

Minneapolis . Saint Paul

CO₂ REDUCTION PROJECT

A project in cooperation with ICLEI, a United Nations agency.

City Hall, 305M
350 South 5th Street
Minneapolis
MN 55415-1376
(612) 673-2347 or
(612) 673-3417
FAX 673-3250

MINNEAPOLIS - SAINT PAUL URBAN CO₂ PROJECT PLAN

A Framework for Developing Strategies to Reduce CO₂ Emissions, Save Taxes, and Save Resources

Adopted by the
Saint Paul City Council

December 16, 1993

Minneapolis City Council

December 17, 1993

This document underscores the participant's commitments to carbon dioxide reduction in the cities of Minneapolis and Saint Paul. This figures, strategies, and specific steps outlined within represent one possible scenario that could be used to reach the stated reduction target.

SPONSORED BY:
Cities of
Minneapolis and Saint Paul,
3M Company,
Center for Energy and
Environment,
Honeywell Incorporated,
Honeywell Foundation,
Minnegasco,
Minnesota Department
of Public Service,
Northern States Power Co.,
Urban Consortium



Printed on paper with
50% recycled fiber
and 20% post-consumer waste

Prepared by
Sheryl Carter
and the

Center for Energy and Environment
100 North 6th Street, Suite 412A
Minneapolis, Minnesota 55403-1520
612-348-6829

**Executive Steering Committee
of the
Minneapolis-Saint Paul CO₂ Reduction Project**

Donald Fraser	Mayor of Minneapolis
James Scheibel	Mayor of Saint Paul
Mark Andrew	Hennepin County Board
Ross Hammond	Northern States Power Company
Paul Hansen/Bill Grant	Izaak Walton League of America, Inc.
Sarah Hernandez	Honeywell, Inc.
Carol Johnson	Minneapolis City Council
Robert Long	Saint Paul City Council
Thomas Lowenberg	3M Company
Hal Norgard	Ramsey County Board
Dottie Rietow	Metropolitan Council of the Twin Cities
Albert Swintek	Minnegasco
Ginny Yingling	Sierra Club

This project is funded with \$46,484 of federal money (35% of total project funds).

Public Works

COMMITTEE
12/1993

Council File # 93-1793

DEC 28 1993

Green Sheet #

RESOLUTION
CITY OF SAINT PAUL, MINNESOTA

21

Presented By BA [Signature]

Referred To _____ Committee: _____ Date _____

A RESOLUTION ACCEPTING THE
"MINNEAPOLIS-SAINT PAUL CO2 PROJECT PLAN: A FRAMEWORK FOR
DEVELOPING STRATEGIES TO REDUCE CO2 EMISSIONS"

- 4 WHEREAS, on March 14, 1991, the Saint Paul City Council passed Resolution 91-423, authorizing the
- 5 City to participate in an Urban CO2 Reduction Project as a joint member with the City of
- 6 Minneapolis; and
- 7 WHEREAS, the project is currently done in cooperation with the International Council for Local
- 8 Environmental Initiatives (ICLEI), a United Nations sponsored organization; and
- 9 WHEREAS, the project has involved cooperative work between the Cities of Saint Paul and
- 10 Minneapolis and cities around the world, as well as public utilities such as Northern States Power and
- 11 Minnegasco, representatives of the business community such as 3M and Honeywell, and
- 12 representatives of environmental protection organizations such as the Izaak Walton League; and
- 13 WHEREAS, for the last two years these groups have worked together to develop the plan titled
- 14 "Minneapolis-Saint Paul CO2 Project Plan: A Framework for Developing Strategies to Reduce CO2
- 15 Emissions"; and
- 16 WHEREAS, the plan outlines methods for the Cities of Saint Paul and Minneapolis to reduce the
- 17 output of carbon dioxide, a compound that has been linked to the depletion of stratospheric ozone and
- 18 the rise in global temperatures; and
- 19 WHEREAS, some of the methods for reduction of carbon dioxide emissions includes increased energy
- 20 efficiency in public buildings and vehicles, increased efforts of urban reforestation, and changing
- 21 methods of urban planning to encourage the reduction of dependence on single-passenger vehicles;
- 22 and
- 23 WHEREAS, the City of Saint Paul has already begun to undertake a number of these efforts; and
- 24 WHEREAS, this plan was recently approved by the Executive Steering Committee and the Project
- 25 Team for the Minneapolis-Saint Paul CO2 Project; and

1 WHEREAS, the plan serves as an advisory tool, rather than a mandate; and

2 WHEREAS, the Plan states that "actions not deemed to be cost-effective or feasible will not be
3 implemented; now, therefore, be it

4 RESOLVED, that the City of Saint Paul accepts and approves the ~~carbon reduction strategies outlined~~
5 ~~by~~ the document titled "Minneapolis-Saint Paul Urban CO2 Project Plan: A Framework for
6 Developing Strategies to Reduce CO2 Emissions" (attached) and will work to implement those
7 strategies which are cost-effective and feasible; and be it further

8 RESOLVED, that the City restates its dedication to the concepts of carbon dioxide emission reduction
9 and renews its intent to work with City departments and businesses and residents within the City to
10 reduce the level of carbon dioxide emissions within the City.

	Yeas	Nays	Absent
Grimm	/		
Guerin	/		
Long			/
Maccabee	/		
Rettman	/		
Thune	/		
Wilson	/		
	4	0	1

Requested by Department of:

By: _____

Form Approved by City Attorney

By: _____

Approved by Mayor for Submission to Council

By: _____

Adopted by Council: Date DEC 16 1993

Adoption Certified by Council Secretary

By: [Signature]
Approved by Mayor: Date DEC 22 1993

By: [Signature]

Whereas, the benefits of implementing the Plan go beyond progress towards staving off global warming and include reductions in a wide range of pollutants, improved energy efficiency and productivity, reduced reliance on fossil fuels and increased reliance on domestic renewable fuels, enhanced local employment and strengthened economic base, waste reduction, slowed urban sprawl, and economic savings;

Now, Therefore, Be It Resolved by The City Council of The City of Minneapolis:

That the City adopts the "Minneapolis-St. Paul Urban CO2 Project Plan: A Framework for Developing Strategies to Reduce CO2 Emissions" and the Plan's 20% CO2 reduction goal.

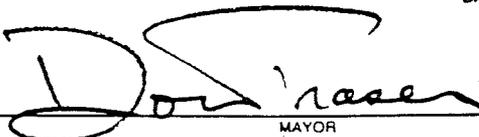
Be It Further Resolved that appropriate City staff be directed to develop cost-effective strategies for the purpose of implementing the Plan.

RECORD OF COUNCIL VOTE (X INDICATES VOTE)													
COUNCIL MEMBER	AYE	NAY	NOT VOTING	ABSENT	VOTE TO OVERRIDE	VOTE TO SUSTAIN	COUNCIL MEMBER	AYE	NAY	NOT VOTING	ABSENT	VOTE TO OVERRIDE	VOTE TO SUSTAIN
Dziedzic		X					Scallon		X				
Campbell	X						Niemiec	X					
Biernat	X						Cramer	X					
Rainville		X					Schulstad	X					
Cherryhomes	X						Johnson	X					
Niland	X						President						
Scott	X						Sayles Belton	X					

PASSED DEC 17 1993
DATE

APPROVED - ~~NOT APPROVED~~ ~~RECEIVED~~ DEC 23 1993
DATE


PRESIDENT OF COUNCIL


MAYOR

ATTEST _____
CITY CLERK

REFERRED TO (NAME OF) COMMITTEE:
DATE:

RESOLUTION
of the
CITY OF
MINNEAPOLIS

Johnson, Cramer, Niland and Campbell

By _____

Adopting the "Minneapolis-St. Paul Urban CO2 Project Plan: A Framework for Developing Strategies to Reduce CO2 Emissions," SAVE Taxes and Resources and the Plan's 20% CO2 reduction goal.

