" that has a particularly aggressive green buildings program. Besides adopting citywide green building requirements for municipal facilities and private projects receiving economic development support, the city has concentrated federal stimulus dollars in a "Green Impact Zone" close to downtown. Plans for the 150-block zone—which suffers from high crime and unemployment rates and which has many abandoned properties—include weatherizing every home that needs it, creating a smart energy grid, and offering training programs for green jobs.

Of course, economic arguments are often as powerful as environmental ones. In Ann Arbor, Michigan, the roots of the city's climate program lie in the energy planning work begun during the 1970s oil crisis. The program is seen as both environmentally progressive and a way to save money on energy bills, says energy programs manager Andrew Brix. But there's also a more general benefit: "If Ann Arbor is going to

the Action Is

By Adam Millard-Ball



UCLA Program on Local Government Climate Action Policies

California Air Resources Board

Testing air quality for the Central California Air Quality Studies (opposite). Above: Southern California cities vary in their commitment to climate action plans: general plan policy addressing GHG (yellow); climate action plan (purple); no climate change policy (orange); climate action plan and general plan policies (green); all others in blue. Left: Refrigerated trucks are monitored for emissions, as required under California's 2006 law on global warming.

be a town that people want to live in and that attracts new businesses, we need to be a climate-friendly city," he adds.

Others cite green job creation as another reason for climate planning. Deborah Salon, staff economist at the Institute of Transportation Studies at the University of California, Davis, is leading research on climate planning in California cities. She notes that planners working on a climate action plan for the Central Valley city of Fresno emphasize the things that could bring "lots of green jobs and an energy-efficient housing stock." And, she adds, "you don't have to be an environmentalist to support those strategies."

Leading the states

As it happens, California is at the center of climate planning. Its local governments are producing more than one-third of all the climate action plans being developed in the U.S., according to ICLEI data. Further, a 2008 survey by the Public Policy Institute of California found that three-quarters of local governments in the state were working on climate issues. Half had completed climate action plans or were planning to do so.

Two flagship state laws have played a major role in catalyzing local action. Assembly Bill 32, passed in 2006, set out an overall emission reduction target and policy framework for the state. Senate Bill 375, adopted in 2008, created greenhouse gas targets and funding incentives for metropolitan planning organizations.

Neither law requires local climate planning. But state Attorney General Jerry Brown has argued that greenhouse gas emissions must be analyzed and mitigated under the California Environmental Quality Act—and he has filed suit against local governments that have failed to do so in conjunction with general plan updates. A settlement agreement negotiated with San Bernardino County, the target of one such suit, required that a climate action plan be developed.

Even without a mandate, these laws have caught the attention of local officials, says Terry Roberts, planning liaison at the

California Air Resources Board. They have "elevated the focus on greenhouse gas emissions and climate change," and made local governments ponder how to address the issue.

Greenprint Denver takes a broad brush approach to sustainability planning—including water conservation and natural lands management. Here: an urban park where Cherry Creek and the South Platte River meet in Denver's Lower Downtown.

Bigger thinking

Climate action plans typically include a greenhouse gas emissions inventory and emission reduction targets for municipal operations, and sometimes for the wider community as well. Transportation, energy and buildings, and waste management are often the main areas addressed, with some plans also including urban forestry and water conservation.

Roberts notes a trend toward plans that move beyond city hall. "The early climate action plans were dealing mainly with municipal operations: improving fleet vehicle efficiency, recycling, and energy efficiency in city buildings," she says. "Now, more of these plans are dealing with jurisdiction-wide policies such as land-use planning."

Ann Arbor is a case in point. Until recently, says Brix, its climate efforts were mainly limited to securing energy savings in city departments. But in 2006, following the city council's adoption of the Green Energy Challenge, the city began to set wider goals. The challenge is actually a series of targets aimed at encouraging the use of renewable energy and at reducing greenhouse gas emissions 20 percent citywide from 2000 levels by 2015.

