LESSONS FROM THE PIONEERS:
TACKLING GLOBAL WARMING AT THE LOCAL LEVEL

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Since 1974, ILSR has researched the technical feasibility and commercial viability of environmentally sound state-of-the-art technologies with a view to strengthening local economies. The Institute works to involve citizens, governments and private enterprise in the development of a comprehensive materials policy oriented toward efficiency, recycling, and maximum utilization of renewable energy sources.

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Executive Summary

As of January 2007, 355 mayors in communities representing over 54 million Americans in 49 states have signed the U.S. Mayor's Climate Protection Agreement (formalized in June 2005). Participating cities agree to reduce community-wide greenhouse gas (GHG) emissions by 2012 to at least 7 percent below 1990 levels. The number of communities involved promises a diversity of strategies and a steep learning curve as communities learn from one another what works, and what doesn't work.

We surveyed the climate change activities in 10 cities to find out how well these "Kyoto cities" were doing in meeting their goals and what strategies and methodologies they were using. The overriding conclusion is that, despite their commitment and their elaboration of significant programs, reducing GHG emissions below 1990 levels will be a major challenge. Many cities will likely fail in their attempts unless complementary state and federal policies are put in place. Our findings include:

- The methodologies and assumptions used to create GHG inventories differ among communities, making comparisons between cities problematic. Convenient access to the data was sometimes lacking. A standard GHG estimation methodology is not yet in place, but useable models exist. Convergence and standardization may come soon. Transparency of assumptions is critical.

- In all cities, community-wide emissions have risen since 1990, sometimes dramatically. Based on progress to date, it is unlikely that more than one or two of our ten cities and quite possibly none, will reduce their GHG emissions 7 percent below 1990 levels by 2012. Overall emissions increases ranged from 6.5 percent to 27 percent from 1990 baseline measurements. An exception was Portland, Oregon, which reports a tiny 0.7 percent increase above the 1990 baseline.

- Almost all of the cities we surveyed were expecting to realize a significant portion of their GHG reductions as a result of actions taken by higher levels of government (e.g. a state-level renewable portfolio standard or an increase in federal fuel economy standards). Relying too heavily on strategies out of the city's direct control could stunt creative local solutions and inhibit the city's investments in energy-related projects that have ancillary economic and environmental benefits.

- Cities are not investing significant amounts of their own money to reduce GHG emissions. This may be understandable, given tight budgets, but cities should remember that energy-related investments, unlike many public investments, repay themselves, often in relatively short time frames.

Lessons from the Pioneers: Tackling Global Warming at the Local Level

John Bailey, Institute for Local Self-Reliance
January 2007

Introduction

> *"Climate change is the biggest environmental threat facing our planet. When it comes to climate change, we are all part of the problem – and part of the solution."*
>
> Seattle Mayor Greg Nickels

In February 2005, the Kyoto Protocol went into effect. More than 140 nations formally committed to significantly reduce their greenhouse gas (GHG) emissions. The United States was a highly visible non-signatory. In response, Seattle's Mayor Greg Nickels challenged mayors across the country to adopt Kyoto-like reduction goals at the local level.

In June 2005, the U.S. Mayors Climate Protection Agreement was adopted by the U.S. Conference of Mayors.[1] As of January 2007, 355 mayors in communities representing over 54 million Americans in 49 states have signed the Agreement.[2] A number of these cities have had climate action plans in place for five years or more. A larger number have had long standing energy efficiency or energy conservation programs.

For 33 years, the Institute for Local Self-Reliance (ILSR) has focused on bottom up solutions for national and international problems. The willingness by over 350 U.S. cities to formally agree to do just that with regard to the planetary threat of climate change is a welcome initiative. The number of communities involved promises a diversity of strategies and a steep learning curve as communities learn from one another what works, and what doesn't work.

Insufficient time has passed to allow for a serious evaluation of the effectiveness and impact of these pioneering efforts. Nevertheless, ILSR believes there are lessons to be learned even at this juncture. Given the rapidly expanding number of cities signing on to the Agreement, we decided to undertake an initial investigation. Due to a lack of significant funding, we view this report as preliminary and hope it will spur others to undertake a more in-depth, comprehensive examination.

This report addresses the following questions:

1) How are the top "Kyoto cities" in the United States measuring success?

2) What strategies and methodologies have they embraced to achieve their goals?

3) How well are they doing?

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[1] Participating cities agree to reduce community-wide GHG emissions by 2012 to at least 7 percent below 1990 levels

[2] Signatories are online at http://www.seattle.gov/mayor/

To gather information, ILSR examined ten community-wide GHG reduction programs: Austin, TX; Ann Arbor, MI; Berkeley, CA; Boulder, CO; Cambridge, MA; Minneapolis, MN; Portland, OR; San Francisco, CA; Salt Lake City, UT; Seattle, WA. These cities were chosen in part because they are among the initiatives most visible in the media, in part because they are self-described as having strong and successful programs, and in part because experts cite these programs as among the most effective.

Findings

The overriding conclusion of our survey of these "Kyoto cities" is that, despite their commitment and their elaboration of significant programs, reducing GHG emissions below 1990 levels will be a major challenge. Many cities will likely fail in their attempts unless complementary state and federal policies are put in place. Most do not appear to be slowing their GHG emissions more than their state, or the national averages.