Whereas, there is international scientific consensus that the issue of climate change is of paramount global concern; and

Whereas, Former President Bush signed the United Nations Framework Convention on Climate Change in 1992 and President Clinton has pledged to stabilize U.S. emissions of greenhouse gases at 1990 levels by 2000; and

Whereas, the cities of Minneapolis and St. Paul have been working collaboratively with a U.N. agency, the International Council for Local Environmental Initiatives (ICLEI), and 11 other cities in North America, Europe and the Middle East on the Urban CO2 Reduction Project; and

Whereas, the cities of Minneapolis and St. Paul have established the Executive Steering Committee (ESC) to guide the local effort, namely, the Minneapolis-St. Paul CO2 Reduction Project, and have worked with representatives of local government, industry, and environmental organizations; and

Whereas, the ESC has completed and approved the "Minneapolis-St. Paul Urban CO2 Project Plan: A Framework for Developing Strategies to Reduce CO2 Emissions" after more than two years of work; and

Whereas, the goal of the Plan for the two cities is as follows: "By 2005, reduce carbon dioxide emissions by 20 percent from 1988 levels, with an intermediate goal of 7.5 percent by 1997. (Subject to future reports on specific initiatives which will clarify the costs and the trade-offs involved in achieving the objectives and targets);" and

Whereas, the Plan consists of a flexible and technically feasible "framework through which Minneapolis and St. Paul can reach its 20% reduction target;" and

Whereas, all of the Plan's recommendations for City implementation are consistent with the Directions Framework and other existing City policy directions; and

Whereas, the City is already involved in implementing some of the Plan's key recommendations; and

Whereas, the cost to the City of implementing the Plan is expected to be modest and subject to future individual approvals; and

Whereas, the Plan states that "actions not deemed to be cost-effective or feasible will not be implemented" in response to the fact that the costs to others--including Northern States Power, Minnegasco and local transportation agencies--for implementing the plan are likely to be high and very difficult to quantify; and

CONTENTS

About The Plan: Economic, Environmental, and Social Impacts.....	i
Executive Summary	v
I. Introduction	1
The Threat of Global Warming and Climate Change	2
Approach to Developing the MSP Urban CO ₂ Reduction Plan	6
Baseline Data: Current and Projected Emissions.....	8
II. Minneapolis-Saint Paul Plan Scenario	
MSP Strategy Elements	11
Municipal Action Plan	12
Diversification of MSP Transportation Sector.....	20
Expand Urban Reforestation Efforts.....	31
Energy Efficiency	34
Supply Strategies	44
Solid Waste Reduction and Recycling.....	48
III. Overcoming Barriers.....	50
Advocacy Options.....	50
Federal Policies.....	50
State Policies.....	53
Other Policies.....	55
Public Participation and Education.....	55
Encourage Long-Term Persistence	57

ABOUT THE PLAN: Economic, Environmental, and Social Impacts

In Minneapolis and Saint Paul, an Executive Steering Committee made up of key decision makers has been created to direct the development of the Minneapolis - Saint Paul Urban CO₂ Project Plan, a voluntary effort to reduce CO₂. The committee is made up of the mayors and other elected officials from both cities, a representative from the Hennepin and Ramsey County Boards, executives from Northern States Power, Minnegasco, Honeywell and 3M, and representatives from the Metropolitan Council, Sierra Club and Izaak Walton League. A Technical Advisory Committee with representatives from key organizations advised on the project. In addition, expert review was received from Americans for an Energy Efficient Economy, Lawrence Berkeley Laboratory, and the Union of Concerned Scientists, as well as from the other participating project cities. The international cities participating in the Urban CO₂ Reduction Project provided additional help. The plan will be released for comment from the public, including meetings with environmental, business and civic groups. It is anticipated that the Minneapolis and Saint Paul City Councils will give approval of this framework by November, 1993.

THE URBAN CO₂ PROJECT PLAN PROPOSES A BASIC FRAMEWORK THROUGH WHICH MINNEAPOLIS AND SAINT PAUL CAN REACH ITS 20% CO₂ REDUCTION TARGET. It is one scenario of a set of actions and is not intended to be a step-by-step implementation plan. The recommendations presented in this plan represent actions that range widely in their aggressiveness, certainty, and economic, environmental, and social impacts. For this reason, the Executive Steering Committee wants to stress the importance of evaluating each action prior to adoption and implementation, based on its benefits and costs.

ALTHOUGH IMPACTS OF SOME OF THESE ACTIONS ARE KNOWN - MANY ARE NOT, AND CALCULATING SPECIFIC COSTS AND BENEFITS FOR EACH ACTION IS BEYOND THE SCOPE AND PURPOSE OF THIS PLAN. However, it is important to relate the general magnitude of these potential impacts in order to recognize the aggressiveness of these actions and the challenges they present. Implementation of this framework will not only challenge the political will of the City Councils of Minneapolis and Saint Paul, but also require a commitment by them to develop public/private partnerships with state and county agencies and area utilities and businesses.

SOME ACTIONS IN THE PLAN CARRY LITTLE OR NO INCREMENTAL COST TO THE CITIES AND IMPACTS ARE READILY ESTIMATED. For example, the impacts on the cities of reducing energy use in city-owned and leased buildings, already underway in Saint Paul and Minneapolis, is fairly

well-known. The project is designed to be self-financing in that only those efficiency improvements that can be repaid through energy savings over a ten-year period will be undertaken. NSP's new municipal program will be the source of initial funding for up to \$1 million per city per year (\$5 million available each year) for 5 years at 0% financing. Since the loan will be repaid through energy savings, the costs to the city are virtually nothing. The cost of the project to NSP is \$1.5 million per year which includes the lost earning power of the money for the period of the loan, and the audit, engineering, and evaluation expenses of the program. However, this program will benefit NSP by delaying the need for capacity expansion. The city will benefit by lower energy bills, greater comfort level in the buildings, and through related structural improvements that may be undertaken along with the energy retrofits.

THERE ARE ALSO ACTIONS IN THE PLAN THAT HAVE A POTENTIALLY LARGE IMPACT ON THE VARIOUS STAKEHOLDERS AND THE EXACT COSTS AND BENEFITS ARE NOT VERY WELL KNOWN. Transportation and energy efficiency fall under this category. The transportation-related actions in this scenario call for the cooperation of city, county, regional, state and even federal agencies, each of which will need to contribute to planning and costs. Because it is a mobile source of pollution, this is the most difficult sector in which to determine potential impacts. There is no easy way to calculate the costs or benefits of a specific measure like land-use planning or idling ordinances.

The target reductions in energy efficiency are not to be achieved solely through utility demand-side management (DSM) programs. Building and appliance efficiency standards and code enforcement are also important measures. The cost and benefit impacts of these measures, however, are also very difficult to determine. The greatly increased goals for electric and natural gas utility DSM will also produce large uncertain impacts. The plan calls for an increase of about 200 to 250 percent over the current DSM targets. Experts in utility energy efficiency programs are not in agreement over what level of DSM is cost-effective or even feasible. Some programs may turn out to be very feasible and cost-effective, while others may not. Two things are certain - reaching this level would require a substantial increase in utility investment over current levels, and would require significant increases in customer commitment and participation in energy conservation.

Currently, NSP estimates its conservation plans to cost \$1.7 billion through 2005. Assuming that the current average cost of NSP's electric DSM programs remains constant, the level called for in the plan could lead to an increase of about \$200 million a year (over the planned \$50 million) through 2005. This cost would be seen as an increase in per-unit charges for electricity for

ratepayers, in lost energy sales for utilities, and as an increase in electricity bills for nonparticipants in DSM programs. Ramping energy conservation up to the \$250 million per year level based on the Urban CO₂ Project Plan and assuming that these energy saving programs have the same cost-effectiveness characteristics as current NSP conservation programs, could lead to a societal benefit of about \$780 million a year by 2005¹. These benefits would be seen by participants in the DSM programs as lower bills, by the utility as avoided costs, and by society as better overall environmental quality as well as increased employment and income benefits for Minnesotans. A more aggressive DSM scenario will likely return a smaller net financial benefit despite the greater level of energy savings, but the net benefit could still be a positive one. It is uncertain that this level of conservation could be achieved at any price and would not be offset by increased usages such as electric vehicles. Increased levels of natural gas utility DSM would also have large and uncertain potential costs and benefits.

It must be stressed, that under the criteria set in the plan, actions not deemed to be cost-effective or feasible will not be implemented. In addition, a system of checks and balances already exists through the screening of each utility DSM program for cost-effectiveness by the Department of Public Service.

