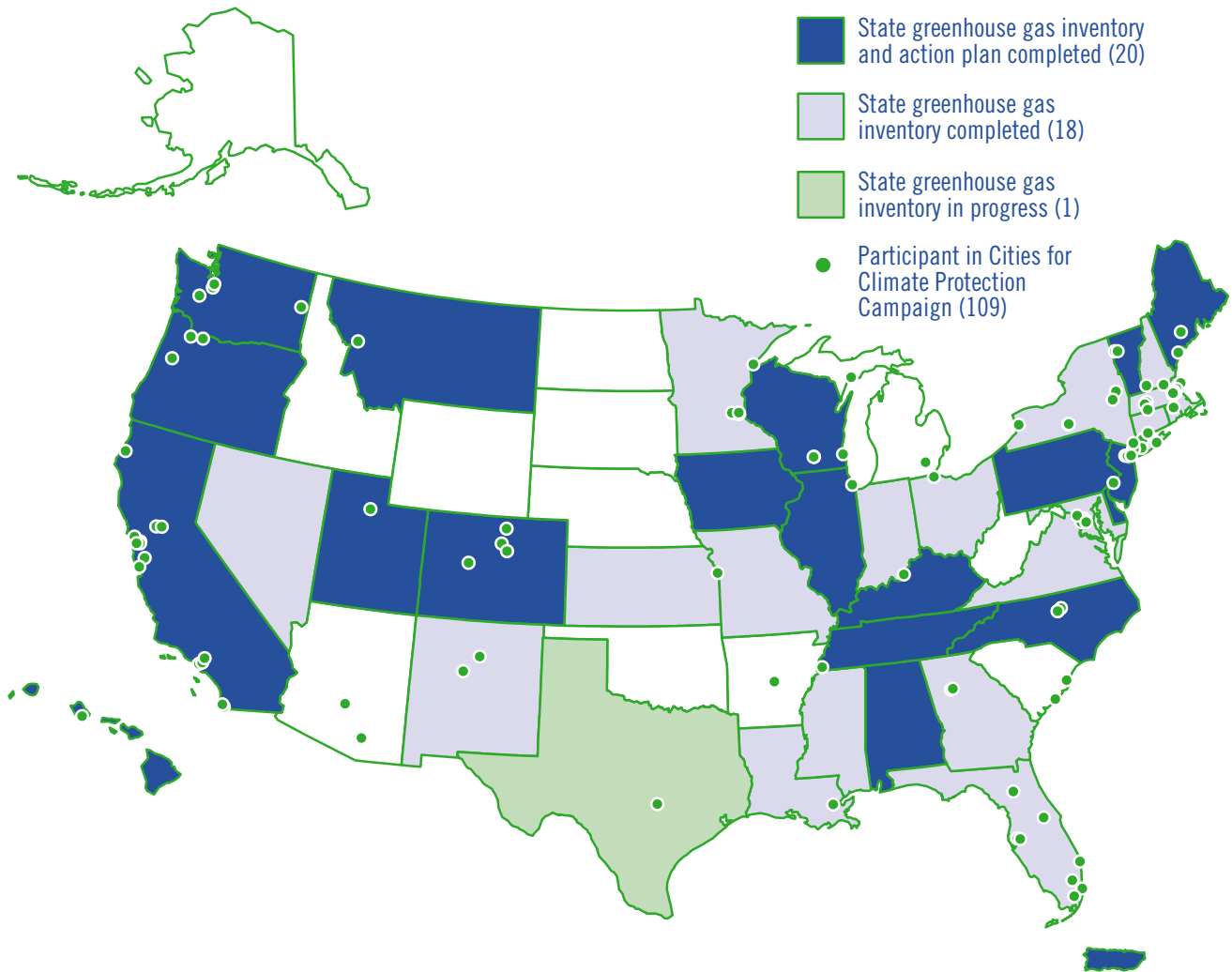




Partnerships and Progress

EPA State and Local Climate Change Program
2001 Progress Report

State and Local Climate Change Program Participants



Alachua County, FL
 Albuquerque, NM
 Amherst, MA
 Ann Arbor, MI
 Arcata, CA
 Arlington, MA
 Arlington County, VA
 Aspen, CO
 Atlanta, GA
 Augusta, ME
 Austin, TX
 Berkeley, CA
 Boston, MA
 Bridgeport, CT
 Boulder, CO
 Brookline, MA
 Broward County, FL
 Buffalo, NY
 Burien, WA
 Burlington, VT
 Cambridge, MA
 Carrboro, NC
 Chapel Hill, NC
 Charleston, SC
 Chicago, IL
 Chittenden County, VT
 Chula Vista, CA
 College Park, MD

Corvallis, OR
 Dane County, WI
 Davis, CA
 Decatur, GA
 Delta County, MI
 Denver, CO
 Duluth, MN
 Durham, NC
 Fairfax, CA
 Fairfield, CT
 Fort Collins, CO
 Georgetown, SC
 Gloucester, MA
 Hennepin County, MN
 Hillsborough County, FL
 Honolulu, HI
 Huntington, NY
 Ithaca, NY
 Keene, NH
 Little Rock, AR
 Los Angeles, CA
 Louisville, KY
 Lynn, MA
 Madison, WI
 Maplewood, NJ
 Medford, MA
 Memphis, TN
 Mesa, AZ

Miami Beach, FL
 Miami-Dade County, FL
 Milwaukee, WI
 Minneapolis, MN
 Missoula, MT
 Montgomery County, MD
 Mount Rainier, MD
 Mount Vernon, NY
 Multnomah County, OR
 Nashua, NH
 New Haven, CT
 New Orleans, LA
 Newark, NJ
 New Rochelle, NY
 Newton, MA
 New York, NY
 Northampton, MA
 Oakland, CA
 Olympia, WA
 Orange County, FL
 Overland Park, KS
 Pawtucket, RI
 Philadelphia, PA
 Portland, ME
 Portland, OR
 Prince George's Co., MD
 Ramsey County, MN
 Riviera Beach, FL

Sacramento, CA
 Saint Paul, MN
 Salt Lake City, UT
 San Diego, CA
 San Francisco, CA
 San Jose, CA
 Santa Cruz, CA
 Santa Fe, NM
 Santa Monica, CA
 Saratoga Springs, NY
 Schenectady County, NY
 Seattle, WA
 Somerville, MA
 Spokane, WA
 Springfield, MA
 Suffolk County, NY
 Takoma Park, MD
 Tampa, FL
 Toledo, OH
 Tompkins County, NY
 Tucson, AZ
 Washtenaw County, MI
 Watertown, MA
 Westchester County, NY
 West Hollywood, CA



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Chapter 1:

Introduction

Since 1990, EPA's State and Local Climate Change Program has provided technical and financial assistance to states and localities in their efforts to address global climate change. State and local governments have the ability to affect U.S. greenhouse gas emissions significantly. They set policies and make daily investment decisions in electricity production, land use, buildings, transportation, and other key areas that provide opportunities to reduce emissions.

Currently 38 states and Puerto Rico participate in the program.¹ At the local level, the program supports the Cities for Climate Protection Campaign of the International Council for Local Environmental Initiatives (ICLEI), which currently involves 109 cities and counties in the United States with a combined population of 44.3 million.

In addition to working with state and local governments, either directly or through ICLEI, the program has established relationships with a number of nongovernmental organizations that support state and local government operations, including the following:

- Environmental Council of the States;
- International City/County Management Association;
- National Association of Counties;
- National Association of Regulatory Utility Commissioners;
- National Association of State Energy Officials;
- National Conference of State Legislatures;

- National Governors Association;
- State and Territorial Air Pollution Program Administrators-Association of Local Air Pollution Control Officials; and
- United States Conference of Mayors.

EPA works with these organizations to increase the level and quality of climate change outreach and to facilitate the sharing of successful mitigation activities.

The program provides partners with a variety of tools, resources, and publications, including the following:

- Searchable online databases of information on state emissions, action plans, case studies, actions implemented or under consideration, tools to assess mitigation options and activities, funding opportunities for climate change-related projects, and climate-related legislation;
- A listserv for those interested in climate change impacts and solutions from the state and local government perspective; and
- Publications, such as the electronic newsletter "Inside the Greenhouse," guidance documents and methodologies, and a CD-based outreach kit that enables states to develop their own outreach materials.

Program Goals and Achievements

The State and Local Climate Change Program helps states and local communities develop the ability to assess their greenhouse gas emissions and implement voluntary measures that save money, reduce greenhouse gas emissions, and improve public health and quality

¹ A state is deemed a program participant if it has received financial and/or technical assistance from EPA's State and Local Climate Change Program.