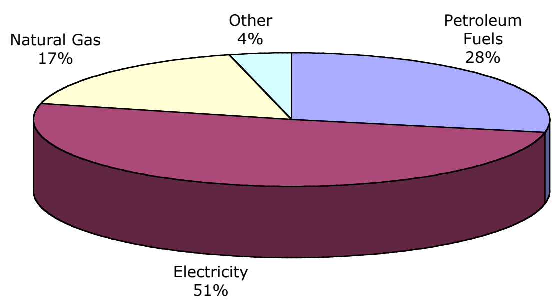
ILSR is strongly supportive of this effort but cities should be fully aware that the road ahead will not be easy.

1. Data gathering, reporting and availability.

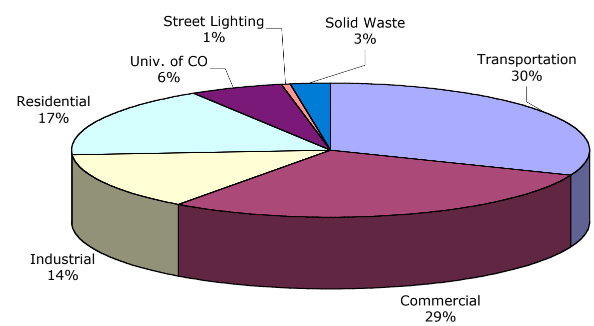
At present, these cities do not always gather and report GHG emissions in a consistent manner. This makes comparisons among cities difficult. In terms of individual cities, sometimes the data is inaccessible or presented in a manner that is difficult for the public to understand. Some of the cities described their frustrations and difficulties in having to rely on electric and gas utilities to supply community-wide energy consumption data.

GHG Emissions - Boulder, CO - 2004

By energy source:



By sectors:



Some cities break down data by sector (residential, commercial, industrial, solid waste and transportation); some by a combination of fuel source and sector (electricity, natural gas, motor fuels and solid waste). Some report GHG emissions both ways (e.g. Cambridge, Boulder). Most cities report GHG emissions in terms of metric tons of CO2-equivalent emissions, but at least one city reported C02-equivalent emissions in short tons.[3] To allow for maximum uniformity and compatibility, metric tons should be used.

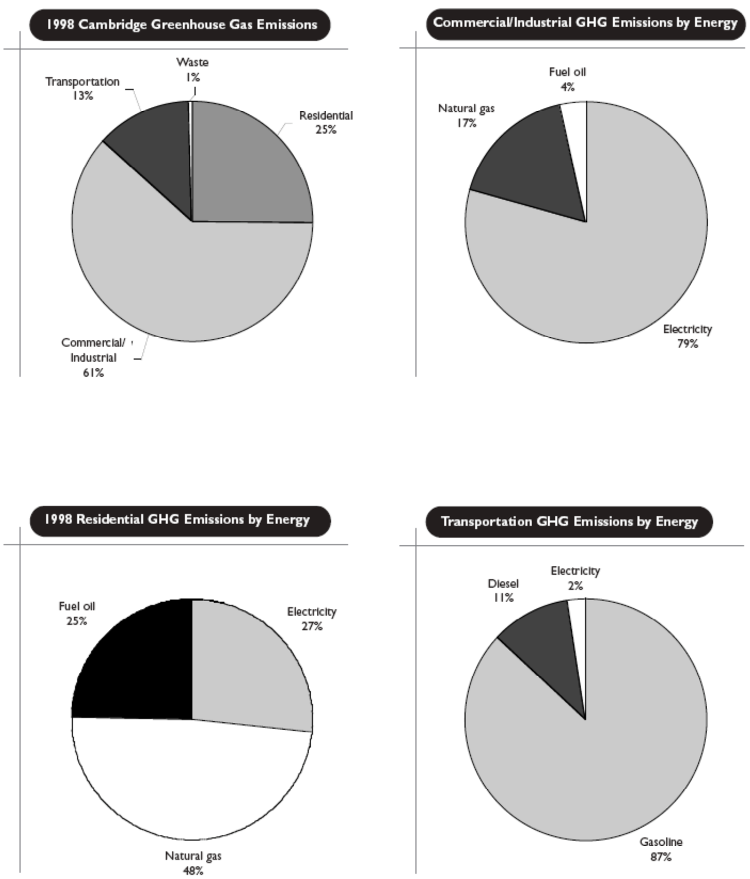
At a minimum, there should be two breakdowns of GHG emissions – one by sector and one by energy source. Cities should also break down energy consumption by energy source, sector and end use technology. The effort to reduce carbon emissions overlaps but is not the same as the effort to improve energy

[3] A short ton is 2,000 lbs, a metric ton is approximately 2,204.6 lbs. To allow for maximum uniformity and compatibility with emerging GHG registries and protocols, metric tons should be used.

efficiency since one can adopt a strategy primarily based on shifting to lower carbon or zero carbon fuels while maintaining the same overall energy consumption. In developing GHG emission numbers, cities invariably will begin with energy consumption data. They should make this available.

Boulder's inventory (completed by Econergy International Corporation) has a nice example of a graphical representation of GHG emissions that accompanies the raw numbers (see charts previous page). The charts provide a quick way to identify sectors' contribution to the community's emissions and which should receive the most attention.

GHG Emissions - Cambridge, MA



Econergy developed an inventory maintenance system that will make it easy for Boulder staff to update their GHG inventory on an annual basis. Boulder also negotiated an agreement as part of recent franchise negotiations with Xcel Energy to have community-wide energy consumption data downloaded directly to the city from the utility.