OTHER ACTIONS IN THE PLAN HAVE NO REAL NET COSTS AND DO MORE THAN JUST PAY FOR THEMSELVES - THEY PRODUCE NET SAVINGS. The recommendation to create an Energy Investment Fund to be used for improvement in city operations or investments in energy efficiency is one example of a measure that could do this. An example of two such funds that have had great success over an extended period of time are the Iowa Energy Management Program and the Texas LoanSTAR Program. Iowa's model energy management program leverages energy savings to provide energy-related capital improvements for public and non-profit facilities. The Iowa Energy Bank is expected to facilitate the implementation of more than \$200 million in improvements using private funds in combination with minimal state and federal support. As of Spring 1993, the local government program (the newest addition to the Energy Bank) has implemented \$300,000 in improvements, with an annual savings of \$40,000. Iowa has estimated the results of energy management investments to date to be about 12,000 jobs, \$50 million in savings, and a reduction of one million tons of CO₂.

The Texas LoneSTAR Program (Loan to Save Taxes And Resources) is a statewide energy conservation revolving loan program. In 1988, Texas received approval from the U.S.

¹ This figure was derived from NSP's ELECBEN model input data.

Department of Energy to use oil overcharge dollars to establish a \$98.6 million statewide retrofit demonstration revolving loan program to be used for retrofits in state, local government and school buildings. Loans are repaid according to estimated energy savings in four years or less, and proceeds are used to pay for the retrofits, engineering and design, and installation expenses.

THE REDUCTION OF CO₂ IS NOT THE ONLY ADVANTAGE OF THIS COMPREHENSIVE PLAN. In addition to providing a framework to help meet our CO₂ reduction goals, these strategies provide the benefit of promoting the economic and environmental goals of the region and enhance the livability of the cities. They are intended to achieve significant emissions reductions using actions that provide leverage against the potentially devastating effects of climate change, but are beneficial even if these effects do not fully materialize. In addition to the uncertain costs, there exist many potential benefits not directly related to the environment from the result of these actions. For example, the retrofitting of public housing and other low-income energy efficiency programs may result in rehabilitated housing and increased employment. The reduction of vehicle miles traveled may result in economic savings from greater productivity because of less time spent on the road. And more integrated land use planning may help to curb urban sprawl. Under the framework of this plan, these actions will be implemented so that as energy efficiency is expanded, economic efficiency also increases.

- Executive Summary -

THE PROJECT

Minneapolis and Saint Paul are participating jointly in the International Urban CO₂ Reduction Project, a global effort to reduce emissions of greenhouse gases which threaten to dramatically alter the global climate. The project is sponsored by the United Nations affiliated International Council for Local Environmental Initiatives (ICLEI). The other cities participating in the project include:

- Portland Oregon
- Toronto, Canada
- Bologna, Italy
- Copenhagen, Denmark
- San Jose, California
- Helsinki, Finland
- Saarbrücken, Germany
- Dade County, Florida
- Denver, Colorado
- Ankara, Turkey
- Hannover, Germany

In Minneapolis - Saint Paul, an Executive Steering Committee made up of key decision makers has been created to direct plan development and implementation. Members of the Committee include:

- Mayor Fraser, Minneapolis and Mayor Scheibel, Saint Paul
- Council Member Bob Long, Saint Paul and Council Member Carol Johnson, Minneapolis
- Executives from: Northern States Power, Minnegasco, Honeywell, and 3M
- Representatives from: Metropolitan Council, Izaak Walton League, and the Sierra Club

In addition, a Technical Advisory Committee with representatives from key organizations are advising the project.

GLOBAL WARMING AND LOCAL GOVERNMENT

The potential effects of global warming are both serious and complex. Cities are especially vulnerable to these risks. Even a nominal rise in temperatures may be magnified in cities where asphalt and concrete absorb solar radiation, producing heat and increasing air conditioning loads. This could facilitate the formation of ground level ozone, degrade local air quality, harm human health, and create stresses on urban forests. Urban water supply may also be at risk as the potential for more frequent droughts increase. National and state level policies have failed to

adequately address these pressing concerns and local governments have begun to increase their involvement in environmental issues and actions because of their direct contact with residents and business.

THE PLAN

In response to the seriousness of this problem and the slow action of the federal government, Minneapolis and Saint Paul proposes the following CO₂ reduction target:

By 2005, reduce carbon dioxide emissions by 20 percent from 1988 levels, with an intermediate goal of 7.5 percent by 1997. *(Subject to future reports on specific initiatives which will clarify the costs and the tradeoffs involved in achieving the objectives and targets)*

In terms of CO₂ emissions, this means a reduction of about six million metric tons will be needed by 2005. The Minneapolis - Saint Paul strategy to reach this target involves six elements. The actions recommended in the plan identify incentives, changes in regulation, and public education as the key for achieving these reductions. It seeks to work with existing institutions and ongoing decision-making processes and stresses the use of self-financing investment strategies and market mechanisms to encourage reductions. Although all six elements will be essential to meeting the target, this plan presents but one scenario of how these reductions could be achieved.

Strategy #1 Municipal Action Plan

Purpose: To show city governments taking the lead in reducing carbon dioxide and setting an example to encourage other sectors to act in kind. This is the most important aspect of the plan where the city governments are concerned. Scenario reduction: 0.027 million metric tons.

Strategy #2 Diversification of Minneapolis - Saint Paul Transportation Sector

Purpose: To change the efficiency and mix of the Minneapolis - Saint Paul transportation sector so as to significantly reduce carbon dioxide emissions. Scenario reduction: 1.829 million metric tons.

Strategy #3 Expand Urban Reforestation Efforts

Purpose: To use strategic tree planting to shelter buildings and modify climate which will effectively reduce fuel consumption needed to cool buildings. Scenario reduction: 0.009 million metric tons.

Strategy #4 Energy Efficiency

Purpose: To reduce carbon dioxide emissions from residential, commercial, and industrial sectors by reducing energy use through cost-effective efficiency measures. Scenario reduction: 3.386 million metric tons.

Strategy #5 Energy Supply Strategies

Purpose: To reduce carbon dioxide emissions from energy production sources by improving the efficiency of the production of energy and promoting the use of renewable forms of energy supply. Scenario reduction: 0.708 million metric tons.

Strategy #6 Precycling and Recycling

Purpose: To reduce carbon dioxide emissions through energy saved from reducing product use and making products from secondary rather than raw material. Scenario reduction: 0.027 million metric tons.

STRATEGY ADVANTAGES

Carbon dioxide emissions reduction is not the only (nor necessarily the most important) advantage of this comprehensive plan. Even if the predicted effects of global warming do not fully materialize, these strategies provide the benefit of promoting the economic and environmental goals of the region and enhance the livability of the Cities. Some of these benefits could include:

- reduction of local air pollution levels
- preservation of public health
- reduction in energy bills for business and families because of increased efficiency
- waste reduction
- increased employment and new marketing opportunities
- relief from increasing traffic congestion and prevention of further urban sprawl

I. INTRODUCTION

Minneapolis and Saint Paul are participating jointly in the International Urban CO₂ Reduction Project, a global effort to reduce emissions of greenhouse gases which threaten to warm the planet and dramatically alter global climate.

The Urban CO₂ Project is sponsored by the International Council for Local Environmental Initiatives (ICLEI), an affiliate agency of the United Nations Environmental Programme (UNEP). ICLEI has selected fourteen local governments around the world, eight in North America and six in Europe, to test policies designed to cut greenhouse gas emissions by 1-2 percent per year over a 15-year period. The United States communities participating in the Project include Denver, Colorado; San Jose, California; Dade County (Miami), Florida; and Portland, Oregon.

The reductions sought by the Urban CO₂ Project are consistent with reduction goals established by many nations around the world. Most industrialized nations, including Germany, the United Kingdom, Canada, Australia, Austria, Belgium, France, Finland, Switzerland, New Zealand, Japan, Denmark, Sweden, and the Netherlands, have made specific commitments to reduce emissions of carbon dioxide and other greenhouse gases. The United States has not yet committed to an ambitious emissions reduction goal, though it has expressed support for the Earth Summit goal of stabilizing CO₂ emissions by 2000.

In the United States, cities and states are leaders in making specific commitments to reduce greenhouse gas emissions. New York and Vermont have pledged to cut carbon dioxide emissions by at least 15 percent over the next 15 years. Several of the other project cities have adopted CO₂ reduction goals or at least made CO₂ reduction an explicit issue in their long-term energy and environmental planning.

In response to the seriousness of this problem and the slow action of the federal government, MSP proposes its own CO₂ reduction target:

By 2005, reduce carbon dioxide emissions by 20 percent from 1988 levels, with an intermediate goal of 7.5 percent by 1997. *(Subject to future reports on specific*

initiatives which will clarify the costs and the tradeoffs involved in achieving the objectives and targets.)

