



Climate Change Solutions



Twin Cities Trim Climate Change

The neighboring cities of Minneapolis and Saint Paul have long promoted energy efficiency for economic, environmental, and social reasons. In 1993, they began using their expertise to address the risk of global warming. Today their efforts are paying off with significant economic and environmental savings.

Minneapolis and Saint Paul are partners in the Cities for Climate Protection Campaign, a program of the International Council for Local Environmental Initiatives (ICLEI) with funding from the U.S. Environmental Protection Agency's State and Local Climate Change Program. In 1993, the Twin Cities pledged to reduce their combined carbon dioxide emissions to 20 percent below 1988 levels by the year 2005—a reduction of roughly six million metric tons. Minneapolis, as the larger city, is responsible for achieving 60 percent of the combined emissions reduction goal. Saint Paul is to provide 40 percent.

The Twin Cities' initial efforts at reducing emissions have focused largely on improving energy efficiency in municipal properties. Working with the

electric and gas utility Northern States Power, Minneapolis has invested \$4.7 million to complete 120 energy efficiency retrofits in municipal buildings and to retrofit red traffic lights. The annual savings have been substantial: \$752,000 in energy costs, 11,300 tons of carbon dioxide (CO₂) emissions, 30 tons of sulfur oxides, and 32 tons of nitrogen oxides. These projects have reduced energy use by nearly 17 million kilowatt-hours, or 12 percent of the city's energy bill.

Saint Paul is achieving comparable results in its municipal buildings and equipment. Since 1992, the city has invested more than \$3.1 million in dozens of upgrade projects that together save more than \$500,000 annually and reduce the city's CO₂ emissions by approximately 7,200 tons per year.

Both cities are reducing emissions further through other initiatives, including efforts to improve industrial and residential energy efficiency, citywide recycling and source reduction programs, tree-planting projects, and transportation programs.

RESULTS AT A GLANCE

- The Twin Cities' municipal building energy retrofits save \$113 million per year in energy costs and reduce CO₂ emissions by more than about 18,000 tons annually.
- Saint Paul's recycling programs reduced the city's greenhouse gas emissions in 1997 by the equivalent of 59,000 tons of CO₂.
- Volunteers in Saint Paul have planted more than 7,200 trees that will sequester more than 120 tons of CO₂ annually by 2010.
- Residential insulation programs in Minneapolis and Saint Paul have served some 25,000 households over the last 10 years.
- Saint Paul's Climate Wise program has enlisted 3M and Northstar Steel as its first partners. Northstar is the first steel mill in the country to sign on to the Climate Wise program.



Photo by Susan Ode

An electrician installs energy-efficient lights as Laurie Kaplan, of Saint Paul's Planning and Economic Development department, watches.

A Comprehensive Approach

The Twin Cities have identified six strategies that the two communities can use to meet their emission targets:

- Improve energy efficiency in municipal buildings.
- Reduce emissions from the transportation sector.
- Expand urban reforestation.
- Improve energy efficiency in the residential, commercial, and industrial sectors.
- Improve the efficiency of energy production and promote the use of renewable forms of energy supply.
- Promote recycling and source reduction.

Efforts are underway to implement many of these strategies. Even if global warming were not an issue, these

measures would make economic and environmental sense. "We are taking steps that result in tangible local benefits such as improved air quality, waste reduction through improved reuse and recycling of resources, lower energy bills, and new job opportunities," says Chuck Armstrong, assistant to Saint Paul Mayor Norm Coleman, "at the same time as we reduce greenhouse gas emissions to benefit the global climate."

Setting an Example

Minneapolis and Saint Paul have focused most of their efforts on improving energy efficiency in city-owned properties. By demonstrating the cost-effectiveness of improved efficiency, they have set an example for industries and individual homeowners in the metropolitan area.