Cambridge's Climate Action Plan report goes a step further and provides an illustration of the fuel types used in each of the main sectors – residential, commercial/industrial and transportation.

Ann Arbor has compiled a comprehensive and transparent GHG emission inventory, thanks to the efforts of a dedicated group of graduate students at the University of Michigan's Natural Resources and Environment Program.[4] The remarkably detailed report (nearly 500 pages) contains an extensive section explaining the methodology. Some city inventories we examined, even when they contained good data on overall emissions lacked any discussion of the methodology used to arrive at its quantitative conclusions.

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[4] Epstein, Seth; Malcoun, Joseph II; Oorbeck, Jenny; and Yamada, Mamoru, May 2003. "City of Ann Arbor Greenhouse Gas Emissions Reduction Strategy," Center for Sustainable Systems, University of Michigan. [http://www.css.snre.umich.edu/css_doc/CSS03-02.pdf]

Cities could copy Ann Arbor's strategy but it would require that the city have a staff person prepared to guide the project along. Local graduate schools should be eager to assist. Their students, as part of a class or independent project, could quickly, inexpensively and thoroughly gather the baseline emissions data and provide an easy to follow methodology to allow city staffers to regularly update the database. A note of caution that one of our cities pointed out is that a 500 page academic report will not be something that city staffers will want to hand to decision makers and expect them to develop policy around. Any such research analysis must be broken down into a manageable, succinct policy report.

Although city activities themselves generate only a tiny portion of the community's overall GHG emissions (typically less than 5 percent), cities should break out GHG emissions and reductions generated from their internal municipal operations in the reports.

In reporting on GHG reduction efforts, each of the cities' GHG reports illustrated individual municipal-level and community-wide actions that had been taken. Sometimes the lists contained dozens of actions: improving city-owned vehicle efficiency by purchasing hybrids, switching to LEDs for traffic signals, tightening city government and community-wide building energy codes, expanding public transit, expanding recycling and capturing methane. However, most lacked a breakdown of municipal-only GHG emissions over time. Such data is important because the municipal corporation must be the leader and model for community-wide GHG reduction initiatives. The city must clearly demonstrate that large GHG reductions are possible, especially in existing buildings.

Perhaps most importantly, several cities lacked a data base sufficient to allow city officials or interested researchers to measure the community's progress and performance. Of the 10 cities examined, three either had no baseline or current GHG inventory or the data they did have was too limited to be of significant utility.[5] The others had adequate inventories but often public access to the information was very difficult.

2. Methodological considerations

A standard GHG estimation methodology is not yet in place, but useable models exist. Convergence and standardization may come soon.[6] For any GHG inventory process, assumptions will have to be made that will impact the final numbers. One basic assumption will involve drawing the boundary for GHG emissions included. For example, should the inventory include GHG emissions generated by inter-city or inter-regional commuters? Transparency is critical and whatever decisions are made, it will be important that future inventories remain consistent to the chosen methodology so that trends in GHG emissions will be comparable.

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[5] For example, Minneapolis did develop a baseline GHG inventory in 1993 for the year 1988, but a recent examination led the city to reconsider its accuracy. A new baseline analysis and current inventory are in the process of being developed. We deemed Berkeley's baseline inventory inadequate since it does not include the significant contributions of GHG emissions from the University of California-Berkeley and Lawrence Berkeley National Laboratory.

[6] National signatories of the Kyoto Protocol itself are required to meet GHG inventory standards adopted by the Intergovernmental Panel on Climate Change (IPCC) http://www.ipcc-nggip.iges.or.jp/ The IPCC supplies Kyoto countries with a Good Practice Guidance document that provides the methodologies to estimate GHG emissions in four broad sectors: Energy (electricity, heating, transportation, etc.), Industrial Processes, Agriculture and Waste.

Many of the cities in our sample use a GHG inventory model called the Clean Air and Climate Protection (CACP) software (http://www.cacpsoftware.com/ . Developed jointly by the State and Territorial Air Pollution Program Administrators/Association of Local Air Pollution Control Officials (STAPPA/ALAPCO) along with the International Council for Local Environmental Initiatives (ICLEI), CACP first became available in May 2003.

Many current and future inventory protocols rely on the ongoing work of the World Resources Institute/ World Business Council for Sustainable Development (WRI/WBCSD).[7] The WRI/WBCSD models target the business community but its spreadsheet tools can be modified and used by cities.

The California Climate Action Registry[8] (the Registry), established by state statute, has developed a General Protocol and industry-specific protocols based on the WRI/WBCSD models. Registry participants use the General Reporting Protocol[9] to report emissions, and then they use the Registry's Certification Protocol to certify that report.[10] The Registry is working with other states to help them establish similar protocols for GHG inventories and offset certifications.

The Registry appears to be on track to become the default methodology for certifiable GHG emissions inventories at the state and local level.

Some cities using the CACP software have expressed concerns that they will not be able to meet the requirements of other emerging GHG verification protocols and GHG offset trading systems. Those fears seem to be unfounded. The latest version of the CACP software allows users access to advanced reporting features in order to generate the data necessary to integrate GHG inventory information into the California Climate Action Registry. The primary differences between the two approaches are that the California Registry requires third party certification of the GHG report while CACP doesn't, and the Registry distinguishes between emissions generated directly and those generated indirectly from the use of electricity, steam, or heat. ICLEI can help cities with an easy workaround to get the data in the correct format for use with the Registry.