This will mean cutting the carbon dioxide emissions to about 35 percent below the 2005 forecast. As much as possible and wherever effective, the target reductions should be distributed among the various sectors (government, utilities, transportation, residential, commercial, industrial) according to their relative contribution. However, final actions implemented will be those determined to be the most feasible and cost-effective.

The 20 percent reduction level is an internationally recognized target which many European countries and some states and cities in the U.S. have committed to. According to the 1991 Office of Technology Assessment (OTA) report, "Changing by Degrees", major technological breakthroughs are not needed and existing equipment will not have to be instantly scrapped and replaced with untested prototypes to reach this goal¹. The OTA report also states that a 20 percent reduction does not represent maximum potential and requires no loss in services.

This reduction target will help set the framework for local actions by the municipalities of Minneapolis and Saint Paul as well as the private sector and provide common objectives, while the deadline will encourage prompt adoption and implementation of agreed upon actions. By setting an example, the goal will also serve to stimulate other municipalities in the Twin Cities (and perhaps the state) to take action toward this goal. Striving for this goal would not only provide cost-effective insurance against the risks and uncertainties of climate change, but also a variety of more immediate and direct impacts resulting in improvements in local air quality, in traffic congestion and safety, and in new market opportunities.

The Threat of Global Warming and Climate Change

Despite scientific consensus on many issues surrounding the global warming debate, confusion still exists about the facts.

The scientific community is in complete agreement that:

¹ U.S. Congress, Office of Technology Assessment, *Changing by Degrees: Steps to Reduce Greenhouse Gases*, OTA-O-482 (Washington, DC: U.S. Government Printing Office, February 1991).

- *there is a natural greenhouse effect which already keeps the Earth warmer than it would otherwise be.*
- *atmospheric concentrations of a number of greenhouse gases have been rising and are continuing to rise, as shown by ongoing measurements in a global network of monitoring stations². Increasing concentrations of these gases is a concern because they trap heat. That is, as solar radiation is absorbed by the earth's surface and atmosphere and infrared radiation (heat) is reemitted, greenhouse gases act to prevent the heat from escaping the Earth's atmosphere.*

Very little debate continues to exist in the scientific community that:

- *continuing rises in the atmospheric concentration of carbon dioxide and other greenhouse gases such as methane, chlorofluorocarbons (CFC's), and nitrous oxide will enhance the greenhouse effect, resulting on average in an additional warming of the Earth's surface*

Uncertainty among the scientific community remains about:

- *the degree and timing of the climate change the earth will experience*
- *the regional impacts that would result from the predicted climate change*

In 1992, the Intergovernmental Panel on Climate Change (IPCC), composed of more than 250 of the world's leading climate scientists, released a supplement to its *Scientific Assessment*. The supplement stated that the findings of scientific research since 1990 do not affect the fundamental understanding of the science of global warming. These findings have affirmed the major conclusions of the 1990 assessment. Since 1990, there has been better understanding of the cooling effect of sulfate aerosols and stratospheric ozone depletion. Taking these cooling influences into account increases the consistency between observations of global temperature changes over the past century and model simulations due to greenhouse gases over the same

2 Data from trapped air samples in ice cores have shown that for the last 150,000 years, atmospheric carbon dioxide and methane concentrations have closely tracked the surface temperature changes brought on by glacial and interglacial periods. Krause, Florentin, Wilfrid Bach and Jon Koomey. 1989. Energy Policy in the Greenhouse, Volume I. From Warming Fate to Warming Limit: Benchmarks for a Global Climate Convention. (International Project for Sustainable Energy Paths, El Cerrito, California). Recent evidence from ice core samples suggests that the earth has undergone abrupt changes in temperature and climate in as few as 20 years during previous ice ages and interglacial periods.

period. If the amount of CO₂-equivalents doubles in the atmosphere, scientists predict a global average warming of 2-9°F.

Although uncertainty exists as to the degree and timing of climate change, it is the serious risk of catastrophic consequences indicated by some theories that cause many to be concerned. A warmer climate would probably endanger marine ecosystems, natural landscapes, and already-threatened species. In addition, a warmer climate would seriously stress forestry, water resources, agriculture, and tourism industries. In other words, natural and human systems which have been adapted to historical climates may be threatened by climate change. It should be noted that there are also many scientists that challenge these theories.

Cities are especially vulnerable to these risks. Even a nominal rise in temperatures may be magnified in cities, where asphalt, concrete, and roofs absorb solar radiation, producing heat, and increasing air conditioning loads. This "heat island effect" facilitates the formation of ground level ozone, degrades local air quality, harms human health, and creates stresses on urban forests. Urban water supplies may also be at risk, as reservoirs dry up during more frequent periods of drought, and salt water from rising seas intrudes into the ground water supplies of coastal cities. Carbon dioxide levels are currently about 25 percent above pre-industrial levels and are increasing about 0.5 percent per year. Carbon dioxide is responsible for about 50 percent of current anthropogenic emissions. Each CO₂ molecule is expected to stay in the atmosphere for 50-200 years. To stabilize CO₂ levels would require an emissions reduction of 60-80 percent. Similar reductions are needed to stabilize the atmospheric concentrations of other greenhouse gases, including chlorofluorocarbons (CFCs) and nitrous oxides (N₂O). A smaller reduction, about 15-20 percent, would be needed to stabilize concentrations of methane (CH₄).

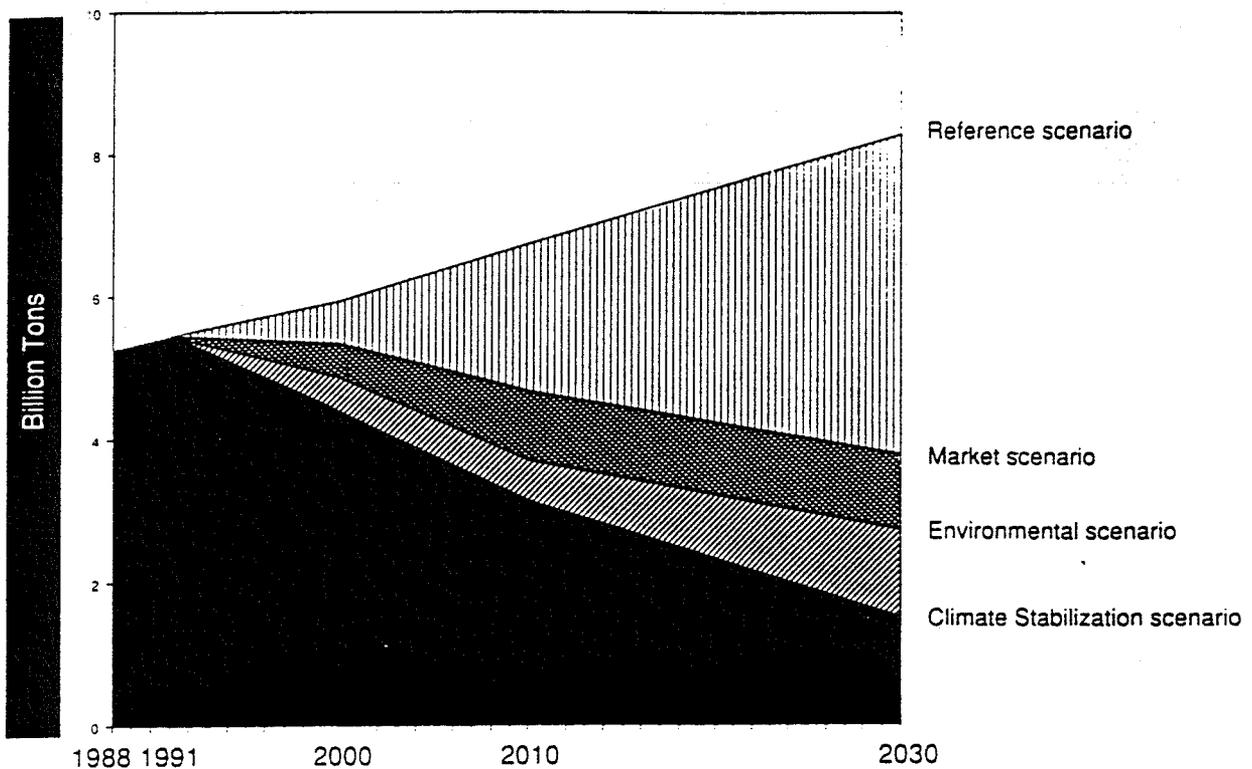
Many studies have been conducted to examine the implications of various mitigation and stabilization scenarios with a variety of results. In one such comprehensive study entitled "America's Energy Choices"³, three plausible energy scenarios were examined in relation to current policies, practices and trends for the United States. The three scenarios--market, environmental, and climate stabilization--are all designed to deliver the same level and quality of energy services as the reference scenario, but they do so at lower cost and with less environmental damage. They do this by employing greater end-use efficiency, efficient new

3 Alliance to Save Energy, the American Council for an Energy Efficient Economy, the Natural Resources Defense Council and the Union of Concerned Scientists in consultation with the Tellus Institute. 1991. "America's Energy Choices: Investing in a Strong Economy and a Clean Environment."

power supplies, infrastructure changes and renewable energy investments. The relative CO₂ emissions in billions of tons differ markedly under the three scenarios over about a 40-year period, Figure 1.