Results at a Glance

State Greenhouse Gas Emissions Inventories

- Number of completed state greenhouse gas emissions inventories: 38
- Percentage of U.S. emissions accounted for by states that have submitted inventories: 87 percent
- Net greenhouse gas emissions reported by states submitting greenhouse gas emissions inventories: about 1,050 million metric tons of carbon equivalent (MMTCE)

State Actions to Reduce Emissions

- Number of completed state action plans: 20
- Estimated annual greenhouse gas emissions reductions from partner states' actions in 2000: 3.2 MMTCE²
- Potential greenhouse gas emissions reductions from actions proposed in state action plans by 2010: 53-71 MMTCE
- Potential greenhouse gas emissions reductions from actions proposed in state action plans by 2020: 69-96 MMTCE
- Estimated cost savings from actions proposed by states for 2010: \$8 billion

State and Local Climate Change Program Outreach through 2000

- Attendees at 4th Annual Partners' Conference in November 2000: 212
- Number of publications distributed since 1990: 68,762
- Number of hits to state and local section of the Global Warming Web site since 1997: 152,246
- Number of outreach toolkits distributed since release in 2000: 4,205
- Number of hits to outreach toolkit Web page since release in 2000: 7,024
- Number of stakeholders reached at trade conferences since 1990: 2,600
- Number of listserv messages sent since listserv launch in 1997: 204
- Cumulative number of listserv subscribers since 1997: 700

State and Local Demonstration Projects

- Estimated total greenhouse gas emissions reductions from demonstration projects: approximately 1.9 MMTCE
- Estimated total cost savings from demonstration projects: more than \$70 million annually
- Estimated total air pollution reductions: more than 28,000 tons per year³

² All emissions reductions reported are gross estimates provided by state and local governments and may differ from EPA program reductions reported elsewhere. In national documents, for example, the State and Local Climate Change Program discounts the reductions to avoid double-counting between federal programs; therefore the numbers in those documents are generally smaller.

³ Pollutants included in this total are NO_x, SO_x, carbon monoxide, VOCs, and PM-10.



of life. The program encourages states and localities to use a multipollutant approach, integrating the control of criteria air pollutants and hazardous air pollutants with efforts to address greenhouse gases.

Through support of state action plans, demonstration projects, and outreach and education programs, the program's activities have directly or indirectly led to annual greenhouse gas emissions reductions of more than 4 million metric tons of carbon equivalent (MMTCE) in 2000.^{4, 5} This reduction is equivalent to taking almost one million cars off the road.⁶

The program encourages states and localities to view climate protection as an essential aspect of protecting public health, as a way to enhance their ability to be economically competitive, and as the road to attaining quality environmental conditions.

Inventories and Action Plans

One of the major objectives of the program is to encourage states to complete a greenhouse gas inventory and then develop an action plan to reduce net emissions. Thirty-seven states and Puerto Rico have completed an inventory using EPA guidance.⁷ Those states account for approximately 87 percent of total U.S. carbon dioxide emissions. Texas currently is developing an inventory. In spring 2001, EPA issued a request for proposals to support new inventories and action plans and received proposals from five states interested in developing or updating inventories.

To date, 25 states and Puerto Rico have initiated or completed a climate change action plan. Actions identified in 12 of the completed action plans could, if implemented, reduce greenhouse gas emissions in those states by a combined total of up to 70 MMTCE per year by 2010. Fourteen of the plans have identified options that could reduce those states' annual emissions by a combined total of nearly 100 MMTCE by 2020. Actions identified in several state plans could save the states and their residents a combined total of about \$8 billion annually by 2010.

The State and Local Climate Change Program actively encourages partner states to implement their action plans voluntarily and take advantage of the benefits they themselves have identified. In response to the 2001 request for proposals issued by EPA, the program received proposals from three states interested in developing action plans.

Demonstration Projects

State and local governments often have innovative ideas for new programs to reduce emissions but need to test the ideas before launching a major effort. EPA's State and Local Climate Change Program supports demonstration projects that catalyze efforts in states and localities to test and implement the best approaches for reducing greenhouse gases. By demonstrating and disseminating information about the success of various mitigation options, these projects facilitate replication of the most promising practices across the country.

⁴ This number represents gross reductions and does not omit reductions that other federal programs, such as ENERGY STAR®, may attribute to their efforts. The State and Local Climate Change Program seeks to facilitate greenhouse gas reductions and encourages state and local governments to take advantage of other federal programs and tools to achieve these reductions.

⁵ State and local governments frequently report emissions and reductions in short tons of carbon dioxide equivalent. The State and Local Climate Change Program converts these reported values to MMTCE.

⁶ U.S. EPA Annual Emissions and Fuel Consumption for an "Average" Passenger Car, U.S. EPA 1997.

⁷ Louisiana is the only state that did not receive financial assistance from the State and Local Climate Change Program to conduct an inventory. Louisiana developed its inventory independently using EPA guidance.

The State and Local Climate Change Program has funded 16 demonstration projects throughout the United States since 1990. Projects completed or underway have achieved total emissions reductions of approximately 1.9 MMTCE per year.

The State and Local Climate Change Program works in cooperation with its partners to develop demonstration projects that meet the needs of the local community yet are widely replicable by others. For example, the State and Local Climate Change Program supports ICLEI's Cities for Climate Protection campaign. Campaign participants commit to developing a greenhouse gas emissions inventory, setting a reduction target, developing and implementing a local action plan, and monitoring and verifying reductions. ICLEI provides cities with assistance in reaching their goals, including technical information, training workshops, and guidance. The successes of the participants are shared with other participants in order to foster replication of the policies that generate the most benefits. This campaign has resulted in total annual reductions of greenhouse gas emissions of an estimated 1.86 MMTCE, criteria air pollutant reductions of 28,000 tons, and cost savings of more than \$70 million.⁸

Outreach and Education

The State and Local Climate Change Program has awarded 32 grants and cooperative agreements totaling more than \$3.5 million for education and outreach programs. Support for education and outreach helps provide states with an opportunity to inform their own citizens about the potential impacts of climate change. States can develop messages and information that are specific to their own par-

ticular conditions and needs. These activities can augment and improve federal efforts to increase awareness about climate change.

For example, with EPA assistance, the Wisconsin Department of Administration developed information on energy and climate change that was distributed through the Wisconsin K-12 Energy Education Program to more than 1,200 teachers by the fall of 2000. The department also held a "Time for Change, Not Climate Change" bookmark contest for sixth-, seventh-, and eighth-grade students that resulted in the dissemination of nearly 750,000 winning bookmarks throughout Wisconsin by the state and a utility that put them in every customer's bill.

In another project, the Interstate Renewable Energy Council developed and distributed 1,500 copies of the second edition of the *Procurement Guide for Renewable Energy Systems* to state and local procurement officials.

Building Networks

Since its inception, the State and Local Climate Change Program has held four conferences for partners, creating opportunities to share results, techniques, and lessons learned. More than 200 individuals attended the fourth conference, held in Alexandria, Virginia, in November 2000. At that meeting, they exchanged information and perspectives on harmonized options to reduce greenhouse gases and criteria pollutants, voluntary registries of emissions reductions, outreach challenges and successes, carbon sequestration and offsets, energy tax credits, renewable resource trust funds, transportation opportunities, and other key topics.

⁸ U.S. *Communities Acting to Protect the Climate: Achievements of ICLEI's Cities for Climate Protection-U.S. 2000*. International Council for Local Environmental Initiatives. Berkeley, California.

Climate Change and State and Local Governments

Earth's climate is predicted to change because humans are altering the chemical composition of the atmosphere. The burning of fossil fuels and other activities have led to a buildup of heat-trapping greenhouse gases—primarily carbon dioxide, methane, and nitrous oxide. The warming effect of these gases is expected to lead to widespread changes in temperature, precipitation, extreme weather events, and sea level. Although scientists are unsure exactly how the climate will respond to a continuing increase in greenhouse gases, global temperatures are rising.

Climate change is a global phenomenon with regional and local impacts. Long-term changes in climate can affect local economies, public health, water supplies, electric power production, and key industries such as tourism, agriculture, and forestry. An increase in the frequency and severity of extreme weather events could lead to more droughts, floods, and storm damage in many parts of the country. Low-lying coastal communities face added risk from sea level rise and associated increases in storm surges and coastal flooding.

Some regions and economic sectors may benefit from climate change while others may be harmed. Any adverse impacts would occur concurrently with other stresses, such as land-use change, air and water pollution, and population growth.

Although the actions of an individual state may have little impact on global greenhouse gas concentrations, the combined effect of many states and localities acting together can be significant. For example, actions identified in the climate change action plans of just 12 states could reduce their total net emissions by up to 70 MMTCE by 2010. At the local level, the U.S. cities and counties that partici-

pate in ICLEI's Cities for Climate Protection campaign have reduced their greenhouse gas emissions by nearly 2 MMTCE per year, an amount equivalent to taking half a million cars off the road.

States and localities have unique authorities to affect emissions in areas such as energy use, transportation, and growth and development patterns. In many cases they may be able to set policies and implement them more quickly than the federal government can.

By acting now to inventory greenhouse gas sources and sinks and to develop plans to reduce emissions, states and localities learn more about what climate change and climate change mitigation could mean for them. States and localities then can select policy responses that are appropriate to their circumstances and most beneficial to them while also helping to minimize the future impacts of climate change.

Opportunities for Multiple Benefits

The burning of fossil fuels results in emissions of greenhouse gases, criteria air pollutants that contribute to smog, and hazardous air pollutants. When fossil fuels are used more efficiently, or when they are replaced by non-fossil energy sources such as solar or wind power, both air pollution and greenhouse gas emissions are reduced.

Pollution prevention strategies that focus on achieving multiple benefits provide a framework for efficient, coordinated, and cost-effective compliance with a wide range of regulatory requirements and voluntary goals. Historically, however, most regulators have treated individual environmental problems separately, so state and local agencies may not have the capacity, tools, or flexibility to take an integrated approach.