The Chicago Climate Exchange[11] (CCX), the world's first and North America's only legally binding GHG emission reduction and trading system, requires participants to complete an independently certified baseline and ongoing inventory. Emissions are quantified using continuous emission monitors (when avail-

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[7] The WRI/WBCSD developed a GHG Corporate Accounting and Reporting Standard and a Project GHG Accounting and Reporting Standard.(http://www.ghgprotocol.org/) The program currently offers free downloads of a suite of peer-reviewed software tools using Microsoft Excel spreadsheets.

[8] http://www.climateregistry.org/ Registry participants include businesses, non-profit organizations, municipalities, state agencies, and other entities. San Francisco, one of our profiled cities, recently became the first U.S. city to certify their emissions inventory with the Registry.

[9] General Reporting Protocol, Version 2.1, June 2006 - http://www.climateregistry.org/docs/PROTOCOLS/GRP%20V2.1.pdf

[10] General Certification Protocol, Version 2, July 2003 - http://www.climateregistry.org/docs/PROTOCOLS/General_Certification_Protocol_July_03.pdf. The Registry's enabling legislation directs two state agencies, the Resources Agency and the Environmental Protection Agency, to provide technical guidance to the Registry. The Registry participant must submit its GHG reports via a web based software interface called CARROT (Climate Action Registry Reporting Online Tool).

[11] http://www.chicagoclimatex.com/

able), or through protocols developed by CCX and those developed by WRI/WBCSD.[12] At this time, cities participating in the CCX are including GHG emissions from municipal operations only not community-wide emissions.

Overall, methodological issues do not appear insurmountable. Variations among methodologies are diminishing. However, some estimation issues may be worthy of further investigation. One involves the way communities assess GHG emissions from activities that cross their borders. One good example is measuring the GHG emissions from gasoline and diesel used for transportation.

Estimating emissions from transportation can be especially difficult when there is a great deal of inter-city and suburb-to-city traffic. If citywide gasoline sales are used, the amount of emissions could be underestimated. If vehicle miles traveled (VMT) are used, emissions levels might be overstated. Both approaches require a variety of assumptions (e.g. allocating gas sales, allocating VMT, vehicle types, mpg estimates) in order to calculate emissions.

Regardless of the chosen method, the resulting GHG emissions numbers can only be considered approximate. Ultimately, the most important thing the city can do is to make the calculation and assumptions easily understood and easily evaluated by the public.

For the foreseeable future, precise estimates of community-wide GHG emissions from transportation will be difficult to calculate. The community's access to certain types of data (e.g. gas tax revenues or regional VMT statistics) will lead them to use a particular methodology. The CACP software handles both but the software manual steers users to utilize VMT estimates, and many cities are using that approach. In talking to the city of Portland, we came away believing that gasoline taxes (a surrogate for sales) can lead to as accurate if not greater accuracy as VMT. Once again, it is important to make the calculation fully transparent

3. Much of the emission variations among cities may be explained by the different carbon content of the fuels used to generate electricity.

Per capita emissions in the ten cities range from a low of 12.2 metric tons of carbon dioxide equivalent (CO2e) emissions, to 20.3 tons.[13] The per capita carbon dioxide equivalent emissions was 24.5 tons for the U.S. as a whole.[14] The differences can largely be explained by the different fuel source for the city's electricity. In Austin, for example, over 50 percent of GHG emissions are generated from electricity consumption from its largely coal fired power supply. In largely hydroelectricity-dependent Seattle, on the other hand, electricity use accounts for less than 10 percent of the city's overall GHG emissions.

Transportation is the other significant source of GHG emissions, varying from 17-50 percent in the ten cities we looked at. But here too the wide variation may be tracked back to the varying level of GHG

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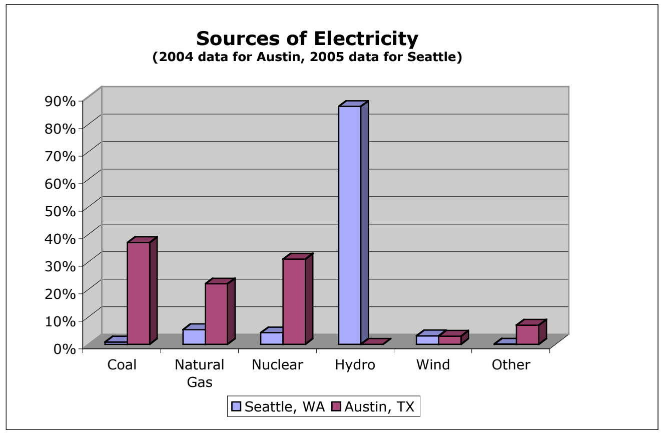
[12] Emissions are reported quarterly, and are subject to external verification and audit

[13] Translate CO2 emissions into carbon emissions by dividing by 3.67. Thus per capita carbon emissions range from 3.3 to 5.5 metric tons. Insufficient data exists to estimate emission levels in Berkeley, Minneapolis and Salt Lake City.