Minneapolis plans to reduce CO₂ emissions from municipal buildings to 16,000 tons below 1988 levels by the year 2005. The city is now more than 60 percent of the way toward that goal. Guy Fischer of the Minneapolis Environmental Section expects that Minneapolis will meet its target with the help of a Rebuild America grant from the U.S. Department of Energy. The grant will be used to train building managers to use monitoring software for tracking energy use.

Saint Paul's municipal energy projects are noteworthy for their use of innovative, state-of-the-art technologies. Infrared heating systems installed at four city vehicle garages save Saint Paul \$18,000 per year in fuel costs.

Saint Paul also has embarked on a program to replace red traffic signals with light emitting diodes (LEDs). During the

pilot stage of the project, lamps at 72 intersections were converted. The pilot project showed that red LEDs are more affordable and durable than conventional lights. Full-size yellow LEDs are not yet cost-effective given the amount of time they are in use, and green LEDs are not available. Saint Paul will install red LEDs and red arrows at more than 200 intersections citywide over the next three years, for a projected annual savings of more than \$135,000 and 1,250 tons of CO₂.

Both cities' energy efficiency projects are financed by Northern States Power, which provided no-interest loans of up to \$1 million per year for five years. The savings created by the improvements are roughly equal to the Twin Cities' loan payments, which are paid back to the utility through the cities' monthly power bills. No taxpayer dollars are used, and the improvements pay for themselves in 10 years or less.

Cutting Emissions in Other Sectors

In addition to working on municipal buildings, Minneapolis and Saint Paul are making progress toward reducing emissions in the residential, commercial, industrial, and transportation sectors. Recycling programs and urban tree-planting projects also are underway.

Residential, Commercial, and Industrial Projects

According to Sheldon Strom, of the Center for Energy and Environment, residential insulation programs in Minneapolis and Saint Paul have served some 25,000 households over the last 10 years. Although the Minnesota state government recently authorized electric

utilities to eliminate those programs due to the impending restructuring of the electricity industry, Strom said that his organization is trying to save and rebuild them.

Strom's nonprofit also works with utilities to improve energy efficiency in multifamily housing in the Twin Cities and coordinates a number of building rehabilitation projects for the Neighborhood Revitalization Program. This program provides more than \$20 million per year to the 81 neighborhoods in Minneapolis.

Energy efficiency in large commercial, government, and school buildings in both cities will be improved through a Rebuild America grant. Buildings will be equipped



Rick Anderson, of Saint Paul's Environment and Energy Resource Center, looks on as John Benjamin, of the Public Works Department, describes an infrared heating system that saves money and reduces CO₂ emissions.

Photo by Susan Cole

CITIES AND CLIMATE CHANGE

Even a small increase in average temperature from global climate change may be magnified in cities, where asphalt and concrete absorb radiation and increase the ambient temperature. This "heat island effect" facilitates the formation of urban smog, increases air conditioning loads, and may raise the risk of heat mortality and heat stress. Global warming also may lead to an increased risk of floods or droughts, affecting urban water supplies and waterfront property.

Urban areas account for the greenhouse gas emissions of more than three-quarters of the U.S. population. Therefore, cities need to play a role in reducing the risks from global warming. City officials have a number of tools at their disposal to lower their municipality's emissions and improve the community's ability to withstand the impacts of climate change. Zoning laws, building codes, infrastructure investments, land-use plans, municipal utilities, transportation policies, and educational institutions all can be brought to bear in the effort to mitigate global climate change.

with energy-monitoring instruments and software, and building managers will be trained and certified in their use.

Efforts to improve energy efficiency in Minneapolis and Saint Paul will be helped further by proposed revisions to strengthen the statewide energy code. The Minnesota legislature requires that any energy code adopted by the state must equal or exceed the strongest code of any other state in the nation. In addition to tighter efficiency requirements, the proposed revisions include new standards on indoor air quality and ventilation.