A net monetary benefit is expected under each of these scenarios. Indeed, "far from being a costly drag on the economy, increased use of renewable energy technologies and energy efficiency can save American consumers and businesses hundreds of billions of dollars over the next 40 years⁴," Figure 2.

Figure 1
CO₂ Emissions Under Differing Scenarios, 1988 - 2030



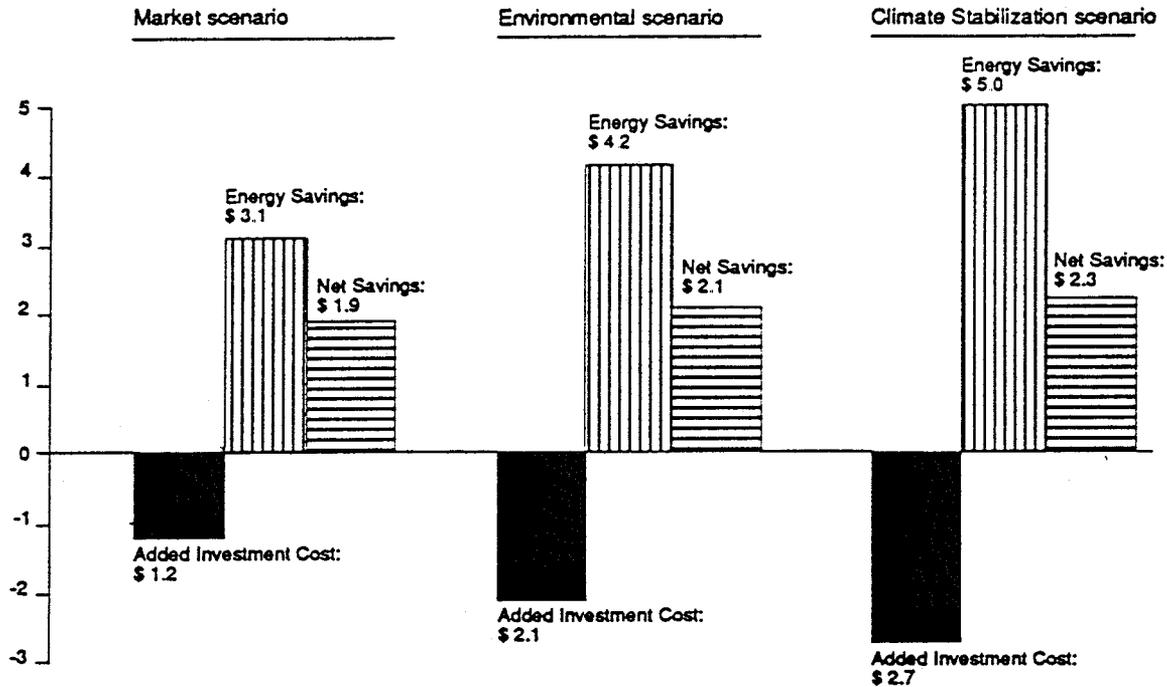
This figure illustrates CO₂ emissions in billions of tons under the Market, Environmental, and Climate Stabilization scenarios and compares them with a reference case representing business as usual. Alliance to Save Energy, the American Council for an Energy Efficient Economy, the Natural Resources Defense Council and the Union of

⁴ ibid.

Concerned Scientists in consultation with the Tellus Institute. 1991. America's Energy Choices: Investing in a Strong Economy and a Clean Environment, (Union of Concerned Scientists, Cambridge, MA.) p. 9.

Figure 2
Costs and Savings Compared to Reference Case

Cumulative Present Value (Trillion 1990 Dollars) at 3% Discount



This figure illustrates the expected costs and savings under the three scenarios in comparison to the Reference case representing business as usual. Alliance to Save Energy, the American Council for an Energy Efficient Economy, the Natural Resources Defense Council and the Union of Concerned Scientists in consultation with the Tellus Institute. 1991. America's Energy Choices: Investing in a Strong Economy and a Clean Environment, (Union of Concerned Scientists, Cambridge, MA.) p. 10.

Approach to Developing the MSP Urban CO₂ Reduction Plan

The Minneapolis-Saint Paul CO₂ Reduction Plan is intended to achieve three goals:

- To provide a policy framework for long-term city action to advocate emissions reductions on major energy-related projects.
- To prescribe specific actions for the cities to take and specific policies for the cities to advocate to reduce greenhouse gas emissions.

- To clearly articulate roles for businesses, utilities, schools, government agencies, and individuals in cutting emissions.

Reducing CO₂ emissions and other greenhouse gases can be achieved in several areas. The most important is efficient use of fossil fuel energy, especially coal and oil. Energy use produces carbon dioxide, methane, nitrous oxide, and other pollutants which account for about 60 percent of the global heating from anthropogenic (human-caused) emissions. Chloroflourocarbons (CFCs) are used primarily as coolants and industrial solvents. Methane and nitrous oxide are also produced from landfills and agricultural activities, which are largely beyond the scope of the Minneapolis-Saint Paul plan.

The Minneapolis-Saint Paul plan is intended to achieve significant emissions reductions using actions that provide leverage against the potentially devastating effects of climate change, but are beneficial if even these effects do not fully materialize. These benefits go far beyond just greenhouse gas emission reductions. The actions suggested complement other, more local economic and environmental goals: reducing air pollution, preserving public health, providing cost-effective electric power and natural gas service, reducing reliance on fossil fuel imports, increasing reliance on renewable resources, increasing energy efficiency and productivity, reducing energy bills for businesses and families, waste reduction, preventing urban sprawl and traffic congestion, promoting tree planting, and providing employment opportunities locally.

In order to accomplish this, the plan explicitly identifies several criteria for guiding action.

First, the plan identifies incentives, changes in regulation, and public education as key measures for achieving CO₂ reductions. The plan's task is to ensure that people are aware of the CO₂ challenge and about the actions they can take to significantly reduce energy use.

Second, the plan seeks to work with established institutions and ongoing decision-making processes to stress the importance of greenhouse gas emissions. Ongoing developments and projects present an opportunity to make significant CO₂ reductions at little or no net cost.

Third, where possible, the plan looks for self-financing investment strategies and market mechanisms to encourage CO₂ reductions. The plan aims to direct economic activity into environmentally-sound enterprises and to minimize any economic impact. It is only

through sustainable development that Minneapolis and Saint Paul can effectively cut CO₂ emissions and become a model metropolitan area.