[14] *Navigating the Numbers: Greenhouse Gas Emissions.* World Resources Institute, 2005. http://www.wri.org/climate/pubs_description.cfm?pid=4093

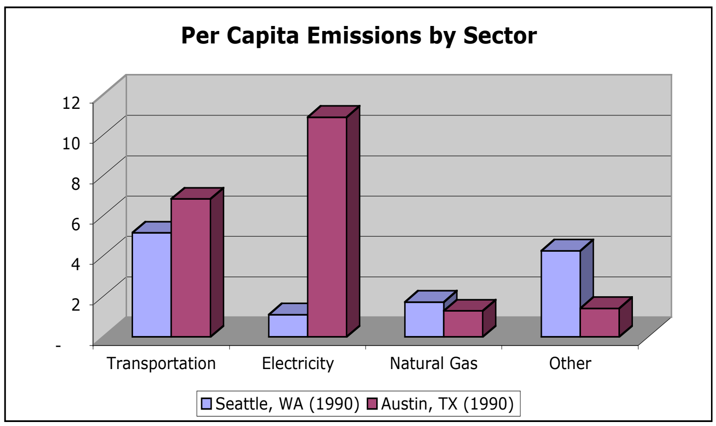
emissions in the electricity sector. Low carbon electricity tends to lead to a higher percentage of community emissions coming from transportation and vice versa.

The differences in the level of carbon in electricity fuels doesn't necessarily give a city an advantage in achieving GHG reduction goals because the goals are a reduction from a 1990 baseline. Low carbon content electricity cities may have a lower baseline, making their absolute GHG reduction goals lower. For Seattle, with a very low electricity fuel carbon content, less future emissions reductions can be wrung from the electric sector than in other cities and instead will have to come from sectors where community-wide GHG savings are more difficult (e.g. transportation). Austin, on the other hand, expects to meet more than 42 percent of its GHG reduction target by developing renewable energy for electricity, displacing coal.



Seattle's electric utility overwhelmingly relies on renewable fuels. Austin's has a largely fossil fuel portfolio. Austin's GHG per capita emissions are almost 30 percent higher than Seattle's as a result.

We should note that Seattle's municipally owned utility has become the first to become climate neutral by purchasing carbon offsets to cover the remaining GHG emissions in the electricity sector (about 200,000 metric tons per year).



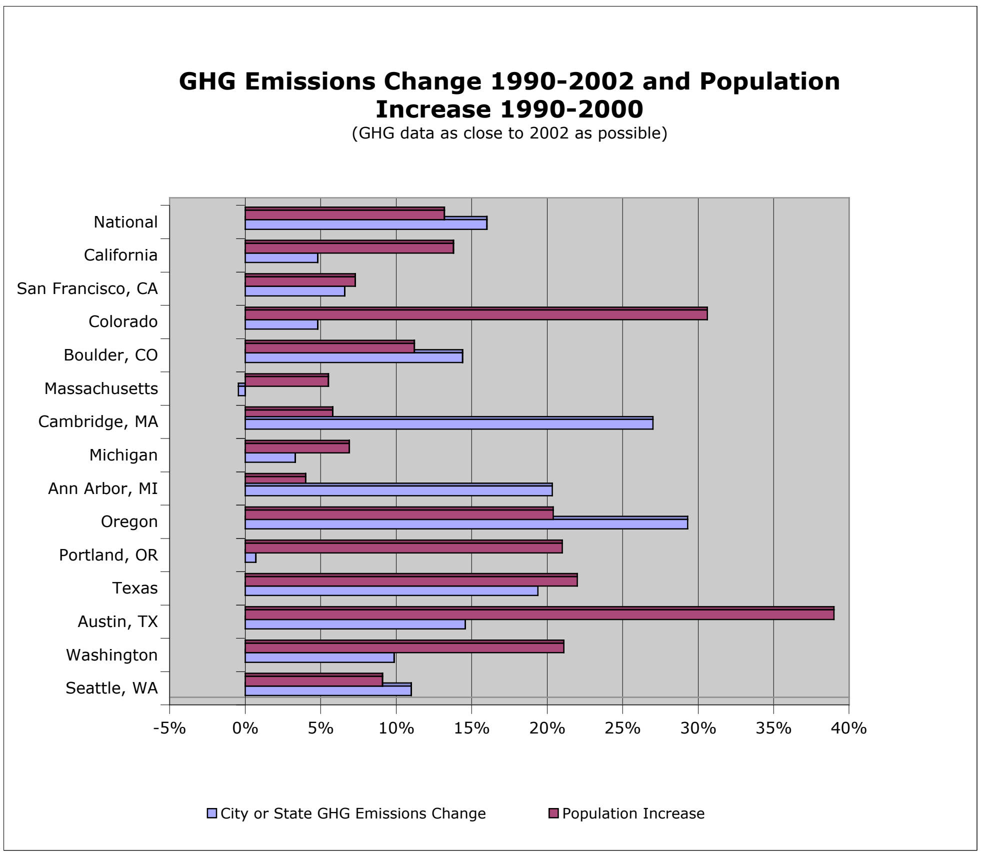
4. In all cities, community-wide emissions have risen since 1990, sometimes dramatically.

This is a key and troubling finding, demonstrating how challenging the effort to achieve even the modest Kyoto goals will be at the local level. Based on progress to date, it is unlikely that more than one or two of our ten cities and quite possibly none, will reduce their GHG emissions 7 percent below 1990 levels by 2012.

Overall emissions increases ranged from 6.5 percent to 27 percent from 1990 baseline measurements. An exception was Portland, Oregon, which reports its overall emissions a tiny 0.7 percent above the 1990 baseline.