A U.S. EPA Climate Wise grant to Saint Paul will reduce emissions from the city's industrial sector by encouraging companies to take comprehensive, cost-effective measures to improve energy efficiency and prevent pollution. Northstar Steel and 3M are the first companies to sign up for the Saint Paul Climate Wise program. Northstar Steel also is the first steel mill to participate in Climate Wise nationally. The company plans to use high efficiency burners and motors at their facilities. 3M has decided to enroll all of its facilities in the program, not just those in Saint Paul. They are developing a plan to reduce their greenhouse gas emissions.

Recycling and Source Reduction

Both Minneapolis and Saint Paul provide recycling services for their residents. The Minneapolis recycling program is run by the city; the Saint Paul program has been managed since 1986 by the Neighborhood Energy Consortium, a private nonprofit organization, under contract with the city. According to Mary Tkach of the consortium, the state, county and city-funded program provides recycling pickup services to residences, multifamily buildings, city buildings, and small businesses that promote recycling to their clients. The multifamily program alone serves nearly 30,000 households in Saint Paul.

Saint Paul's neighborhood clean-up program has drop-off sites for residents to dispose of accumulated trash and unwanted items on specified days

throughout the year. The program, through recycling and reuse, has achieved a 69 percent rate for diverting trash from the county's waste-to-energy facility.

All told, Saint Paul's recycling programs for residences and multifamily buildings, along with neighborhood cleanups, diverted approximately 20,000 tons of materials, including more than 13,000 tons of paper, from the waste-to-energy facility in 1997. An estimated 20,000 tons of plant debris also were diverted to composting facilities. According to an estimate by ICLEI, these programs reduced the city's greenhouse gas emissions in 1997 by the equivalent of 59,000 tons of CO₂. Emissions were cut by saving energy and materials that would be used to produce new products, and by reducing the methane that is generated when waste decays in landfills.

Urban Reforestation

Saint Paul is well on its way toward restoring its portion of the Mississippi River valley from an industrial wasteland to a natural plant community. The city's Greening the Great River Park project will result in the planting of 35,000 trees and shrubs and 60 acres of prairie, re-establishing a long-vanished wildlife corridor through the city. According to Rob Buffer, who coordinates the project for the Saint Paul Foundation, so far volunteers have planted more than 7,200 trees, 17,000 shrubs, 40 acres of prairie, and thousands of wildflowers. The trees alone will sequester more than 120 tons of CO₂ per year by 2010. Funding comes primarily from the Saint Paul Foundation, along with federal and state sources.

Minneapolis and Saint Paul also run active urban forestry programs, planting



Residential efficiency programs will save energy and reduce emissions from apartment buildings like this one in Saint Paul's inner city.



Photo by the Neighborhood Energy Consortium

Saint Paul recycled more than 13,000 tons of paper in 1996.

and caring for streetside trees throughout the Twin Cities. Trees help mitigate the urban "heat island" effect (see "Cities and Climate Change" on page 2), reduce cooling energy costs by providing shade to buildings, and sequester carbon from the atmosphere.

District Heating and Cooling

Saint Paul has two large renewable energy projects underway. A district heating system provides hot water to 139 large buildings and 298 single-family residences in and around downtown Saint Paul for space heating, hot water, and industrial process use. More than 23 million square feet of building area are served, including more than 75 percent of downtown building space. The district heating system uses half as much fuel as would be used if each building had its own heating system. In addition, a cogeneration plant meets 95 percent of the district heating needs and produces excess electricity for sale.

Another renewable project is a district cooling system that serves 8 million square feet of building space. Eight chillers use low-cost, off-peak electricity to chill water. The water is stored and used to cool the buildings during the day; neither groundwater nor chlorofluoro-carbons (CFCs) are used for cooling. Separate systems for each building would use twice as much fuel as the district cooling system uses. The system is designed to double its capacity over the next 15 years.

Transportation

Several projects are underway to improve transportation in the Twin Cities. A major study by the Center for Energy and Environment, to be completed in 1999, will attempt to quantify the cost of urban sprawl in the

metro area. “If we can come up with credible estimates for that cost,” says the center’s Sheldon Strom, “it may provide an incentive to develop less wasteful land-use patterns, reduce the call for additional highways and roadways, and reduce dependence on the automobile.” Strom notes that there also is growing interest in developing a light rail transit system to serve downtown Minneapolis and Saint Paul, the municipal airport, and a nearby mall. In addition, Saint Paul is using ethanol in its gasoline-powered fleet vehicles and is testing compressed natural gas- and electrically powered vehicles.