Projected Regional Effects of Climate Change

According to the U.S. Global Change Research Program's *National Assessment of the Potential Consequences of Climate Variability and Change*, the following regional impacts are among those that may occur during the next 100 years⁹:

- **Northeast:** Rising temperatures are very likely to increase the heat index dramatically in summer, with impacts on health and comfort. Warmer winters are likely to reduce cold-related stresses. It is very probable that warm weather recreational opportunities like hiking will expand while cold weather activities like skiing will decline.
- **Southeast:** Under warmer and wetter scenarios, the range of southern tree species is likely to expand. Warmer and moister air will very likely lead to more intense rainfall events, increasing the potential for flash floods. It also is very probable that rising sea levels and storm surges will threaten natural ecosystems and human coastal development and reduce buffering capacity against storm impacts.
- **Midwest:** Prairie potholes, which provide important habitat for ducks and other migratory waterfowl, are likely to dry up in a warmer climate. Higher carbon dioxide concentrations are likely to offset the effects of rising temperatures on forests and agriculture for several decades, increasing productivity. In the Great Lakes, lake levels are likely to decline, leading to reduced water supply and more costly transportation. Shoreline damage due to high water levels is likely to decrease.

- **Southwest:** With an increase in precipitation, the desert ecosystems native to this region are likely to decline while grasslands and shrublands expand.
- **Northwest:** Higher winter temperatures are very likely to reduce snowpack and peak runoff and shift the peak to earlier in the spring, reducing summer runoff and complicating water management for flood control, fish runs, municipal water supplies, and agricultural irrigation. Increasing stream temperatures are very likely to further stress migrating fish, complicating restoration efforts.
- **Alaska:** Sharp winter and springtime temperature increases are very likely to cause continued thawing of permafrost, further disrupting forest ecosystems, roads, and buildings.
- **Pacific and Caribbean Islands:** Low-lying islands that are not rising are very likely to be at risk from sea-level rise. Examples of sites that are already close to sea level include the Republic of the Marshall Islands in the Pacific and much of the metropolitan area of San Juan in Puerto Rico.

The effects described above are based on the projections of computer-based climate models. These models do a reasonably good job of simulating the large-scale aspects of a complex climate system. Still, model accuracy is limited by a number of factors such as difficulties reproducing the effects of clouds, water vapor and ocean heat transport on our changing climate. Model projections scaled down to the regional level contain considerable uncertainty.

Language Used to Express Considered Judgement⁹



⁹ National Assessment Synthesis Team (NAST), *Climate Change Impacts on the United States: The Potential Consequences of Climate Variability and Change: Overview Report*, Report for the U.S. Global Change Research Program, Cambridge University Press, New York, 154 pp., 2000.

EPA's State and Local Climate Change Program encourages states and localities to develop integrated multipollutant strategies that achieve optimal reductions in soot, smog, air toxics, and greenhouse gases while minimizing costs *and* administrative burden.

Potential Benefits of Reducing Greenhouse Gas Emissions

States and localities that decide to address climate change can reap multiple benefits that improve air quality, local economies, and public health as well as the climate.

Public Health

- Improved respiratory health. Actions that reduce the use of fossil fuels lead to less air pollution, with significant health benefits, particularly for populations that are vulnerable to air pollution such as children, the elderly, and people with asthma and other lung diseases. Even modest exposure to high levels of ozone can cause healthy individuals to experience chest pains, nausea, and pulmonary congestion.

Environmental Quality

- Better air quality. By reducing greenhouse gas emissions, states and municipalities will likely reduce other pollutants and compliance costs associated with air pollution.
- Reduced environmental costs associated with air pollution that is mitigated through greenhouse gas mitigation policies. Cities and states incur costs from acid rain and smog, which adversely affect trees, wildlife, natural ecosystems, agriculture, and structures and equipment such as buildings and cars.
- Improved water quality from reduced nitrogen deposition. Nitrogen fertilizer management to reduce nitrous oxide emissions reduces surface water acidification from agricultural runoff.

- Reduced climate change and its potential effects.

Economics

- Reduced energy costs to households, businesses, organizations, and governments. Energy efficiency saves money while reducing greenhouse gas emissions and air pollution.
- Lower material costs and disposal fees due to recycling and source reduction.
- Lower maintenance costs required for alternative technologies such as efficient appliances and lights, compared with conventional products.
- Greater reliability of certain alternative power sources, such as fuel cells, which may benefit businesses and agencies that rely on uninterrupted power.
- Increased demand for energy efficiency technologies and alternative power sources, translating into more profits and jobs for businesses that supply those sectors .

Land Use

- More walkable cities and towns. Mixed residential and commercial areas can reduce car use (and vehicle miles traveled) by enabling consumers to walk or bike to nearby retail stores, workplaces, and recreational areas instead of driving to distant chain retailers.
- More efficient use of land within communities, preserving the vibrancy of downtown areas while conserving valuable open space and farmland outside cities.

Forestry

- Greener cities and towns. Trees can be planted to remove carbon dioxide from the atmosphere while making urban areas and towns more attractive.
- Reduced summer cooling costs through strategic tree planting. Trees can provide shade for buildings, window air-conditioners, and streets, reducing the amount of energy needed to cool buildings.
- Sustainably managed forests. When forests are managed for long-term carbon storage, sustainable forestry practices are observed.
- Reduced urban heat island effect. Declining tree cover is a major cause of increasing urban temperatures. Materials such as asphalt store much of the sun's energy and remain hot long after sunset. Trees can help by providing shade and cooling through evapotranspiration.
- Reduced stormwater runoff. Tree roots can reduce urban runoff by holding soil in place and increasing water infiltration.

Agriculture

- Reduced energy costs to farmers from improved energy efficiency in farm building operations and farm equipment.
- Reduced energy costs from conservation tillage. Low-till or no-till agriculture saves significant amounts of diesel fuel and helps reduce soil erosion.
- Reduced costs to farmers through alternative farming practices such as the strategic use of fertilizers. Reducing the use of nitrogen fertilizer helps prevent emissions of nitrous oxide, a potent greenhouse gas, while reducing fertilizer costs to farmers.
- New potential source of income for farmers from the use of agricultural crops for biofuels such as methanol or biodiesel. Some biofuels may reduce greenhouse gas emissions by displacing fossil fuels.
- Reduced energy costs and a new income source for farms through processing of livestock waste to produce power.

State Greenhouse Gas Inventories

A greenhouse gas inventory allows a state to identify major sources and sinks of greenhouse gas emissions and to create a baseline for evaluating the success of emission reduction strategies. An inventory represents a state's first step toward developing a climate change action plan.

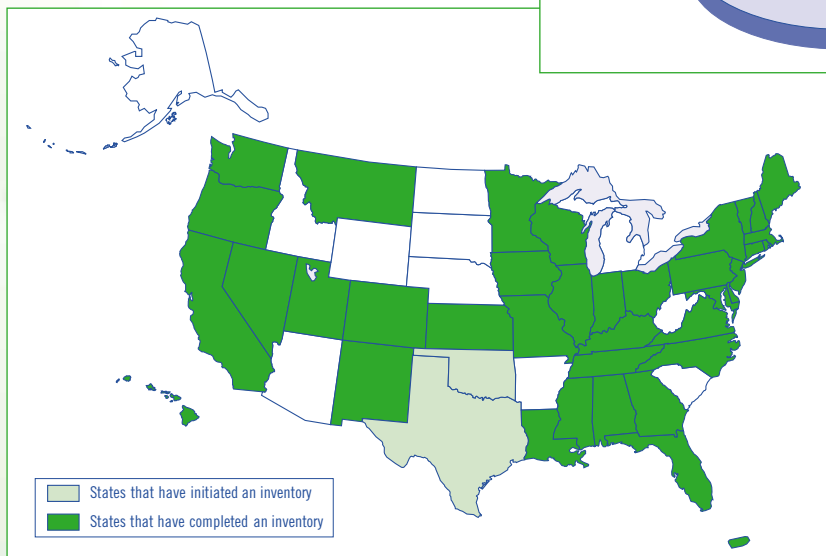
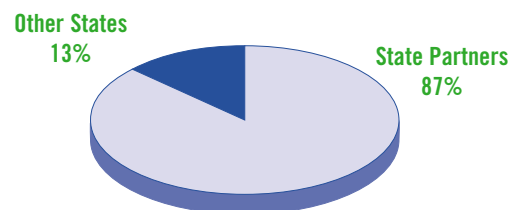
From FY 1992 through FY 2000, EPA's State and Local Climate Change Program provided technical assistance and \$781,265 in grants and cooperative agreements to help 38 states and Puerto Rico prepare greenhouse gas inventories.

Inventories present annual greenhouse gas emissions by sector, source, and gas, as well as estimates of key sinks such as forests. The inventory methodology is based on activity data, such as electricity use, and emission

factors derived for specific activities and gases. Since 1995, EPA has revised its emissions inventory guidance three times to incorporate changes in international guidelines, U.S. inventory methodologies, and advice from a panel of state representatives. Most recently, the guidance has been thoroughly reviewed, revised, and updated under the auspices of the Emission Inventory Improvement Program (EIIP), a program to determine standard methodologies for performing air emissions inventories.

Currently 37 states and Puerto Rico have completed inventories using EPA guidance, representing more than 1,050 MMTCE or 87 percent of total U.S. emissions in 1990. Texas initiated an inventory recently and expects to complete it by the end of 2001.