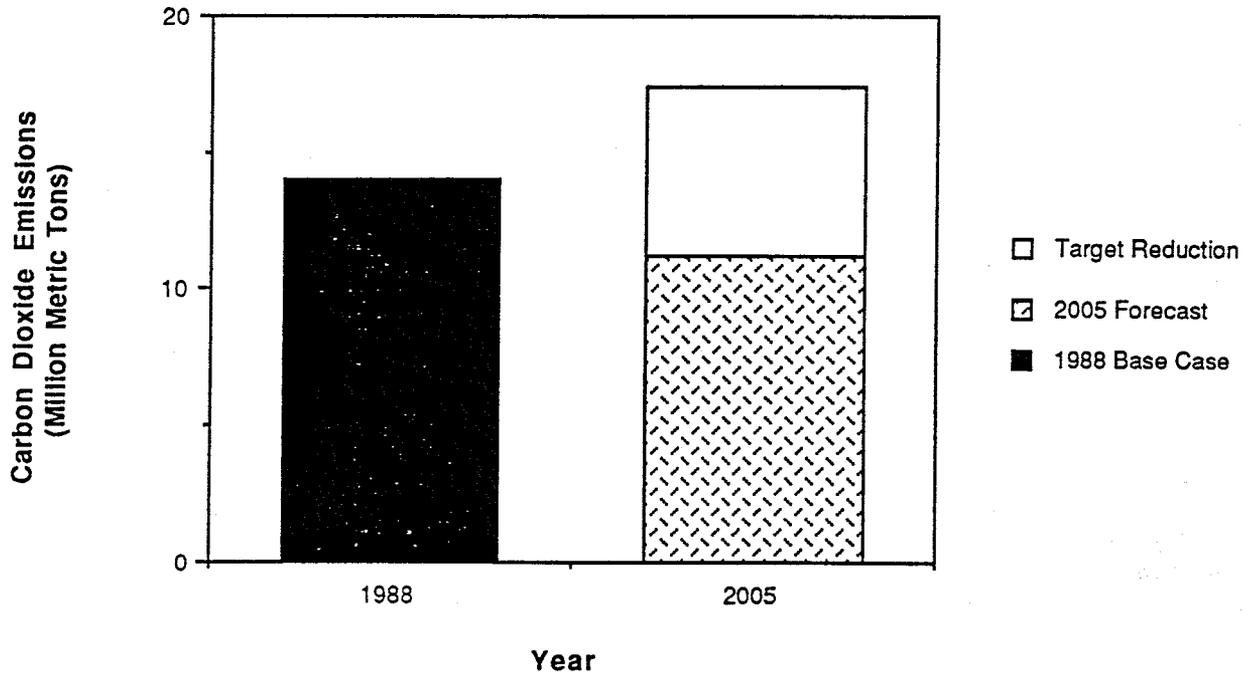
Finally, the city governments of Minneapolis and Saint Paul must set a good example for all institutions in the Twin Cities, either through their leadership on issues or through their willingness to adapt successful programs to their own operations. Businesses, schools, and other institutions have often led the Twin Cities in environmentally-sound management. City agencies must now match or exceed the performance of the best institutions in Minneapolis and Saint Paul.

Baseline Data: Current and Projected Emissions

In 1988, CO₂ emissions in Minneapolis and Saint Paul totaled over 14 million metric tons (MMT), or about 22.3 tons per capita. If the Cities continue on with "business as usual" and present trends are fulfilled, CO₂ emissions will reach over 17 million metric tons by 2005 (a 24 percent increase). This increase is due primarily increases in vehicle miles traveled, electrical power production by fossil fuels, and energy usage. In order to achieve a 20 percent reduction from 1988 levels, the cities must reduce annual CO₂ emissions by about six million metric tons by 2005 from projected levels. This is an overall reduction of 35 percent from projected 2005 levels, Figure 3. A sector breakdown of baseline carbon dioxide emissions shows transportation and industry as the largest contributors, Figure 4. Gasoline and electricity are the largest contributors to carbon dioxide emissions when baseline emissions are broken down by energy source, Figure 5.

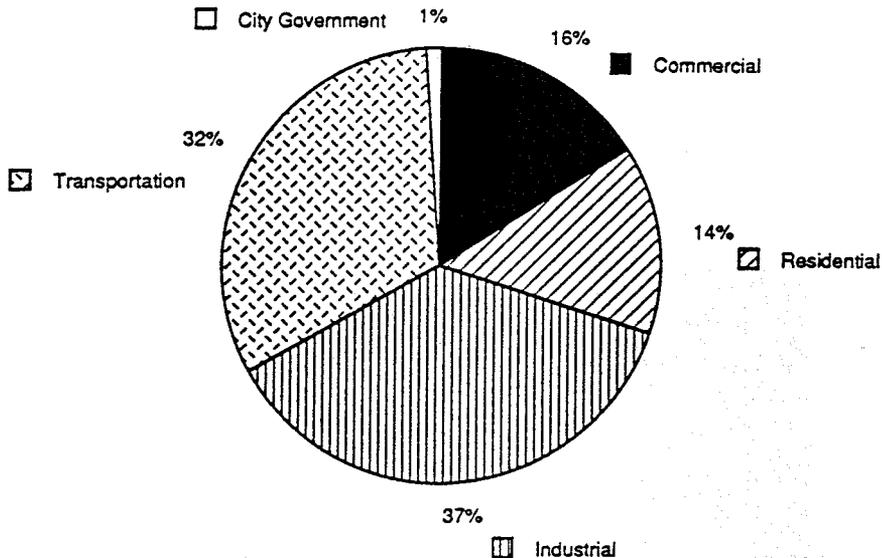
Figure 3

Minneapolis - Saint Paul 1988 Base Case, 2005 Projection
and Reduction Target for Carbon Dioxide Emissions



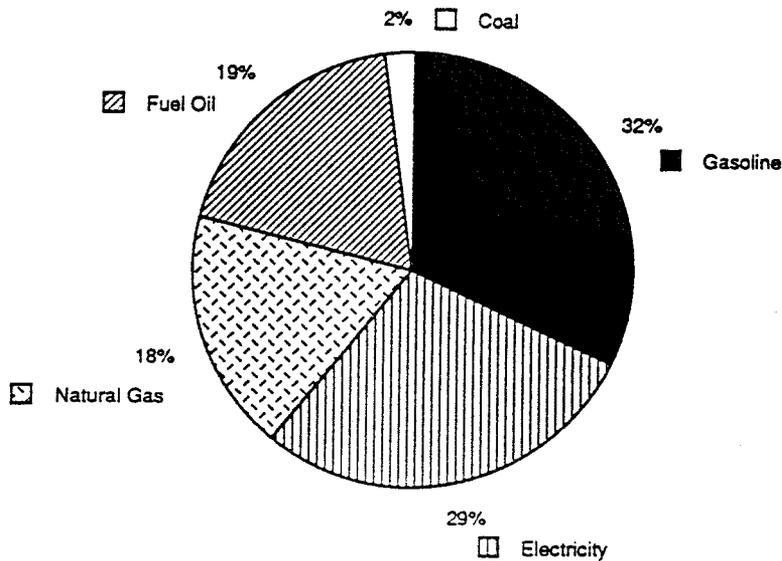
Baseline emissions in 1988 were 14.05 MMT. Carbon dioxide emissions are projected to be about 17.38 MMT by 2005 under the current scenario. A reduction of 6.14 MMT will be needed from 2005 levels to achieve this projects' target.

Figure 4
Sector Share of 1988 Carbon Dioxide Emissions



This figure illustrates the sector share of carbon dioxide emissions in 1988. Transportation and industry are the largest contributors.

Figure 5
Energy Source Share of 1988 CO₂ Emissions in MSP



This figure illustrates the energy source share of baseline carbon dioxide emissions for MSP. Electricity and gasoline are the largest contributors.

II. MINNEAPOLIS - SAINT PAUL PLAN SCENARIO

MSP Strategy Elements

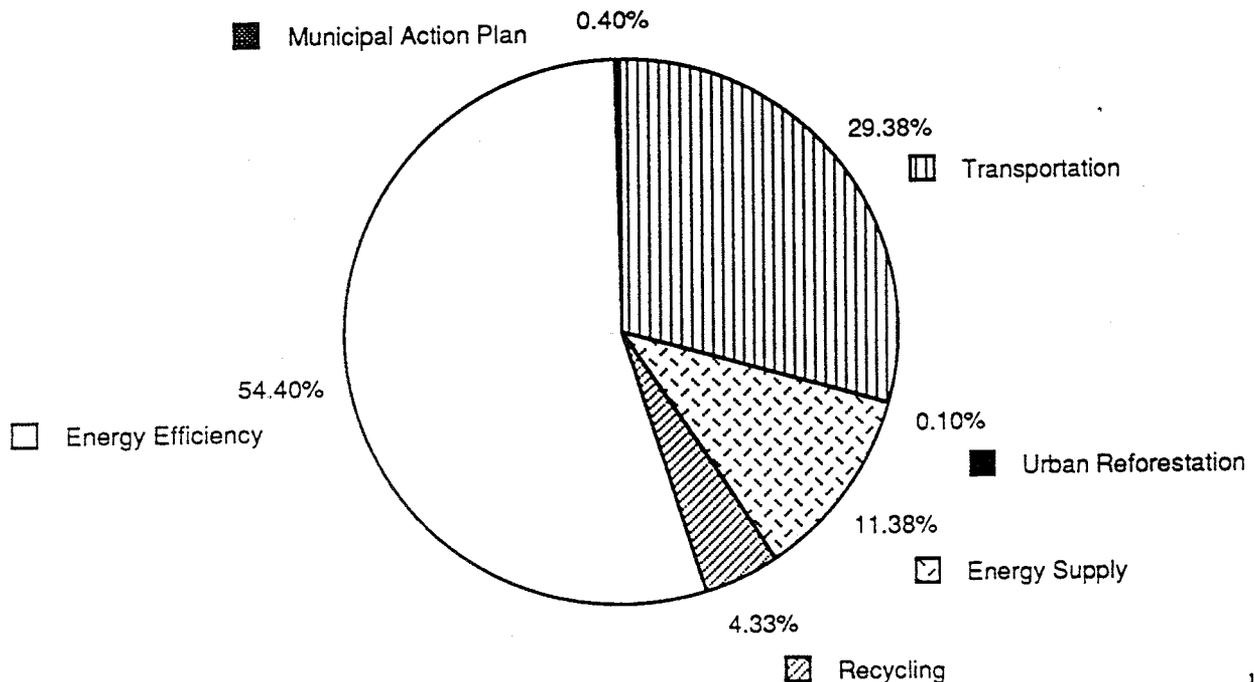
This plan presents a scenario that, if implemented, could achieve the stated target of a 20 percent reduction from 1988 levels by 2005. No one strategy or element could achieve the goal alone. In the strategy, CO₂ reductions come from six elements, Table 1.