Lessons Learned

Reducing emissions is good business

To Chuck Armstrong, of the Saint Paul Mayor’s office, a key factor in the success of the Twin Cities’ energy efficiency efforts is that the two communities have undertaken measures that are good business decisions as well as good for the environment.

Partnerships between government and utilities are the key to success

An important ingredient is the strong working relationship between the municipal governments and the local utility, and the commitment of both

parties to make the effort a success. “Participation in this program with Northern States Power has allowed the city to make capital improvements to its facilities at a minimal cost and also reduce our cost of operations. Without their commitment we could not have achieved this success,” Armstrong says.

Look for innovative projects

“Cities need to look beyond the standard lighting and gas projects,” he adds. Saint Paul has found many innovative ways to save energy, such as a more efficient system to remove lime from the water that saves about 1.5 megawatts per year, \$105,000 in energy costs, and 960 tons of CO₂. “We have installed ultrasonic humidification units in two of our buildings, and we have made improvements to pumps, motor drives, and elevators,” Armstrong says. “The energy conservation opportunities are there; you just have to be aggressive and find them.”

Start with municipal buildings

Officials from both cities agree that focusing first on improving efficiency in municipal properties is a good strategy. Not only does it set a good example, but competing interests and priorities can make it harder to attract and maintain political support for some nonmunicipal programs. “To get anything done in the city, it takes a lot of political pushing,” says Sheldon Strom.

Looking Ahead and Beyond

The actions of the Twin Cities mirror efforts at the state level to reduce greenhouse gas emissions. Minnesota’s state government completed a greenhouse gas emission inventory for the state in 1995 and currently is developing a state climate action plan. Like the Twin Cities’ strategy, the state plan is expected to focus on improving energy efficiency, expanding the use of alternative energy sources, promoting efficient transportation, reducing waste, and sequestering carbon through tree-planting programs. Some state-level policies already address climate change: The Minnesota Department of Public Service, for example, has established a cost value for CO₂ emissions that will be used by electric utilities in long-term resource planning.

Will Minneapolis and Saint Paul meet their emissions targets? Strom thinks it will be a “miracle.” But, he adds, “our view is that we should start somewhere and give it a try.”

In the meantime, the Twin Cities’ efforts are paying off, both in terms of environmental protection and economic sustainability. By promoting energy savings and other improvements in municipal and nonmunicipal sectors, Minneapolis and Saint Paul benefit from lower operating budgets and maintenance costs, a more livable city, a smaller drain on natural resources, and reduced CO₂ emissions to protect the global climate. As Chuck Armstrong says, “it’s just good business.”

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Related Websites

EPA’s Climate Wise program:
<http://www.epa.gov/climatewise>

EPA’s WasteWiSe program
(source reduction and recycling):
<http://www.epa.gov/wastewise>

**The Department of Energy’s
Rebuild America program:**
<http://www.eren.doe.gov/buildings/rebuild/>



THE CITIES FOR CLIMATE PROTECTION CAMPAIGN

The International Council for Local Environmental Initiatives (ICLEI), a worldwide association of municipalities committed to environmental issues, encourages cities to reduce local emissions of greenhouse gases through its Cities for Climate Protection Campaign. More than 170 municipalities worldwide—and more than 55 in the United States alone—have joined the campaign, and their number is growing. Participating cities pledge to develop a local action plan to reduce emissions, significantly cut back energy use in municipal buildings and emissions from vehicle fleets, and launch public awareness and education programs.

For more information, visit the U.S. Cities for Climate Protection website at http://www.iclei.org/us/us_ccp.html or contact ICLEI at 510-540-8843; fax: 510-540-4787.