State Partners 1990 Emissions as a Percentage of U.S. Emissions



Total Greenhouse Gas Emissions and Sinks by State and Sector (1990)

STATE	Energy		Waste		Agriculture		Industry		GT	Land Use		NT
	M	%G	M	%G	M	%G	M	%G	M	M	%G	M
Alabama	34.1	90.7	1.8	4.8	1.0	2.6	0.7	1.9	37.6	-5.4	-14.3	32.2
California	110.1	89.2	5.0	4.0	4.6	3.8	3.7	3.0	123.4	-7.5	-6.1	115.9
Colorado	20.8	90.9	0.5	2.0	1.4	6.1	0.2	1.0	22.9	-19.5	-84.9	3.5
Connecticut	10.6	92.3	0.8	6.8	0.1	0.5	0.0	0.4	11.5	-0.2	-1.3	11.4
Delaware	4.1	95.3	0.1	3.1	0.1	1.6	0.0	0.1	4.3	0.0	0.0	4.3
Florida	50.7	90.7	2.7	4.8	2.5	4.5	0.0	0.0	55.9	-2.5	-4.5	53.4
Georgia	40.8	90.9	1.7	3.9	1.5	3.4	0.8	1.8	44.9	-4.6	-10.2	40.3
Hawaii	3.8	89.6	0.3	7.0	0.1	2.8	0.0	0.6	4.2	-0.2	-5.5	4.0
Illinois	56.6	85.6	6.9	10.5	2.2	3.4	0.3	0.5	66.1	0.0	0.0	66.1
Indiana	57.0	92.5	1.7	2.8	1.8	3.0	1.0	1.7	61.6	-0.4	-0.6	61.3
Iowa	17.3	72.1	0.9	3.8	4.2	17.6	1.6	6.5	24.0	-6.9	-29.0	17.0
Kansas	17.8	85.7	0.3	1.3	2.6	12.6	0.1	0.4	20.8	0.0	0.0	20.8
Kentucky	36.8	83.9	0.7	1.6	1.2	2.7	5.2	11.8	43.9	-8.5	-19.3	35.4
Louisiana	63.5	92.9	1.1	1.7	1.4	2.0	2.3	3.4	68.4	-6.2	-9.1	62.2
Maine	4.7	90.7	0.4	7.4	0.1	1.2	0.0	0.7	5.2	-0.6	-11.7	4.6
Maryland	17.2	92.7	0.8	4.1	0.4	1.9	0.2	1.3	18.5	0.4	2.0	18.9
Massachusetts	22.4	93.3	1.5	6.4	0.0	0.2	0.0	0.2	24.0	-2.3	-9.6	21.7
Minnesota	21.3	85.4	1.2	4.7	2.5	9.9	0.0	0.0	24.9	-2.4	-9.6	22.5
Mississippi	13.9	55.2	0.9	3.8	10.2	40.7	0.1	0.2	25.1	0.0	0.0	25.1
Missouri	30.0	85.8	0.7	2.1	2.9	8.3	1.3	3.7	35.0	-5.7	-16.2	29.3
Montana	7.5	85.1	0.2	2.3	0.8	9.0	0.3	3.5	8.8	-4.7	-53.7	4.1
Nevada	8.3	92.5	0.1	1.6	0.2	2.5	0.3	3.3	9.0	0.0	-0.5	8.9
New Hampshire	4.1	93.8	0.2	5.2	0.0	0.6	0.0	0.4	4.3	-1.2	-27.9	3.1
New Jersey	32.2	91.2	2.7	7.7	0.1	0.1	0.3	0.9	35.3	0.0	0.0	35.3
New Mexico	15.9	92.1	0.6	3.3	0.8	4.4	0.0	0.2	17.2	-1.0	-6.0	16.2
New York	62.3	82.3	11.6	15.3	0.9	1.2	0.9	1.2	75.7	0.0	0.0	75.7
North Carolina	30.4	88.6	1.5	4.4	2.3	6.7	0.1	0.3	34.3	-2.4	-6.9	31.9
Ohio	76.9	85.0	11.3	12.5	1.7	1.9	0.6	0.7	90.5	-1.6	-1.8	88.9
Oregon	17.0	90.7	0.6	3.3	0.7	3.7	0.4	2.3	18.8	1.1	5.7	19.9
Pennsylvania	68.3	89.9	3.6	4.8	3.3	4.4	0.7	0.9	75.9	0.1	0.1	76.0
Puerto Rico	9.7	92.1	0.4	3.8	0.4	3.5	0.1	0.6	10.5	-1.1	-10.8	9.4
Rhode Island	2.5	97.6	0.1	2.1	0.0	0.3	0.0	0.0	2.6	0.0	0.1	2.6
Tennessee	26.8	88.3	1.5	5.0	1.3	4.4	0.7	2.4	30.3	-1.2	-4.0	29.1
Utah	15.7	92.6	0.3	1.8	0.5	2.8	0.5	2.8	16.9	0.0	0.0	16.9
Vermont	1.3	62.9	0.1	3.2	0.1	6.4	0.6	27.6	2.1	0.0	-0.8	2.1
Virginia	28.1	80.4	5.8	16.6	0.8	2.2	0.3	0.8	34.9	-5.7	-16.4	29.2
Washington	18.4	80.7	1.6	7.1	1.0	4.4	1.8	7.8	22.8	-5.8	-25.3	17.0
Wisconsin	23.4	86.9	0.9	3.4	2.5	9.3	0.1	0.4	27.0	0.2	0.6	27.1

Key

M=MMTCE

%G= % Gross

GT=Gross Total
(excludes land use)

NT=Net Total
(includes land use)

Gases included: carbon dioxide, methane, nitrous oxide, PFCs

Inventories as Tools for Education

Rhode Island took an innovative approach to its state greenhouse gas inventory: The state's inventory was designed from the start to be published only on the Web. Rhode Island also turned the inventory into a learning tool by creating a companion site for educators and students.

Released in 2000, the inventory was prepared by Brown University's Center for Environmental Studies under contract to the Rhode Island Department of Environmental Management (DEM). Center Director Harold Ward emphasizes that developing a Web-based inventory requires a different approach than that used for printed reports. "On the Web you don't do a linear presentation of methodologies and results followed by conclusions," he says. "You have to start with what you want to say and provide links to the supporting information."

Ward proposed publishing the inventory on the Internet to make it more accessible to a broad audience. "I've been impressed with the Web's effectiveness as a way to make environmental information available," Ward says. "It's very powerful." Both DEM and EPA's State and Local Climate Change Program responded enthusiastically to the idea of a Web-based inventory.

The inventory's companion educational site provides a study guide; background information on the science of climate change, emissions sources, and mitigation options; and links to online lesson plans and other educational resources. The study guide poses seven questions related to Rhode Island's greenhouse gas emissions, along with step-by-step instructions for using the inventory to obtain the answers.

Rhode Island's inventory shows that total in-state greenhouse gas emissions increased by 44 percent between 1990 and 1996, much of that due to a 74 percent increase in emissions from the combustion of fossil fuels. The increase reflects a major change in the amount of electricity produced in-state during that period, as Rhode Island evolved from a net importer to a net exporter of electricity.

The inventory, the education resources site, and the study guide are available at:
http://www.brown.edu/Research/EnvStudies_Theses/GHG/index.shtml

Inventory Updating

Once states have created an inventory of their greenhouse gas emissions and sinks, they have the capacity to update the inventory on a regular basis. Many states take advantage of that ability and conduct periodic updates. For example, Washington State updates its inventory annually for energy use, based on adjusted data from the federal Energy Information Administration. The state updates its inventories for agricultural and industrial emissions approximately every two years. Funding for the updates comes from the energy policy section of the Washington Office of Trade and Economic Development, which prepares a biennial report that includes a section on global climate change.

Illinois prepares biennial updates of its greenhouse gas inventory and has prepared five inventories to date. The state is currently working on its 2000 inventory. Virginia updated its inventory in 1999 to incorporate new energy consumption estimates for 1996. In September 2000, California Governor Gray Davis signed a law requiring the state to update its greenhouse gas inventory on or before January 2002. The law further requires an update to be prepared every five years thereafter.

Facilitating the Inventory Process

Compiling a comprehensive state greenhouse gas inventory can be a time-consuming and labor-intensive effort. To simplify the process, EPA is developing a spreadsheet-based inventory tool that simplifies and standardizes the process. The tool will walk the inventory developer through a step-by-step process and provide guidance about sources of data. EPA plans to develop the spreadsheet to include all sources identified in the Emissions Inventory Improvement Program guidance and make it available to state partners via CD-ROM in early 2002.

Inventory Highlights

In addition to Rhode Island, seven states—Connecticut, Florida, Georgia, Louisiana, Maryland, Nevada, and Virginia—have completed greenhouse gas inventories since the State and Local Climate Change Program's previous progress report was published in 1998:

Connecticut

The State of Connecticut Department of Environmental Protection worked with the Environmental Research Institute and the Department of Natural Resources Management and Engineering at the University of Connecticut to produce *Connecticut's Greenhouse Gas Emissions Inventory: 1990 and 1995 Calendar Years*. Connecticut was one of the first states (along with Rhode Island) to use methods from the draft 1998 version of EPA's guidance document *State Workbook: Methodologies for Estimating Greenhouse*

Gas Emissions. The 1998 workbook covers non-CO₂ emissions from mobile and stationary sources and incorporates a number of methodological improvements. The state reported net emissions of 11.4 MMTCE in 1990 and 10.4 MMTCE in 1995—a 7.6 percent reduction over the five-year period.