Brix's position is funded by charging city departments proportionally for their share of energy use. (The mechanism is an interdepartmental transfer fee.) "The rationale is that I'm able to save them money on their bills, or bring in grant funding for their projects," he says. "It's a similar model to IT and other services. It's pretty common in Ann Arbor to charge other departments for services."

Strategies

Federal stimulus funding under the Energy Efficiency and Conservation Block Grant has enabled Ann Arbor to add a new staff member to work on community-wide energy programs. Across the country, the $3.2 billion EECBG, which includes $2.7 billion in formula grants to cities and states and $454 million in competitive grants, has been a shot in the arm for local climate work.

The stimulus funds can be used both to develop climate plans and to implement energy programs. And several local governments have used existing climate plans to help secure additional funding from competitive grant programs.

In Durham, North Carolina, a joint city-county proposal with Durham County resulted in a $500,000 grant from EPA's Climate Showcase Communities program. The grant, received this spring, will be used to expand a neighborhood-based residential energy retrofit program, which was launched with funding from the city's EECBG funds.

"We're working with volunteers who go door to door talking about energy efficiency—what resources and grants are out there, showing people how to put in weather stripping, and so on," says Tobin Freid, Durham's sustainability manager. In addition to training and equipping the volunteers, the funding will pay for retrofitting almost 700 homes.

Focusing on the neighborhood is a way to raise the visibility of energy efficiency programs, Freid adds: "Neighbors talk to their neighbors."

Freid says the target neighborhoods are characterized by single-story houses that are under 2,000 square feet and have no unvented internal combustion appliances. Contractors will seal air ducts, add attic insulation, seal air leaks in attics and crawl spaces, and install programmable thermostats. "Probably 90 to 95 percent of houses need those things, so you don't need to use expensive diagnostic tools," says Freid. "We can get a pretty good bang for the buck."

Different strategies are used elsewhere. One is the Property Assessed Clean Energy program or PACE, which is aimed at reducing greenhouse gas emissions from buildings.

PACE was the brainchild of Cisco DeVries, former chief of staff to Mayor Tom Bates in Berkeley, California. DeVries came up with the idea as a way to fund solar energy while developing Berkeley's climate action plan in 2007.

Here's how it works: Local governments issue bonds for various energy retrofits (not just solar) on individual homes. The bonds are repaid (typically over 20 years) by participating home owners, who are charged a special assessment. The idea has since spread across the country, and other jurisdictions are using it for a range of projects.

"PACE is arguably the future of energy financing," says Ann Arbor's Andrew Brix, who is working with other Michigan cities to get enabling legislation through the state legislature. For home owners who can obtain financing elsewhere, PACE helps by tying the loan to the property, reducing the risk for the home owner of losing out if the property is sold.

"One of the challenges that PACE ad-

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dresses is that banks and appraisers don't necessarily recognize the value of the energy improvements," says Brix. "It's not like a kitchen remodel."

Big picture

A climate action plan is just one way that cities can incorporate greenhouse gas emission goals in the local planning process. Some places, such as Denver, are addressing climate change as part of sustainability plans, which have a broader environmental return.

"The climate action plan is one big component of the Greenprint Denver initiative," says Greenprint director Michele Weingarden, but the initiative also includes water conservation, waste diversion, economic development, land use and transportation, and natural lands management. "It's a three-legged stool that's looking at economic, societal, and environmental sustainability," she says.

The program staff relies on "urban fellows" on loan from other departments, a practice that helps to reduce the program's cost and to ensure involvement across city government. "They come to us for a year and then take that knowledge back to their agency," she says. The competitively selected fellows undertake the program management and other tasks of regular employees, such as marketing and neighborhood outreach.

ON A RELATED TOPIC

Grasping the Science

Do recent controversies about the science behind climate change mean that planners should let up on mitigation and adaptation efforts? Certainly not. But we should be prepared to discuss science-based skepticism and confront ideological deniers. A recent Gallup poll found that 48 percent of Americans believe the seriousness of global warming is exaggerated, up from 30 percent in 2006. Local and regional planners can no longer simply point to Al Gore's movie, *An Inconvenient Truth*, and say that the matter is settled.