The mid point in the range of increases in community-wide emissions among our profiled cities is 17 percent. This is almost identical to the 16 percent increase in national GHG emissions between 1990 and 2002.[15]

However, as the chart below reveals, there seems to be a surprising divergence between the trajectory and slope GHG emissions in Kyoto-cities versus those of GHG emissions of the state in which that city is located. We offer the chart with the following caveats: different methodologies used in state level GHG inventories from the U.S. Dept. of Energy can result in different results than state level inventories conducted by the states themselves. Further complicating the comparisons below are different methodologies used by the cities as compared to the state and federal inventories. We urge a more in-depth analysis of these differences.



Note: Community level data for the chart is coming from many different sources and state level information is coming from U.S. Dept. of Energy and U.S. Environmental Protection Agency http://www.epa.gov/climatechange/emissions/state_energyco2inv.html

[15] Energy Information Administration, *International Energy Annual 2004.* http://www.eia.doe.gov/

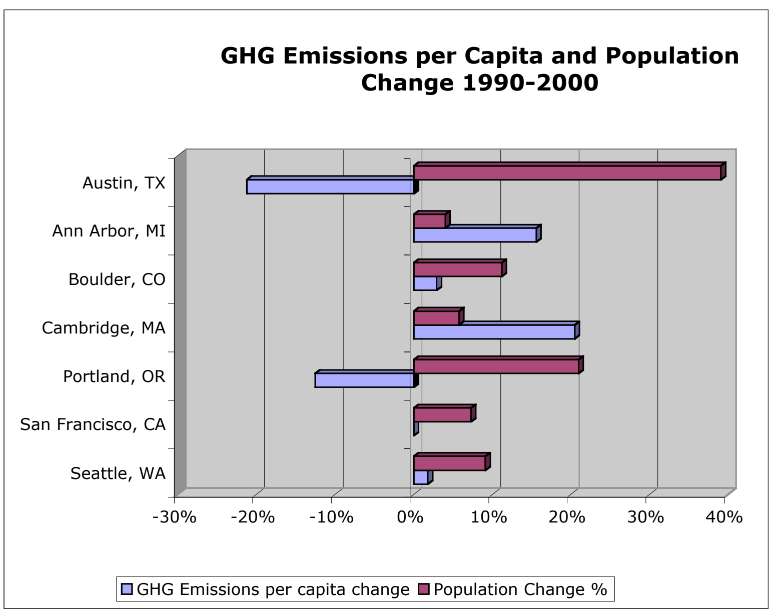
For example, DOE's data shows Oregon's emissions rising by about 35 percent between 1990 and 2000.[16] The GHG inventory by the State of Oregon estimates an increase of about 18 percent. The dramatic difference arises because of different methods of allocating GHG emissions from the electric sector. DOE calculates emissions based on in-state electrical generation, the state of Oregon calculated GHG emissions based on the regional mix of electricity and argues that it "better reflects the carbon mix associated with the delivery of electricity to Oregon's consumers."[17] DOE data for Oregon shows a dramatic 300 percent increase in GHG emissions in the electricity sector between 1990 and 2000. The State of Oregon's data shows a much more modest 17 percent increase in electricity sector GHG emissions from 1990 to 2000.

Using the DOE data, in all but two cases, state-level GHG emissions growth was lower, often dramatically lower, than GHG emissions growth in the Kyoto city within that state.

We also find an interesting correlation between population growth and GHG emissions. In virtually all instances, jurisdictions whose population grew faster had slower emissions growth. California had almost twice the population growth of San Francisco but a smaller emission increase. Colorado's population growth was almost triple that of Boulder but its GHG emission increase was only a third as rapid.

In Texas, on the other hand, population growth at the state level was only half that of Austin's and Austin's GHG emission growth rate was 25 percent slower than its state's.

One theory to explain this correlation is that a greater population growth means that more people are living in much more energy efficient housing and having more efficient appliances. It is also possible that the methodology used by the Department of Energy and that used by the cities differs significantly. Again, more research is needed in this area



The only truly atypical case involves Portland, Oregon. Over the same time period, Oregon and Portland populations increased at virtually the same rate. Yet Oregon's GHG emissions increased almost 30 percent (using DOE data) and 19 percent (using State of Oregon data) compared to the 0.7 percent increase in Portland. Among the cities we examined, Portland is the only one to virtually achieve a zero GHG emissions growth. Why?

It is possible that Portland's urban growth boundaries may have helped in that its population increase raised its residential density significantly and

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16 http://www.epa.gov/climatechange/emissions/state_energyco2inv.html

17 *Oregon Strategy for Greenhouse Gas Reductions*, State of Oregon, December 2004 (p. 150) http://oregon.gov/ENERGY/GBLWRM/docs/GWReport-FInal.pdf

led to an increase in the use of mass transit, reducing transportation fuel consumption beyond statewide levels. This is certainly an area needing further investigation.

5. Some cities are relying largely on higher levels of government to implement policies that will allow them to achieve their goals.

Almost all of the cities we surveyed were expecting, or hoping to realize a significant portion of their GHG reductions as a result of actions taken by higher levels of government. This can mean relying on a state-level renewable portfolio standard or an increase in federal fuel economy standards (or state standards perhaps, if California's action to limit vehicle CO2 emissions is ruled acceptable by the Supreme Court). As the Cambridge climate change action report notes, "Changes in laws, standards, subsidies, and incentives at the federal and state levels can have huge impacts on local emissions; they can either undermine or enhance local actions."