Florida

The Florida Department of Environmental Protection, with assistance from EPA, completed a streamlined inventory in 2001. *The Inventory of Florida Greenhouse Gas Emissions and Sinks: 1990-1997* assessed emissions from seven sources that represent over 90% of national emissions. By focusing on the principal sectors, and excluding minor emissions sources, sources that require extensive data sets and sources that lack cost-effective mitigation options, Florida was able to more easily complete an inventory. The state reported net emissions of 53.37 MMTCE in 1990 and 60.98 MMTCE in 1997—a 14% increase over the seven-year period.

Georgia

The Georgia Department of Natural Resources completed the *Development of a Greenhouse Gas Inventory for the State of Georgia* in January 1999. The state estimated that net emissions in 1990 totaled 38.1 MMTCE and rose 30 percent to 49.6 MMTCE in 1996. Consistent with national trends, carbon dioxide from the burning of fossil fuels was the dominant source of emissions in Georgia. By fuel type, coal used for utilities contributed the largest quantity of emissions for 1990, while petroleum used for transportation contributed the most in 1996.¹⁰

¹⁰ These emission estimates reflect state submissions and may differ from emissions reported in EPA's online state inventory summaries. The online summaries (<http://yosemite.epa.gov/globalwarming/ghg.nsf/emissions/StateAuthoredInventories?Open>) attempt to reflect the most recent guidance by recalculating some of the emission estimates supplied by the states. Because this state provided additional information for years or sources not included in the online summaries, the state's original submission is reported.

Louisiana

The Center for Energy Studies at Louisiana State University and the Louisiana Department of Natural Resources completed the *Inventory of Greenhouse Gases in Louisiana* in 2000. The inventory was conducted following guidance developed by EPA but was funded independently. The state estimated net emissions of 59.4 MMTCE in 1990. Fossil fuel combustion was responsible for 92% of total emissions. The land-use sector offset almost 10% of emissions.

Maryland

The Maryland Department of the Environment prepared the *1990 Maryland Draft Greenhouse Gas Emissions Inventory*. The state estimated that net emissions in 1990 totaled 27.2 MMTCE. Fossil fuel consumption—particularly the use of coal and petroleum—constituted the major source, accounting for 65 percent of total emissions. A large percentage of the state's emissions in 1990—29 percent—came from ozone-depleting compounds. The inventory is intended to aid in taking the next step to produce a greenhouse gas mitigation plan and includes a Maryland Carbon Cycle Budget. The carbon cycle information helps the state identify opportunities to mitigate climate change impacts by increasing carbon storage and decreasing carbon emissions.¹¹

Nevada

The Nevada Energy Office and the Desert Research Institute completed the *Greenhouse Gas Emissions Inventory for Nevada* in November 1998. The state estimated that net emissions in 1990 totaled 8.9 MMTCE, of which 95 percent was carbon dioxide. Nevada's results for CO₂ are higher than the national average of 85 percent of total green-

house gas emissions, a discrepancy accounted for by the presence of several fossil-fuel-burning electrical generation plants. Net emissions in 1995 totaled 10.4 MMTCE, a 17 percent increase from 1990.

Virginia

The James Madison University Integrated Science and Technology Program prepared the *State Greenhouse Gas Emission Inventory for the Commonwealth of Virginia*. The state's estimated net emissions in 1990 totaled 28.0 MMTCE. Although carbon dioxide emissions from fossil fuel combustion accounted for the largest percentage of net total emissions, methane emissions from landfills, coal mining, manure management, and domesticated animals accounted for a higher-than-usual percentage of total emissions. Net emissions in 1995 totaled 26.5 MMTCE, a 5 percent decrease from 1990. However, net carbon emissions per capita remained essentially unchanged between 1990 and 1995.¹¹

EPA Publications and Web Sites on State Greenhouse Gas Inventories

- *Estimating Greenhouse Gas Emissions* (Emissions Inventory Improvement Program Guidelines, Volume VIII) October 1999. Available at: <http://www.epa.gov/ttn/chief/eiip/techreport/volume08/index.html>
- More information on state greenhouse gas inventories is available online at <http://yosemite.epa.gov/globalwarming/ghg.nsf/emissions/state>

¹¹ For complete information see footnote on previous page.

State Climate Actions



After completing an emissions inventory, many states choose to take the next step and develop a climate change action plan—a strategy to reduce greenhouse gas emissions through feasible and effective policies. Typically, the action plans are developed by state officials in consultation with stakeholders. Action plans are designed to minimize the impacts of climate change while ensuring that efforts to control emissions do not burden state constituents.

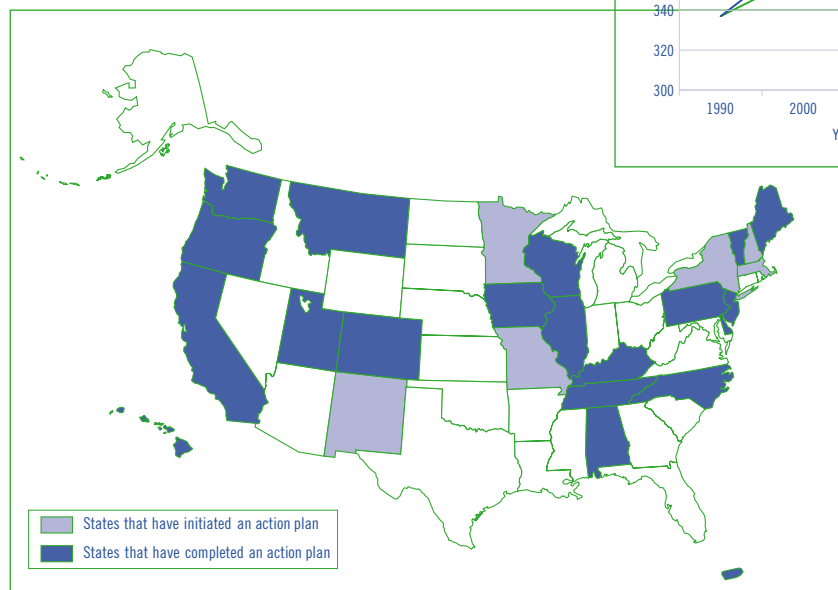
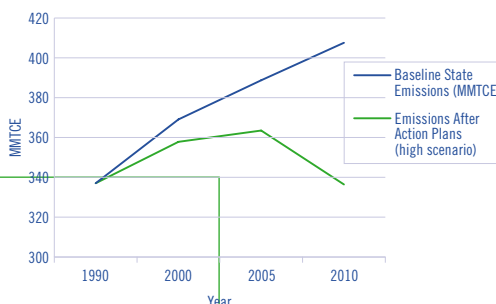
Action plans are tailored to each state's specific circumstances and needs. An action plan typically includes a projection of the state's future greenhouse gas emissions and an emissions reduction goal. It identifies and recommends policy options based on criteria such as emissions reduction potential, cost-effectiveness, political feasibility, ancillary benefits, and public acceptance. Often the state will offer the plan for public comment.

The impetus to develop an action plan or assess greenhouse gas emissions reduction options may come from the legislative branch,

as in Wyoming and Oklahoma; a state agency; or, as in the case of Maryland, New York, and Texas, from the state administration.¹²

From FY 1992 through FY 2000, EPA's State and Local Climate Change Program provided technical assistance and approximately \$2 million in grants and cooperative agreements to help 25 states and Puerto Rico prepare climate action plans. To date, 19 states and Puerto Rico have completed plans. Actions identified in several of the completed action plans could, if implemented, reduce greenhouse gas emissions in those states by a combined total of up to 70 MMTCE per year by 2010 and nearly 100 MMTCE by 2020. Actions already implemented by states avoid a total of more than 3 MMTCE annually.

Emission Reductions from State Action Plans



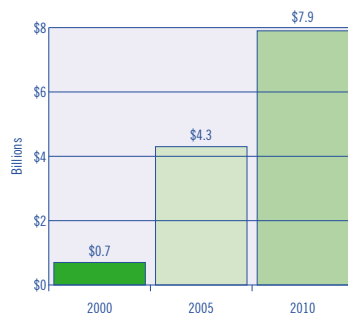
Emissions Reductions from State Action Plans represents potential reductions that would occur if partner states implemented all “maximum feasible” (High Scenario) actions identified in their action plans.

¹² Although Wyoming and Oklahoma are not currently partners in EPA's State and Local Climate Change Program, these states recently passed legislation calling for the assessment of potential mitigation options.

Economic Savings from State Action Plans

- **Iowa's** state action plan identifies 16 cost-effective priority actions that could save up to \$300 million annually in reduced energy costs while reducing greenhouse gas emissions by at least 4 MMTCE.
- **North Carolina's** action plan, if implemented, could reduce greenhouse gas emissions to 7 percent below 1990 levels in 2010 and would save state residents and businesses \$6.7 billion in energy costs in the year 2010.
- **Tennessee** identified policy options that could achieve \$522 million in annual savings to consumers and businesses, create more than 10,000 jobs, and increase annual gross state product by nearly \$500,000 while reducing greenhouse gas emissions by nearly 10 MMTCE in 2017.
- **Vermont's** greenhouse gas action plan cumulatively would reduce energy costs by \$6.2 billion and increase employment by 1 percent, while reducing greenhouse gas emissions by 21 percent (13 MMTCE), acid rain precursors by 24 percent, and ground-level ozone precursors by 30 percent.
- **Wisconsin** identified energy efficiency measures that, by 2010, could save up to \$2.7 billion in cumulative energy and operating costs, create more than 8,500 new jobs, and reduce emissions by nearly 2 MMTCE.