In late 2009, hacked emails led to questions about the climate science undertaken at the University of East Anglia in the UK. In response, an international panel organized by The Royal Society, Great Britain's national science academy, reviewed charges that the East Anglia scientists "dishonestly selected, manipulated and/or presented [climatic data] to arrive at pre-determined conclusions." The panel found "no evidence of any deliberate scientific malpractice," but it noted that the "dedicated if slightly disorganized researchers" could have had better record keeping, more accessible data sets, and more collaboration with statisticians.

Recently, too, the U.N.-sponsored Intergovernmental Panel on Climate Change made a mistake in reporting on the expected disappearance of the Himalayan Glaciers, revealing a flaw in the group's peer review process.

Skepticism can have a broader impact as well. Two Texas oil companies are funding an effort to block implementation of California's AB 32 Global Warming Solutions Act until the state's unemployment rate drops below 5.5 percent.

This year's snowy winter added another wrinkle to the discussion, but it also showed that our senses may mislead us because local variability is not the same as a global climate pattern. To understand global patterns we must use global data.

For planners, educating ourselves and the public about basic climate science is the obvious first step. We should be able to explain the process and the tools of science if we are to combat those who would distort the interpretation of findings. For example, IPCC issues state-by-state reports indicating levels of confidence in their assessments. Some critics have manipulated these figures to suggest a lack of scientific agreement. By appropriately organizing and framing the discussion, we can help to untangle facts about climate change from the value positions that are part of public discourse.

Science is always presenting alternative hypotheses, new measurement schemes, and different interpretations of data. Climate change science is no exception. What we can say is this: Global temperatures are warming, human activity is inducing that warming, and predictions of future global temperature increases carry some uncertainty. The profession's comprehensive, long-term approach and its ability to link science with policy suggest a vital role for planners. We must be the voice of reason on this increasingly polarized issue, distinguishing between valid scientific skepticism and ideologically driven denial.

Richard Willson, FAICP

Willson is a professor of urban and regional planning at California State Polytechnic University, Pomona.

Carbon Capture with Artificial Trees

Unlike people, animals, and machines, trees siphon carbon dioxide out of the air. Can the same thing be accomplished mechanically?

A recent documentary on the Discovery Channel described a new air-capture device—called an "artificial tree"—that is being designed to do just that. It seems that artificial trees may be able to drastically reduce carbon dioxide emissions—if the devices are mass produced and deployed across the globe.

An artificial tree operates in three phases: capture, removal, and storage. First, it traps carbon dioxide from the air with a filter chamber containing a material ("leaves") that absorb the CO_2. Next, the CO_2 is removed from the filter and released by a cleaning process. Finally, it is transported, stored, and secured.

CO_2 can be buried underground. The most feasible storage method is confinement in depleted oil and gas reservoirs, deep unused saline formations, and deep abandoned coal seams, according to Britain's Institution of Mechanical Engineers. Liquid CO_2 can be transported via ships, road, or rail tankers, but the U.S. EPA says pipelines are the most cost-effective way to haul large volumes of the gas.

The larger the collector surface and the higher the speed of the air blowing through the artificial tree, the greater the tree's absorption power. However, even a breeze will allow an artificial tree to capture CO_2, and, according to IME, such a tree is "several thousand times more effective at removing CO_2" than natural trees.

Early versions of an artificial tree developed by Columbia University geophysicist Klaus Lackner used sodium hydroxide as the sorbent material for the filter. That cleaning process was too expensive and consumed too much energy, however, so Lackner's research team developed a sorbent material that can be washed in water vapor to remove the CO_2. That change dramatically reduced energy consumption.

Commercial-scale geologic sequestration is occurring in Canada, Norway, and Algeria, and the U.S. Department of Energy is conducting research on similar technologies.