- Ann Arbor expects that up to 75 percent of the emission reductions will come from the adoption of a state-wide 50 percent renewable electricity standard by 2020.
- Austin proposes to achieve over 30 percent of its overall emission reductions from improved vehicle efficiency and trip reductions in transportation. (1997 report)
- Cambridge proposes to achieve 60 percent of its overall emission reductions as a result of a state 20 percent renewable electricity standard and an increase in the federal fuel economy standards to 40 mpg. (2003 report)
- San Francisco proposes to meet 22 percent of its overall emission reductions from a five mpg increase in the federal corporate average fuel economy (CAFE) standards. (2004 report)

It is clear that action by higher levels of government will be needed and helpful to the local efforts. Thus, as part of their local climate action plans, cities should add a component that elaborates a strategy to work with other communities to influence state and national GHG and energy related policies. Foreseeing this necessity, the U.S. Mayors Climate Protection Agreement emphasizes that cities should be involved in advocacy for complementary state/federal policies. Through the newly created Mayors Council on Climate Protection under the auspices of ICLEI and the U.S. Conference of Mayors, the Kyoto Cities are forming a stronger policy arm to impact changes at the state and federal levels.

Relying too heavily on strategies out of the city's direct control, however, can have the additional drawback of stunting creative local solutions and can inhibit the city's investments in energy-related projects that have ancillary economic and environmental benefits.

6. Many of the reductions to date have come from pollution-shifting, or from a one-time-only capturing of landfill gas

Seattle has documented a 60 percent reduction in its municipal operation's GHG emissions from 1990 to 2000. Three actions achieved almost all the reductions. One was the sale by Seattle's municipal electric utility of its share of the Centralia Coal Plant and a switch to purchasing cleaner electricity. One might call this strategy pollution-shifting since it did not reduce overall emissions but rather shifted the individual responsibility for those emissions (Seattle believes that the fossil fuel divestment and clean energy substitution sends a strong message to the marketplace that it must become cleaner.)

Another step taken by Seattle was to install a methane collection and flaring system in the city landfill.[18] Several other cities have achieved reductions largely from tapping into landfills for methane gas. Ann Arbor reported that over 80 percent of its cumulative savings from its 1990 baseline (that is, reductions from projected growth) were a result of tapping into its garbage landfill and recovering methane. The Mayor of Salt Lake City claimed in the summer of 2006 that city operations have met the goals of the Kyoto Protocol by reducing GHG emissions by 22 percent from a 2001 baseline inventory. Over 70 percent of the GHG reductions from 2001 to 2005 resulted from one action – capturing methane from a city owned landfill.

A third action taken by Seattle, and several other cities, has been to purchase carbon offsets. Seattle proposes to meet about 30 percent of its overall emission reductions by purchasing carbon offsets (200,000 metric tons per year).[19]

Using a related but different strategy, Boulder proposes to achieve 58 percent of their overall emission reductions from purchases of renewable energy.

Buying carbon offsets is certainly a legitimate strategy if the offset project results in real reductions in greenhouse gas emissions. But since the carbon-offset projects can often take place outside the city's jurisdiction, the local government has disconnected responsibility from accountability. Tapping into the carbon offset market beyond a city's borders should be a lower priority GHG reduction option than initiatives that are local. There is also an increasing public awareness that some sources of carbon offsets and purchases of renewable energy credits (RECs) are not resulting in verifiable or real reductions in GHG emissions (a concept known as additionality).[20]

7. Cities are not investing significant amounts of their own money to reduce GHG emissions

Many GHG reduction initiatives are funded from state and federal sources. Cities have often been reluctant to invest their own money. This may be understandable, given tight budgets, but cities should remember that energy-related investments repay themselves, often in relatively short time frames. Cities seem reluctant to invest even on initiatives with a relatively short payback. Probably the clearest evidence is in the LED traffic light substitution programs. Most if not all cities are substituting LEDs for conventional traffic signals, but few have achieved 100 percent substitution. Many will not achieve that level for several years. Some have delayed action for years, awaiting money from state or federal or utility grants, even though LED substitution has a very short payback period.

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[18] *Our Carbon Footprint*, Seattle Office of Sustainability, 2006. Flaring methane at landfills reduces CO2-equivalent emissions substantially compared to landfills that are not flaring.

[19] Seattle has emphasized local GHG reduction strategies. To that end, a portion of their carbon offset purchases currently come from local GHG reduction projects.

[20] *A Consumers' Guide to Retail Carbon Offset Providers*, Clean Air-Cool Planet, 2006 http://www.cleanair-coolplanet.org/

Cities have the ability to borrow large sums at low interest over a long term, thereby achieving significant reductions in carbon emissions while repaying the debt from energy savings. They should more aggressively pursue these opportunities. A city should finance all efficiency improvements that repay themselves in less than 10 years, or in half the physical lifetime of the improvement. Some cities have suggested that maintaining a strong bond rating limits their ability to borrow additional money for energy-savings projects. This may be a valid, albeit surprising situation but one that is beyond the scope of this investigation.

Some cities are dedicating ongoing funds to specifically implement climate action plans. In November, 2006, Boulder, CO, voters passed a referendum imposing a "climate tax" on electricity consumption to finance GHG reduction projects. Boulder climate tax will raise $860,265 in the first year, and up to $1,342,000 each year thereafter for the period of April 1, 2007 to March 31, 2013.