Cost Savings Identified in Action Plans



Emissions Reduction Goal Set in New Jersey

In April 2000, New Jersey's environment commissioner, with support from the governor, issued an executive order to reduce the state's annual greenhouse gas emissions. The order called for the reduction of emissions by 4.7 MMTCE, to 3.5 percent below 1990 levels by 2005, using "no regrets" measures that are readily available and that pay for themselves within the short term.

The potential emissions reductions identified in the *New Jersey Sustainable Greenhouse Gas Action Plan* amount to 5.05 MMTCE, more than enough to enable New Jersey to achieve its goal.

Approximately two-thirds of the reductions will be achieved through energy efficiency and innovative energy technologies in residential, commercial, and industrial buildings; the remainder will come from energy conservation and innovative technologies in the transportation sector, waste management improvements, and natural resource conservation.

Specific actions include enhanced maintenance of vehicles, upgrades to commercial lighting, increased recycling, capture and recovery of landfill methane, tree planting and open-space preservation, greater use of mass transit and alternative fuel vehicles, and use of energy-efficient residential appliances. The state also worked with The Netherlands to develop a greenhouse gas emissions credit trading pilot program.

Annual Potential Reductions Identified in Action Plans (MMTCE)

State	2000		2010		2015		2020	
	Low Estimate	High Estimate	Low Estimate	High Estimate	Low Estimate	High Estimate	Low Estimate	High Estimate
Delaware	n/a		1.8		1.8		1.8	
Hawaii	n/a		0.82		1.0		1.2	
Illinois	0.9	7.0	0.9	7.0	0.9	7.0	0.9	7.0
Iowa ¹³	1.5	3.0	4.0	9.0	4.0	9.0	4.0	9.0
Kentucky ¹⁴	n/a		n/a		n/a		3.2	12.6
Maine	0.12		1.24		1.86		2.5	
New Jersey	n/a		5.05 ¹⁵		5.05		5.05	
N. Carolina	n/a		26 ¹⁶		26		26	
Oregon	0.6		2.9		3.7		3.7	
Puerto Rico	n/a		2.6		2.6		2.6	
Tennessee	n/a		n/a		9.8 ¹⁷		9.8	
Vermont ¹⁸	0.31		0.55		0.77		0.79	
Washington ¹⁹	n/a		4.7		4.7		4.7	
Wisconsin ²⁰	n/a		3.0	9.5	3.0	9.5	3.0	9.5
Total MMTCE Identified	3.43	11.03	53.56	70.85	64.87	82.78	69.24	96.24

Notes: Illinois, Iowa, and Wisconsin provided low and high estimates for potential reductions; both estimates are shown for those states. Several states did not quantify emissions reduction potential but assessed policies qualitatively. Only those with quantitative measurements are included in this table and only for those years reported. Reductions initially were reported in million short tons of carbon dioxide equivalent in the plans but have been converted to million metric tons of carbon equivalent for this table.

¹³ The reductions are from policies ranging from “priority” to “maximum feasible.” According to the plan, the priority options identified could save Iowa up to \$300 million annually from reduced energy costs.

¹⁴ Kentucky policy reductions are derived from either “modest options” or “maximum effort options.”

¹⁵ New Jersey has set a goal of reducing 4.7 MMTCE by 2005 via no-regrets policies that pay for themselves in the short run. The state has identified measures that could reduce 5.05 MMTCE by 2005 in Table 1 of its action plan.

¹⁶ North Carolina estimated that it could reduce 26 MMTCE in 2010, saving 504 trillion Btu and \$6.7 billion in energy costs.

¹⁷ Tennessee gave estimates for 2017, not 2015. Reductions would be achieved with a net economic boost to the state, and more than 10,300 jobs would be created.

¹⁸ These policies also are expected to increase employment in Vermont by 1 percent, save \$6.2 billion in energy costs, reduce acid rain precursors by 24 percent, and reduce ground-level ozone precursors by 30 percent, cumulatively, by 2020. Estimates are from page 5-17, table 5.VIII of Vermont’s action plan.

¹⁹ Washington acknowledges that the reductions are not additive, but for simplicity we have added them here. Adding them may overstate the magnitude of the potential reductions.

²⁰ Wisconsin numbers in the table are from Report 3, Volume 1 of the *Wisconsin Greenhouse Gas Emission Reduction Cost Study, Emission Reduction Cost Analysis*, 1998. Those reported previously are from a sub-analysis, *Report 4, Economic and Greenhouse Gas Emission Impacts of Electric Energy Efficiency Investments*, 1998. The range covers policies that cost \$0/ton–\$100/ton.

New Jersey already has begun to implement a number of actions in its plan. For example, New Jersey's Clean Energy Program provides financial incentives for homeowners and small businesses that choose to install qualified clean energy systems where they live or work. The program supports technologies such as fuel cells, photovoltaics, small wind, and sustainable biomass equipment with incentives of \$5/watt for small systems (less than 10 kilowatts), \$4/watt for medium-sized systems (10-100 kilowatts), and \$3/watt for systems larger than 100 kilowatts, up to a maximum of 60 percent of eligible system costs. The program is funded through an electricity surcharge approved by the New Jersey Board of Public Utilities.

EPA provided technical and financial assistance toward the development of the action plan and toward several other activities related to climate change mitigation in New Jersey, such as the design of the trading program and outreach activities.

Highlights of Action Plans

In addition to New Jersey, seven states—Colorado, Delaware, Hawaii, Maine, North Carolina, Tennessee, and Utah—and the Commonwealth of Puerto Rico have completed state climate action plans since the State and Local Climate Change Program's previous progress report was published in 1998.

Colorado

The Colorado Department of Public Health and Environment released the report *Climate Change and Colorado: A Technical Assessment Examining Climate Change Science, Greenhouse Gas Production, Potential Impacts, and Mitigation* in December 1998. The plan provides an extensive menu of options describing national, state, and local programs and other potential strategies to reduce Colorado's greenhouse gas

emissions. Actions implemented thus far have focused on pollution prevention at ski areas.

Delaware

The Center for Energy and Environmental Policy at the University of Delaware, in collaboration with the government agencies, businesses, and interest groups of the Delaware Climate Change Consortium, completed the *Delaware Climate Change Action Plan* in January 2000. The consortium adopted a target of reducing greenhouse gas emissions to 7 percent below 1990 emissions by the year 2010. To reach this target, the plan recommends cost-effective measures for each sector of the Delaware economy that, cumulatively, could reduce emissions by 15–25 percent during the next 12 years.

Hawaii

The Hawaii Department of Business, Economic Development, and Tourism and the Department of Health completed the *Hawaii Greenhouse Gas Reduction Strategy* in November 1998. The plan is primarily intended to encourage discussion, and it identifies options that could reduce the state's greenhouse gas emissions by nearly 1 MMTCE by 2010, restoring emissions to about 2 percent above 1990 levels by that year. The Hawaii Climate Change Action Team was formed in 1999 to catalyze actions such as reducing emissions through cost-effective and economically beneficial measures; exporting technologies, expertise, and services that reduce emissions; and developing a carbon offset forestry program.

Maine

The Maine State Planning Office, in collaboration with the Maine Climate Change Task Force, completed the *State of Maine Climate Change Action Plan* in 2000. The state agencies, public and private interest groups, business representatives, and state program adminis-

trators that participated in the task force evaluated each policy option in terms of expected emissions reductions, investment by the cost-bearing sector, and the net impact on Maine's economy. The plan sets a statewide goal to reduce carbon dioxide emissions by 0.12 MMTCE beginning in 2000. The plan calls to increase this reduction by 0.12 MMTCE each year over the course of the next 7 to 22 years until total annual emissions stabilize at pre-1990 levels. In order to achieve this goal, the plan sets specific targets for the transportation, utility, industrial, commercial, and residential sectors.

North Carolina

The Department of Geography and Planning at Appalachian State University completed *North Carolina's Sensible Greenhouse Gas Reduction Strategies* in January 2000. North Carolina used the Greenhouse Gas Emissions Software developed for ICLEI to test proposed reduction measures. The state found that it could avoid 26 MMTCE, exceeding the strategy's target of reducing greenhouse gas emissions to 7 percent below 1990 emissions by the year 2010, and resulting in \$6.7 billion in energy cost savings.

Puerto Rico

The Puerto Rico Department of Natural and Environmental Resources and Energy Affairs Administration, working with the Interagency Committee on Climate Change, completed the *Puerto Rico State Action Plan to Reduce Greenhouse Gas Emissions* in December 1999. The plan sets a goal to reduce annual emissions by 2.6 MMTCE—to 10 percent above 1990 levels—by the year 2010. The report recommends 23 cost-effective measures or actions. The commonwealth concurrently conducted a public opinion poll to gauge knowledge and perceptions of climate change issues; the results prompted plans to develop an aggressive public education campaign.

Tennessee

The Center for Electric Power and the Tennessee Technological University completed *Tennessee Greenhouse Gas Emissions: Mitigation Strategies* in April 1999. The strategies identified in this report could reduce annual emissions by nearly 10 MMTCE, approximately 20 percent from the baseline level, by 2017. Based on economic models that simulated the impact on the state economy of changes in public and private spending, taxes, and prices, the state expects that policy measures aimed to reduce emissions also will result in a net economic gain.