Benefits and costs

According to an IME report, "some 50 percent of global CO_2 emissions are emitted from non-stationary and dispersed sources, with about 20 percent derived from the transportation sector alone." A key advantage of artificial trees (or any air-capture approach) is that they can be placed virtually anywhere in the world, and can thus address CO_2 regardless of the source. The IME report suggests that artificial trees could be placed along highways and in spots where CO_2 concentrations are particularly high, thus creating a "low-carbon highway." The "trees" can also be grouped together in artificial "forests."

The report contends that "some 100,000 artificial trees [each absorbing 10 tons of CO_2 per day] would be sufficient to capture the whole of the UK's current non-stationary and dispersed emissions." What is more, "five to 10 million 'trees' could remove the current global annual non-energy production of CO_2 emissions." Each artificial tree might take out a ton of CO_2 a day, the equivalent of the CO_2 produced by 20 average vehicles in the U.S.

Manufacturing costs are expected to amount to about 20 percent of the total cost of removing CO_2 from the atmosphere with this type of technology. According to Lackner's estimates, once in production, the cabin-sized air-capture devices would cost about $20,000 each. Recovering CO_2 from the sorbent filter material is the most expensive operation in terms of energy and cost, but Lackner expects that cost to be "similar to that anticipated in a conventional post-combustion [carbon capture and storage] process."

Some experts suggest that economies of scale could reduce overall costs as the technology improves. Others, though, say that the reported costs of using the technology are "gross underestimates."

Jerry Weitz, FAICP

Weitz is the editor of *Practicing Planner*, AICP's quarterly online publication. He is an associate professor and director of the urban and regional planning program in the Department of Geography at East Carolina University.

Other cities are incorporating climate planning into comprehensive plan or general plan updates. "There has definitely been an evolution," says Tabetha Willmon of the California Air Resources Board. "A lot of the climate plans developed earlier in this decade were more stand-alone. They looked at transportation, buildings, and other areas. We're now seeing a different level of integration with the general plan."

The city of San Carlos near San Francisco comes to mind. Its general plan includes broad policies, but also refers to more detailed measures in the climate action plan, which is to be updated every five years. "We are now seeing that our approach is providing a model for future general plans and climate action plans in the region and the states and perhaps the country," says community development director Al Savay, AICP.

"Adopting climate policies in the general plan is an indication that climate change has been institutionalized in government," suggests Juan Matute of UCLA. "Cities can develop a climate action plan to start, but as part of that process they can outline future general plan goals, objectives, and policies" that then become part of a comprehensive plan.

Still, stand-alone climate plans do have advantages, Matute says. "The process is less formalized and cheaper and quicker," taking perhaps 18 months instead of the many years often devoted to general plan updates.

Another trend Matute notes is a move toward regional collaboration. An example is the South Bay Cities Council of Government, a consortium of municipalities in the Los Angeles metropolitan region. "They worked with ICLEI to conduct operational emissions inventories for every city in the

Global Research Technologies LLC

One design for a carbon dioxide capture devise combines a scrubber with a storage container.

COG," he explains. "It's a way to reduce the cost because you can bring in one consultant, and COG staff can work with the cities to consolidate requests to utilities for energy consumption data."

Transit agencies are also starting to develop emission reduction plans, and the American Public Transportation Association was due to issue its guidelines on climate action planning in late July. According to Eric Hesse, chair of the APTA climate change working group, a climate plan can help agencies identify cost-saving emission reduction measures and demonstrate the environmental benefits of transit. "This is an opportunity to burnish public transportation's image, both to the public it serves, as well as to local, state, and federal officials," state the draft guidelines.

Implementation hurdles

Some critics complain that local climate planning is light on results. Writing in the *Journal of the American Planning Association* in Autumn 2008, Stephen Wheeler, AICP, found that the first generation of state and municipal climate plans tends to "lack the strong actions and political and institutional commitment needed to mitigate emissions or adapt to climate change." At that point, "many proposed actions are voluntary, few resources have been allocated, and implementation of most measures has not yet taken place," concluded Wheeler, associate professor of landscape architecture at the University of California, Davis.