Seattle's 2007-2008 proposed budget contains a $37 million investment over two years to reduce GHG emissions by increasing transit ridership and decreasing driving. The city allocated $3 million from its general fund revenues. The remaining $34 million comes from a portion of a tax levy referendum passed by Seattle voters in November 2006. Seattle (like other cities) has other ongoing programs with expenditures (perhaps tens of millions of dollars) that can impact GHG emissions but are not delineated for climate change efforts.

A small first step for Kyoto-cities that we recommend is a policy of "climate neutral bonding" where any new bond-funded building projects can result in no net increases in GHG emissions within the community when completed.[21] If a new construction project is projected to increase emissions, there must be GHG emissions offsets within the community. Another immediate step is for the city to develop a plan to ensure that city operations become climate neutral as soon as possible.

Good ideas for cities taking responsibility for the global consequences of their consumption habits are sprouting up across the country. In May 2006, the U.S. Conference of Mayor's issued an energy and environment best practices guide[22] that contains dozens of interesting initiatives that cities around the country have engaged in. ICLEI along with other groups are building up resources in their Cool Mayors for Climate Protection web site at http://www.coolmayors.org/. ILSR's New Rules Project's web site on energy (http://www.newrules.org/de/) features a number of innovative policies at the local and state levels.

Conclusions

America's Kyoto cities are pioneers - building a path for others to follow. They are to be congratulated for making a visible, public commitment to address global warming. They have gathered data and created a benchmark (1990 emissions) against which to measure their progress. They have developed strategies and implemented programs. They have picked the low hanging fruit (e.g. tapping into landfills, LED traffic lights, purchasing renewables).

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[21] Climate Neutral Bonding: Building Global Warming Solutions at the State and Local Level, by John Bailey, Institute for Local Self-Reliance, February 2006. http://www.newrules.org/de/climateneutralbonding.pdf

[22] http://www.usmayors.org/uscm/best_practices/EnergySummitBP06.pdf

These cities recognize the difficult challenge before them. Most of them are unlikely to achieve their quantitative GHG reduction goals. Many will miss their goals by a wide margin. Few appear to be doing better than their own states or other cities that have yet to adopt a Kyoto-like standard. All are learning the limits of their authority to effect significant changes in the energy consumption habits of their populations.

Yet the very number of cities that have formally agreed to participate in this effort speaks to a widespread desire to take responsibility for the planetary consequences of our consumption habits. The number of participating cities promises a wide degree of experimentation and innovation and a very steep learning curve. The advantage of many local initiatives is that if there is a failure, the damage done is very small and its lessons can quickly be disseminated. If there is a success, it can quickly be replicated and refined.

It is in that spirit of innovation and refinement that we offered this report.

A Suggested Hierarchy for Community-wide Carbon Reduction Efforts

1. Target direct emissions reductions by focusing on the GHG emissions locally by implementing all cost-effective energy efficiency measures (including efforts to reduce driving), on-site renewable energy and switching to cleaner fuels.

2. Target indirect emissions of GHG emissions in the electricity and transportation sectors that are beyond the direct control of the city.

3. Purchase carbon offsets and/or renewable energy credits that are from third-party verified projects that create GHG reductions that otherwise might not have occurred.

Some outstanding issues to explore in more detail include:

- Urban Forestry and carbon sinks - how to account for GHG reductions from sequestration by trees.
- Transportation estimates - how to make comparisons easier and measurements more precise
- Methodologies - ensuring consistency. Do we need a national standard?
- Offsets - Should they be local? How to make them verifiable and additional.
- Comparisons - Have the Kyoto cities done better than other cities or states?
- Costs - What administrative and operational costs does a municipal climate change program entail? What staffing, budget, data gathering and organizational models exist?
- Why have Portland's GHG emissions remained essentially flat and how can other cities replicate and improve upon their efforts.
- Why are cities not investing more in short and medium term energy savings projects?
- How far can a city go to achieve Kyoto-like goals within its own jurisdiction and authority?
- Information exchange - What is the best way to develop a robust database and information exchange among Kyoto Cities?

Links to the Cities and their Climate Change Web Sites

Ann Arbor, MI
City web site - http://www.ci.ann-arbor.mi.us/
Climate Change Information -
http://www.a2gov.org/PublicServices/SystemsPlanning/Energy/ClimateProtection.html

Austin, TX
City web site - http://www.ci.austin.tx.us/
Austin Energy - http://www.austinenergy.com/

Berkeley, CA
City web site - http://www.ci.berkeley.ca.us/
Energy and Sustainable Development Information - http://www.ci.berkeley.ca.us/sustainable/

Boulder, CO
City web site - http://www.bouldercolorado.gov/
Climate Information -
http://www.bouldercolorado.gov/index.php?option=com_content&task=view&id=1058&Itemid=396

Cambridge, MA
City web site - http://www.cambridgema.gov/

Climate Protection Information - http://www.cambridgema.gov/cdd/et/env/climate/climate.html

Minneapolis, MN
City web site - http://www.ci.minneapolis.mn.us/

Portland, OR
City web site - http://www.portlandonline.com/
Climate Protection Information - http://www.portlandonline.com/osd/index.cfm?c=41896

San Francisco, CA
City web site - http://www.sfgov.org/
Climate Protection Information - http://www.sfenvironment.com/

Salt Lake City, UT
City web site - http://www.ci.slc.ut.us/
Climate Protection Information - http://www.slcgreen.com/

Seattle, WA
City web site - http://www.seattle.gov/
Seattle's Climate Action Plan - http://www.seattle.gov/climate/
Climate Protection Information - http://www.seattle.gov/mayor/climate/