Utah

The Utah Office of Energy and Resource Planning (OERP) and the Utah Division of Air Quality (DAQ) completed *Greenhouse Gas Reduction Strategies in Utah: An Economic and Policy Analysis* in March 2000. The analysis examined the economic impact of 13 fossil fuel-related strategies that Utah could implement, ranging from "feasible" to "potential" options. OERP and DAQ found that Utah could reduce annual greenhouse gas emissions by up to nearly 1 MMTCE, increase average annual earnings by up to about \$24 million (mostly from energy efficiency retrofits), and increase average annual employment in the state by up to 1,600 jobs if all barriers to adoption were removed.

State Greenhouse Gas Registries

California, Maine, New Hampshire, New Jersey, Texas, and Wisconsin are creating greenhouse gas registries that will allow companies and other entities to register their voluntary greenhouse gas emissions reductions. Registries are used to maintain records of historic emissions or voluntary actions taken to reduce emissions. Benefits of participating in a registry include the opportunity for entities to learn more about their emissions profile, the promotion of cost-effective mitigation tech-

niques, public recognition of environmental action, and a credible record of past emissions.

New Hampshire's registry, approved by the state legislature and the governor in 1999, is administered by the state's Department of Environmental Services. The department's final rule establishing the registry was published in 2001. The registry requires voluntary emissions reductions to be computed in accordance with the federal voluntary reporting program for greenhouse gas emissions (section 1605(b) of the Energy Policy Act of 1992), although alternative protocols will be considered.

New Jersey's environment commissioner approved an amendment to add greenhouse gases to the state's existing Open Market Emissions Trading (OMET) program in April 2000. OMET assigns and verifies credits for greenhouse gas emissions reductions, but there is no established, allowable use for those credits and no trading of greenhouse gas credits currently is taking place. Information on OMET is available at <http://www.omet.com/>

The bill establishing Wisconsin's registry was passed in May 2000, and rules currently are being developed by the state's Department of Natural Resources. The department also is developing rules for registering reductions in fine particulate matter, mercury, and other air contaminants. The Wisconsin Voluntary Emission Reductions Registry Advisory Committee has established the following Web site: <http://www.dnr.state.wi.us/org/aw/air/hot/climchgcom/>

California's Climate Action Registry, passed by the state's Senate in August 2000 and approved the following month by the governor, takes the form of a nonprofit public benefit corporation, governed by a seven-member board. Unlike the New Hampshire and Wisconsin registries, California's registry requires organ-

izations to report emissions on an entity-wide basis, rather than project-by-project. The enabling legislation contains detailed requirements for the registry's organization and duties, the metrics to be used in reporting, and provisions for adjusting baselines based on mergers, acquisitions, and other changes to the reporting organizations. More information on California's registry is available at <http://www.climateregistry.org/>, the Web site of the registry working group.

The Texas Natural Resources Conservation Commission (TNRCC) issued an executive order in August 2000 tasking the agency to investigate and implement a voluntary state greenhouse gas registry. TNRCC staff is currently studying registry options and expects to make recommendations by the end of 2001.

In April 2001, Maine's governor approved a bill instructing the state Department of Environmental Protection to establish a voluntary greenhouse gas registry. The registry must provide for the collection of data on production activity and the origin of carbon emissions in order to allow the tracking of future emission trends.

Legislative Highlights

Governors and state legislators play important roles in addressing climate change by responding to national policies as well as their constituents' concerns. Legislative responses implemented by states include laws, bills, executive orders, joint resolutions, and memorials. As mentioned earlier, New Jersey's environment commissioner issued an executive order to reduce the state's annual greenhouse gas emissions, but New Jersey is not the only state to take action at the administrative or legislative level. Currently 48 states have introduced or enacted legislation or administrative orders related to climate change.

In 1990, Connecticut became the first state to pass a law requiring specific actions to reduce carbon dioxide emissions. Public Act 90-219, initially proposed by the state's House of Representatives, established a broad range of energy efficiency measures, including revisions to the building code and requirements that the state purchase energy-efficient appliances and vehicles. The law also allows the state Environmental Protection Commissioner to require the planting of trees or grass to offset carbon dioxide emissions.

In 1997, Oregon passed legislation that establishes a carbon dioxide standard requiring new power plants to emit 17 percent less carbon dioxide than the most energy-efficient plant available. The bill capped emissions at 0.7 pounds of CO₂ per kilowatt-hour for base-load natural gas-fired power plants. In 1999 the cap was lowered to 0.675 pounds per kilowatt-hour. The standard can be met by offsetting emissions through energy efficiency or carbon sequestration projects; energy facilities may implement projects directly or by paying into a climate trust that purchases offsets.

In March 2001, Maryland's governor issued an executive order creating a Maryland Green Building Council. The executive order directs the council to develop a High Efficiency Green Buildings Program and prepare a state action plan for reducing greenhouse gases. The order sets goals for state purchases of energy generated from renewable sources, energy efficiency in state buildings and purchased products, waste diversion or recycling, and the procurement of alternative fueled vehicles.

In June 2001, the governor of New York issued an executive order establishing a New York State Greenhouse Gas Task Force and mandating state agencies to purchase no less than 10 percent of the overall state facility energy requirements from renewable sources by 2005. The task force will make policy recommendations on greenhouse gas emissions and climate change by November 15, 2001 and issue a final report in March 2002. The recommendations will be considered for the New York State Energy Plan, expected to be released in the Spring of 2002.

An extensive list of state legislative initiatives is available on EPA's Global Warming Site at <http://yosemite.epa.gov/globalwarming/ghg.nsf/actions/LegislativeInitiatives/>.

EPA Publications and Web Sites on State Greenhouse Gas Action Plans

- *States' Guidance Document: Policy Planning to Reduce Greenhouse Gas Emissions, Second Edition* (EPA, 1998). Online at: <http://www.epa.gov/globalwarming/publications/reference/statguidance/>
- More information on state action plans, including the text of available plans, a database of actions proposed and their current status, and a list of legislative initiatives, may be found online at: <http://yosemite.epa.gov/globalwarming/ghg.nsf/actions/StateActionPlans/>

State and Local Demonstration Projects

Demonstration projects serve as real-world tests of technologies and policies to reduce greenhouse gas emissions. Projects provide states and localities with key data on cost-effectiveness, political feasibility, and environmental and social benefits, which they can use in formulating future programs and policies.

From FY 1992 through FY 2000, EPA's State and Local Climate Change Program has provided technical assistance and more than \$3.5 million in grants and cooperative agreements to support 16 demonstration projects and local initiatives. To date, demonstration projects completed or underway have avoided a cumulative total of more than 5 MMTCE and have saved approximately \$100 million in energy costs. For example, the State and Local Climate Change Program supports ICLEI's Cities for Climate Protection campaign. This campaign alone avoids nearly 2 MMTCE annually while saving \$70 million in reduced fuel and energy costs and preventing more than 28,000 tons of air pollutants.

Demand for Wind Power Up in Colorado

Twenty thousand households, 500 businesses, and dozens of cities and towns in Colorado voluntarily pay a small premium to purchase some or all of their electricity from wind power, thanks to a project spearheaded by the nonprofit Land and Water Fund of the Rockies, with financial assistance from EPA.

The program, known as the Grassroots Campaign for Wind Power, is a joint effort by the Land and Water Fund and Xcel Energy (formerly Public Service Company of Colorado). Consumers can purchase wind-generated electricity in blocks of 100 kilowatt-hours (kWh) for a \$2.50 per month premium. Wholesale customers also buy bulk quantities of wind-generated electricity and

sell it to their own customers for a similar premium. Approximately 20 Colorado utilities and rural electricity co-ops participate in the program, committing to purchase more than 200,000 megawatt-hours (MWh) annually-enough electricity to power almost 28,000 homes. The program has reduced CO₂ emissions from electricity generation by more than 29,000 metric tons of carbon equivalent, nitrogen oxides (NO_x) by 450 metric tons, and sulfur dioxide (SO₂) by 500 metric tons in the year 2000.

Wind power in Colorado is still growing. By the end of 2001, Colorado will have a total of 87 megawatts of wind-generated electric capacity, 62 megawatts of which has been installed to meet demand from the program. In addition, the Colorado Public Utilities Commission recently ordered Xcel Energy to acquire another 162 megawatts of wind power, which is anticipated to be online by 2002.

More information on the Grassroots Campaign for Wind Power is available at <http://www.cogreenpower.org/>

Results Achieved at the Local Level

ICLEI established the U.S. Cities for Climate Protection campaign in 1993. Part of a larger global campaign involving almost 500 local governments worldwide, Cities for Climate Protection's membership currently includes 109 cities and counties in the United States, representing 16 percent of U.S. greenhouse gas emissions. Their combined actions avoid at least 1.9 MMTCE annually.