Claire Bonham-Carter sees more promise in the current generation of plans. "We're seeing a move toward a lot more detail in individual strategies and measures," says Bonham-Carter, who is the director of sustainable development practice for the international consulting firm, AECOM, headquartered in LA. "Earlier plans were more conceptual and didn't include the nitty-gritty of how their reduction targets were going to be met, or quantify how much greenhouse gas reduction they were expecting from each measure. People are realizing that they need a bit more quantification and analysis in their plans so that they can be sure they meet their targets."

Amy Malick of ICLEI praises the robust reporting systems in New York and Chicago. She calls for cities to do the same for climate as for other areas of service provision. "Cities already track things like emergency response times. If you can do the same for climate, it raises the level of importance of climate measures."

New York's PlaNYC progress report for 2010 shows that 56 percent of the plan's milestones have been achieved or mostly achieved. It also finds that citywide carbon emissions declined nine percent between 2005 and 2008, putting the city on track to achieve its 30 percent reduction goal by 2030. Data on emissions and the plan's other sustainability indicators are made available through the city's online tracking portal.

In Chicago, Joyce Coffee, director of project development in the Department of Environment and the city's climate plan manager, highlights the "dashboard," an internal management tool that shows implementation progress for 33 of the most important actions in the plan. Monthly staff meetings allow each of the relevant departments to report progress in five of their priority areas.

A major benefit of the climate action plan has been to institutionalize this performance tracking system, says Coffee. "It has helped the city to make climate action part of business as usual." The planning groundwork has also helped the city to use federal stimulus money "more rapidly and with more impact," she adds.

Climate planning to date has focused squarely on mitigation—the reduction of greenhouse gas emissions. The wave of the future, though, is adaptation planning: confronting the impacts of climate change.

As part of its climate action plan, Chicago commissioned an impact analysis led by two climate scientists, Donald Wuebbles from the University of Illinois and Katharine Hayhoe from Texas Tech University.

"No one would have believed before the analysis was completed that we'd have 30 days per year above 100 degrees by the end of the century," says Coffee. "That reorients how we manage extreme weather risk."

The *Chicago Climate Impacts Report*, completed in 2008, predicts that heat waves similar to the 1995 event, which killed almost 700 people, will occur every five years on average by the middle of the century. "Oppressive summer weather patterns could arrive in Chicago earlier in the year and last longer, causing air quality to decrease and further affecting respiratory illnesses and disease," it states.

"We found that however much we mitigated, we're going to need to adapt, and the impacts analysis really drove that home," says Coffee.

Andrew Brix agrees that a careful plan can help to set priorities, particularly now that more funding opportunities are available from the federal government and from utilities. But, he cautions, there is sometimes a need for immediate action. "Climate and energy plans are important, but there needs to be a balance with implementation. At some point, you have to put the plan down and go and build something."

Adam Millard-Ball is a PhD candidate at Stanford University and a former principal of the transportation planning firm Nelson\Nygaard. His current work focuses on local climate planning, and the impact of carbon offsets and cap-and-trade programs in transportation.

RESOURCES

FROM APA	"California's Aerial Combat," *Planning*, February 2009; "California Puts on the Brakes," *Planning*, May 2007.
CHICAGO STUDIES	The City of Chicago (www.chicagoclimateaction.org) offers several resources for other local governments, including a "Lessons Learned" report.
CALIFORNIA	UCLA's Program on Local Government Climate Action Policies (www.lewis.ucla.edu/climate) includes a database of funding opportunities and an inventory of climate planning efforts in Southern California.
BEST PRACTICES	See ICLEI (www.icleiusa.org/programs/climate); U.S. EPA (www.epa.gov/statelocalclimate/resources/strategy-guides.html); Institute for Local Government (www.ca-ilg.org/ClimateChange); and Cool California (www.coolcalifornia.org/local-government). ICLEI also publishes a decision-support tool to analyze strategies (www.icleiusa.org/action-center/tools/cappa-decision-support-tool).