Table 1
Carbon Dioxide Reduction Plan Elements

<u>Elements</u>	<u>CO₂ Reduction (MMT)</u>
Municipal Action Plan	0.027
Transportation	1.829
Urban Reforestation	0.009
Supply Strategies	0.708
Energy Efficiency	3.386
Recycling	0.270
<hr/> Total Reductions	<hr/> 6.229

Each category has objectives indicating the potential CO₂ reductions from the action items listed. Figure 6 shows the relative contribution of the different elements toward meeting the goal.

Figure 6
Strategy Contributions to Carbon Dioxide Reductions in 2005



MUNICIPAL ACTION PLAN FOR CITY AGENCIES
CO₂ reduction goal: 0.027 Million Metric Tons

Introduction

In 1988, CO₂ emissions from Minneapolis and Saint Paul (MSP) city buildings and operations were just over 92,000 metric tons. Although this constitutes only 0.6 percent of the total CO₂ emissions for that year, the municipal governments of Minneapolis and Saint Paul have the responsibility to set an example by reducing CO₂ in its own buildings and operations.

In early 1991, the City Council's of Minneapolis and Saint Paul committed to developing strategies designed to test a 20 percent reduction in CO₂ emissions from 1988 levels by 2005. Such a reduction will depend on the participation of both the public and the private sectors, and focuses mainly on end-use measures. In order to earn cooperation from businesses, institutions, and households, the City governments must themselves exhibit a strong commitment to the reduction of CO₂. City governments possess a variety of powers that can be used to reduce energy intensity and CO₂ emissions. The most direct power is to make their own buildings and operations an example.

The Cities own or lease several hundred buildings, operate several thousand vehicles, and employ approximately 8500 people. If the Cities could collect sound information about current practices, and take strong actions to eliminate waste, then there is a great potential to make emission reductions.

Objective 1:

Reduce energy use in all City-Owned and Leased Buildings by 25 percent by 2005

(0.021 MMT potential reduction)

This will create significant energy savings for City owned and leased buildings, which will help to reduce budget shortfalls, lower taxes, and reduce negative impacts on the local environment. This target will apply to all existing buildings that the Cities own or lease as well as any new acquisitions.

Actions

1. Complete an Inventory on Municipal Emissions from City-owned and Leased Buildings, and Operations

The Cities lack concise information on their current energy consumption and CO₂ emissions, a prerequisite for taking the most effective and economical steps to reduce their use. This action requires that the Cities assign a responsible agency such as Public Works to collect and maintain a detailed inventory of the city government's energy use in the building and operations sector. The information collected and maintained should include: energy use and emissions of city owned and leased buildings; and other energy consuming operations (e.g., street lighting, water treatment and pumping, etc.). Inventory information should be collected and reported to the Mayors and City Councils by Spring 1994 and updated regularly after this initial report to facilitate monitoring of the reduction actions.

2. Initiate Municipal Building Retrofits Program

Municipally owned and leased buildings in Minneapolis and Saint Paul are responsible for about 60,000 tons of CO₂ emissions per year. A 20 percent reduction from projected levels could be achieved at a reasonable cost through retrofits with high-efficiency lighting, cooling, and heating systems. A sound building energy efficiency program (UBEEP) already exists at the University of Minnesota which could serve as a model. Saint Paul has already moved ahead on this project. The City has secured financing from Northern States Power for an energy conservation program for city-owned and -leased buildings and are currently in the process of retrofitting buildings. This Saint Paul program has helped develop the format for a similar conservation improvement program recently filed with the Department of Public Service by NSP that would make financing available to all local governments within NSP's service territory. Minneapolis is moving forward to prepare a similar retrofit proposal. Minnegasco is also providing subsidized financing and rebates for public and nonprofit housing in Minneapolis. Non-utility energy service providers, such as Honeywell, also offer similar programs.

The Cities should initiate an energy conservation retrofit program to perform energy-saving retrofits in all existing City-owned and leased buildings. Strategies such as securing financing from NSP, or other energy service companies, in the form of a no-interest loan to be repaid through the efficiency savings could be used. The programs in both cities should begin no later than Spring 1993.

3. Participate in EPA's "Green Lights" and "Energy Star Buildings" Programs

The Environmental Protection Agency's (EPA) "Green Lights" and "Energy Star Buildings" Programs are voluntary, nonregulatory programs. In the Green Lights program, participants upgrade their facilities with energy-efficient lighting whenever it is profitable and maintains or improves lighting quality. Typical lighting electricity reductions range from 40-70 percent. This is substantial considering that lighting makes up about 25 percent of total electricity use in commercial or industrial buildings. The Energy Star Buildings program is for commercial buildings and is closely coupled with the Green Lights program. This program will seek to identify and aggressively promote opportunities for profitable investments in energy efficient equipment and operations in commercial buildings.

Participation carries with it benefits other than exhibiting commitment to conservation. The EPA provides the participants with recognition, develops a decision support system to assist with lighting surveys and technical options analysis, holds workshops and training programs, and works to remove any unjustified regulatory barriers to energy efficient measures. The Cities should sign up to participate in the EPA's "Green Lights" and "Energy Star Buildings" Programs, to be done in coordination with the municipal building retrofits, by Spring 1994.

Objective 2:

Reduce energy use and emissions in the City Fleet and from employee commuting through increased efficiency and use of alternative fuels

(0.006 MMT potential reduction)

At present, the municipalities of Minneapolis and Saint Paul operate about 1,000 non-emergency and 700 emergency cars and light trucks.

Actions

1. Complete an Inventory on Municipal Emissions from City Fleet

The Cities should assign a responsible agency to collect and maintain a detailed inventory of the city government's transportation energy use. The information collected and maintained should include: number, class, efficiency (measured by actual fuel purchases and mileage), miles driven, and fuel type of city fleet vehicles; and employee transportation patterns.

2. Institute A "Green Fleets" Program

City departments should be directed to purchase only cars and light trucks that are among the top 10 percent in efficiency in their class by 1993. Currently, both cities have small ongoing demonstration programs using alternative fuel sources. The Cities should expand their investigation of the feasibility of the different alternative fueled vehicles available by monitoring ongoing public and private studies and increasing demonstration projects. A study on the most cost-effective, efficient fuels for the different city uses should be completed by Spring 1994. In addition, these efforts should be more effectively coordinated not only between departments, but between the two cities as well.

The DOE and DOT may enter into cooperative agreements with transit authorities in urban areas of 100,000 or greater population for alternative fueled transit bus demonstrations. The transit authority funding match is 20 percent. DOT may provide financial assistance to school districts in urban areas of 100,000 or greater population financial assistance to meet the incremental cost of dedicated alternative fueled school buses. Funding authorized for the two programs is \$30 million in each of the years 1993, 1994, and 1995⁵.

⁵ Energy Policy Act of 1992, Conference Report, H.R. 776, Sec. 410 - Alternative Fuel Bus Program.