Energy and Greenhouse Gas Results of Selected Demonstration Projects

	1997	1998	1999	2000
ICLEI Cities for Climate Protection: <i>Local governments set and achieve emissions reduction targets</i>				
Greenhouse Gas Reductions-MTCE	1,110,000	1,340,000	1,340,000	1,860,000
Approximate Energy Savings (kWh)	5,500,000,000	6,600,000,000	6,600,000,000	9,000,000,000
Utah Photovoltaics Project: <i>Conversion of power supply for marina from diesel to solar photovoltaics</i>				
Greenhouse Gas Reductions-MTCE	7	7	8	8
Approximate Energy Savings (kWh)	47,000	47,000	53,500	53,500
Colorado Land and Water Project: <i>Wind power promotion and commitment program</i>				
Greenhouse Gas Reductions-MTCE	—	—	—	29,000
Approximate Energy Savings (kWh)	—	—	—	120,000,000
Wisconsin Water Heaters Program: <i>Water heater conversion project from electric to natural gas</i>				
Greenhouse Gas Reductions -MTCE	—	—	—	98
Approximate Energy Savings (kWh)	—	—	—	483,000
Totals for All Demonstration Projects				
Greenhouse Gas Emissions Reductions - MTCE	1,110,000	1,340,000	1,340,000	1,880,000
Approximate Energy Savings (kWh)	5,490,000,000	6,580,000,000	6,580,000,000	9,260,000,000

Key

MTCE=Metric Tons of Carbon Equivalent

kWh=Kilowatt-hour



Each local government participating in the campaign has agreed to establish a target for reducing its community's greenhouse gas emissions and to implement a comprehensive local action plan designed to achieve that target. Actions completed or underway include energy efficiency retrofits of city and county buildings, switching to power-saving technologies such as LED traffic signals and exit lights, instituting recycling programs, recovering landfill methane, and providing transportation alternatives.

The City of Madison, Wisconsin, for example, has reduced transportation emissions by more than 11,000 metric tons of carbon equivalent through its "Rideshare, Etc." program, which provides matching services for bicycle commuters and individuals wishing to participate in carpools or vanpools. Participants receive a personalized report that identifies carpool or vanpool opportunities as well as alternative transportation options in their area.²¹

The U.S. office of ICLEI, located in Berkeley, California, provides technical tools and information, training workshops, and software packages to evaluate emissions reduction alternatives and to track emissions reductions.

EPA State and Local Climate Change Program Publications and Web Sites on Demonstration Projects and Mitigation Activities

- More information on demonstration projects and other mitigation activities can be found online. Case studies describing actions taken by states, localities, and private sector groups are available on two sites: <http://yosemite.epa.gov/globalwarming/ghg.nsf/actions/CaseStudies> and <http://www.epa.gov/globalwarming/publications/outreach/index.html#solutions>
- More information on Cities for Climate Protection can be found online at: <http://www.iclei.org/us/>

²¹ U.S. *Communities Acting to Protect the Climate: Achievements of ICLEI's Cities for Climate Protection - U.S. 2000*. International Council for Local Environmental Initiatives. ICLEI reports 46,107 short tons of CO₂ equivalent, which translates to 11,287 metric tons of carbon equivalent.

Education and Outreach on Climate Change and Mitigation

EPA's State and Local Climate Change Program provides technical and financial support to help states inform their constituencies about climate change and actions that can be taken to mitigate it. The program also conducts its own outreach efforts to inform state and local officials about climate change through conference presentations, publications, Web sites, and listservs.

From FY 1992 through FY 2000, the State and Local Climate Change Program provided technical assistance and more than \$3.5 million in grants and cooperative agreements for 32 education and outreach programs.

In 2000, the program released a CD-ROM-based outreach toolkit for state and local officials. The *State and Local Climate Change Outreach Kit* is a one-stop-shop collection of climate change education and outreach

resources. The kit includes publications that can be downloaded and printed for distribution, including fact sheets on technologies and policies; basic and advanced climate change information for school audiences; and information on actions that communities, individuals, and businesses can take.

The outreach toolkit also includes lists of videos, Internet sites, a glossary of climate change terms, a slide presentation, and information on EPA and U.S. Department of Energy programs. The contents of the kit are also available on the EPA Global Warming Site.

For more information on the outreach kit, see <http://www.epa.gov/globalwarming/publications/outreach/>

Climate Change a Local Issue in Oregon

The Oregon Department of Energy, in partnership with EPA and other agencies and

Direct Outreach to State and Local Officials

	Total 1992–2000
Number of Stakeholders Reached at Conferences	2,600+
Number of Conferences Attended (since 1997)	20
Number of Publications Distributed	69,000
Number of Hits on State and Local pages of EPA's Global Warming Web Site (established 1997)	152,000
Number of Listserv Messages Sent (since 1997)	200
Cumulative Number of Listserv Subscribers	700
Number of Outreach Kits Distributed (since 1999)	4,200
Number of Hits to Outreach Kit Web site	7,000



organizations, is implementing a targeted education effort to help Oregonians understand what climate change means to them and what they can do about it. The partnership has resulted in the creation and distribution of a video, "Generation to Generation: The Story of Climate Change in Oregon," as well as educational brochures, newspaper supplements, magazine articles, presentations to city councils and local governments, conferences, and a climate change and recycling curriculum for schools.

With EPA support, the Climate Trust, a Portland-based nonprofit, conducted five community forums on climate change in 1999. The meetings, held in Ashland, Bend, Corvallis, Newport, and Portland, gave community leaders a chance to learn about climate change directly from scientists and to discuss strategies for addressing climate change.

The program has distributed 40,000 copies of its educational brochure on climate change, along with 200 copies of the video.

Public Awareness Raised in Washington State

The EPA-supported Global Climate Change Project in Washington State has raised awareness of climate change among city councils, county commissions, business and civic groups, the media, and individuals. The Washington State Department of Community, Trade, and Economic Development conducts the project in collaboration with Washington State University, Climate Solutions (a private nonprofit), and the Northwest Council on Climate Change. To date, the project has created high-quality slide shows and print publications, reached approximately 1,000 individuals through 26 presentations around the state, and held press conferences that

resulted in newspaper and radio stories on climate change in the Northwest.

Outreach to the media through press releases, public service announcements, article placements, and press conferences resulted in television coverage on eight stations, stories on approximately 50 radio stations, and 15 articles and editorials in the print media.

State and Local Climate Change Program Outreach Publications and Web Sites

- *EPA's State and Local Climate Change Outreach Kit*. Available online at <http://www.epa.gov/globalwarming/publications/outreach/index.html>
- *Mapping a Cleaner Future*. First progress report (1998) of the State and Local Climate Change Program.
- **Climate Change Policies**
 - Energy and the Home
 - Green Power
 - Net Metering
 - Public Benefit Funds
 - Renewables Portfolio Standards
 - State Energy Codes
 - Statewide Recycling
- **Climate Change Solutions**
 - Twin Cities Trim Climate Change (1998)
 - Utah's Solar Project Helps Reduce Greenhouse Gases (1998)
 - Vermont Trims Energy Bills for Low-Income Families (1998)
 - Oregon Switches to Cleaner Power (2000)
 - Land and Water Fund of the Rockies Markets Green Power (2001)

- **Climate Change Strategies**

- Businesses Can Save Money—And the Environment
- Climate Smart Tips to Protect the Earth
- Multiple Benefits of Emission Reduction Policies
- Smart Savings: Climate Solutions for Cities

- **Climate Change Technologies**

- Alternative Fueled Vehicles
- Biomass Energy
- Combined Heat and Power
- Fertilizer Management
- Fuel Cells
- Geothermal Heat Pumps

- Landfill Methane Recovery
- Light-emitting Diodes
- Manure Management
- Solar Energy
- Wind Energy

- **State Climate Change Impact Fact Sheets (one each for all 50 states)**

<http://www.epa.gov/globalwarming/impacts/stateimp/>



Chapter 7:

Future Directions

Looking forward to 2002 and beyond, EPA's State and Local Climate Change Program will continue to build state and local capacity to mitigate and adapt to climate change. The program's goal is to assimilate climate change planning into day-to-day and long-term state and local government decision making, and to integrate climate change mitigation goals with priority objectives for clean air, economic development, and energy.

Some of the new projects underway or under consideration for the upcoming year include the following:

- **Development of a modeling tool to assess the clean air and greenhouse gas benefits of policies.** This project will develop and distribute free software for the integrated analysis of harmonized strategies for reducing greenhouse gases and criteria air pollutants. The software can be used by states for comprehensive strategic planning to achieve multipollutant, multibenefit objectives. We expect the software to be available by mid-2002.
- **Continued legislative tracking.** The program will continue to monitor state legislation, executive orders, and administrative decisions affecting greenhouse gas emissions and sinks, with biannual updates to the legislative initiatives summary on EPA's Global Warming Site.
- **State mitigation sheets.** This project will develop and distribute fact sheets that summarize climate change mitigation activities for all 50 states. These publications will include information about state emissions, mitigation planning activities, policies implemented that reduce greenhouse gas emissions, legislative activity related to climate change, and descriptions of the greenhouse

gas, economic, and energy benefits of representative mitigation projects that have been implemented in each state.

- **State greenhouse gas registry workgroup.** The program formed this workgroup in 2001 to facilitate information exchange between states that are developing or considering developing greenhouse gas registries. The working group also will examine linkages between state registries, state inventories, and action plans.
- **State forestry carbon sequestration report.** EPA is developing a joint technical report with the U.S. Department of Agriculture's Forest Service that will provide state-by-state carbon sequestration estimates developed from forestry inventories. EPA expects the report to be completed in early 2002.
- **Inventory spreadsheet tool.** To facilitate and standardize the process of compiling, reporting, and updating emissions inventories, EPA is developing an easy-to-use spreadsheet tool that states can use to calculate emissions based on their activity data. The program expects to make the tool available to interested states in mid-2002.

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Office of Air and Radiation (6205J)
EPA 430-R-02-002
February 2002