Emphasis should be on encouraging efficiency and on using fuels that have minimal impact. These fuels may include ethanol, compressed natural gas (CNG), and electricity among others. Saint Paul currently uses 10 percent ethanol blend gasoline in their city fleet, Minneapolis is demonstrating two CNG vehicles supplied by Minnegasco in their city fleet, and NSP is demonstrating an electric fleet car in the Twin Cities. Other possible measures include driver training that emphasizes fuel efficiency, idling regulations for city vehicles, and efforts to reduce non-highway fuel use wherever feasible (e.g., for street repair and landscaping vehicles, warehouse forklifts, etc).

3. Pursue Employee Transportation Energy Reduction

The Cities should implement trip reduction plans in all city departments, including the City Council, to discourage the use of single-occupant vehicles (SOVs). Such plans should be mandated by the City Council and be completed by Winter, 1994. The Cities should authorize and fund the following initiatives to encourage transportation energy reduction:

- Establish common benefit amount per employee, using the value of free parking as benchmark.
- Extend to each employee a graduated amount as an incentive to carpool, bus, bicycle, or walk to work.
- Initiate a voluntary no-drive day, one day per week. This would result in a 20 percent reduction in individual emissions.
- Provide on-site lunchrooms, daycare facilities, automated bank teller machines and other facilities to reduce miscellaneous travel.
- Encourage employee flextime (e.g., nine hour days with one Friday off every two weeks) and telecommuting.

Objective 3:

Reduce emissions in other city operations through investment and purchasing decisions
(potential reduction not quantified)

Actions

1. Municipal Investment and Purchasing

Government procurement on the state and local levels amounts to approximately 12 percent of the U.S. gross national product⁶. Government procurement can therefore be used effectively as a leverage to encourage industry to manufacture more energy-efficient and environmentally sound products.

The Cities should require all construction projects which receive public financing⁷ to meet stringent building energy efficiency standards (projects with a 10 year payback or better) beginning in Spring 1994. These standards will help capture lost opportunities since new building construction represents long-term investments which have the potential for significant energy savings. It is important to build energy efficiency into construction projects, rather than try to retrofit later. These measures should not only relate to the energy efficiency of the completed buildings, but also the materials and procedures used to construct them⁸. Care should be taken to reduce the size of air conditioning and heating equipment and greater building shell thermal efficiency. MSP should mandate a process to ensure that proposed energy savings are actually achieved. This could include standardized building energy performance measures, independent design review, site inspection, testing, etc.

⁶ Lewis, Eleanor and Eric Weltman. "Government buying can save tax dollars and the environment," *Public Management*, February, 1993.

⁷ Public financing would include any time that the City or City agency directly expenses City resources for construction or site acquisition or sells bonds on behalf of a private concern for construction for housing or commercial purposes. This would include write downs, tax increment financing, and industrial revenue and housing revenue bonds.

⁸ Implementation would require standards for heating and cooling systems, lighting, insulation, tree planting, light colored surfaces, green fleets, transit commuting incentives, bicycle parking with shower facilities, etc.

The Cities should require purchases of energy-efficient products and products with low energy-intensity, such as post-consumer recycled products. To facilitate this, a guide containing specific items to be included and the energy efficiency standards desired for each should be compiled for use by the various municipal purchasing units by Spring 1994. This is especially important because there is little information available for even the most commonly purchased items comparing their life-cycle energy and economic characteristics.

The Cities should require that full life cycle costs are examined in all energy related investments and that a payback period of 10 years be used for future evaluation and decision making. The federal government requires life cycle cost analysis to be used for all energy-related purchasing decisions. In addition, the Cities should provide a 10 percent price preference (like New York State) in their cost analysis for energy efficient and renewable energy projects to reflect environmental benefits and reduced fuel cost risk.

The Cities should join or form a buying consortium or purchase through state contracts to reduce the costs of recycled products.

The Cities should encourage City staff involvement by offering incentives to encourage energy efficiency. A special energy saving competition between buildings similar to that conducted at the University of Minnesota by the University Building Energy Efficiency Program would help educate staff on appropriate measures. Allowing city facilities to keep a percentage of their energy savings would also act as an effective incentive. The 1992 energy law allows federal facilities to retain a percentage of their energy savings for daycare and other programs.

These policies along with stringent standards for environmentally-sound purchasing should be adopted by the City Councils by Spring 1993.

2. New Energy Technology Demonstrations

The Cities should establish partnerships with utilities, businesses and other government agencies to research and make available information on the latest

energy efficiency and renewable energy technologies that are available for practical demonstrations including state-of-the-art heating, ventilation air conditioning and cooling systems, solar (solar-powered bus shelter lighting, passive solar swimming pool heating), wind, and natural gas fired cogeneration units. Possible pilot projects should be explored and reported to the City Council by Spring 1994.

Renewable energy not only reduces CO₂ emissions by replacing fossil fuels, but is also beneficial to the economy. A report by the state Energy/Environmental Planning Management Team created by Governor Arne Carlson in 1991, indicated that every dollar spent of renewable energy in Minnesota has a multiplier effect of \$3.60⁹.

3. Creation of an Energy Investment Fund

The Cities should develop an energy investment loan fund to be continually replenished with savings from energy efficiency measures. Money in this fund could be used for improvements in city operations or investments which result in energy conservation and where financial feasibility of a project is brought into question by the increased cost of CO₂ reduction requirements.

The Cities should also take advantage of conservation grants, rebates and loans offered through utility conservation improvement programs. In addition, the Department of Energy's Institutional Conservation Program (ICP) provides 50 percent matching funds for efficiency projects in schools and hospitals¹⁰

9 Energy/Environmental Planning for Minnesota State Government, 1991.

10 Institutional Conservation Program, Office of Technical and Financial Assistance, Room 5Go63, CE-531, U. S. Department of Energy, 1000 Independence Avenue, SW, Washington, DC 20585.

*DIVERSIFICATION OF MINNEAPOLIS-SAINT PAUL TRANSPORTATION SECTOR
CO₂ reduction goal: 1.829 Million Metric Tons*

Introduction

The transportation sector in Minneapolis and Saint Paul accounted for about 32 percent of total CO₂ emissions in 1988. Present trends indicate growing congestion¹¹ and longer commuting times, with serious implications for worker productivity, as well as for increased air pollution and CO₂ emissions.

To achieve substantial reductions in CO₂ emissions from transportation, national and state-level action is necessary. The Cities, however, can also make a substantial difference directly, both through their own operations and through local ordinances, laws, planning, and education. These actions should promote least-cost transportation strategies that take into account externalities such as environmental degradation (CO₂ emissions) and public health consequences.

The cities must work to achieve the following objectives:

- Discourage unnecessary or inefficient auto use;
- Encourage the use of more fuel efficient vehicles;
- Reinvigorate public transit, to include bus, light rail transit, ride sharing and van pooling;
- Reduce public subsidies for gasoline and diesel powered vehicles and incorporate driving's true costs into the market price;
- Encourage land use patterns that reduce reliance on automobiles and foster other modes of travel;
- Make walking and bicycling trips more feasible;
- Promote policies seeking adequate federal and state funding for alternative modes of transportation.

No one measure alone could substantially reduce the emissions from Minneapolis and Saint Paul's transport sector, but applied together, they have great potential. These measures have more immediate benefits beyond just reducing CO₂ emissions. Changing the transportation system will have the effect of:

11 The miles of freeway with major or severe congestion in the Twin Cities is expected to double by the year 2010. Metropolitan Council's Regional Transit Facilities Plan, February 1992.

- reducing congestion and its costs;
- increasing local air quality which increases the quality of health;
- increasing water quality by reducing non point (runoff) pollution;
- reducing the social and financial costs needed to expand existing roads or to build new ones;
- and reducing foreign oil payments, thereby strengthening the local economy¹².

Objective 1:

Reduce the Minneapolis - Saint Paul vehicle miles traveled (VMT) by 10 percent below 1990 levels

(0.530 MMT potential reduction)

Actions

1. Increase Public Transit Ridership by 50 Percent

The Metropolitan Council's Transportation Development Guide/Policy Plan calls for transit in the region to be strengthened to be more competitive with the single occupant vehicle through investments in services and facilities that provide incentives to use other forms of transit. Higher transit ridership would relieve congestion and reduce emissions. As part of their strategy, transit in MSP will be improved to be more convenient and less expensive than driving alone. However, the 31 percent increase in transit ridership by 2010 that the Metropolitan Council is projecting is not sufficient to meet the challenge of global warming. This objective calls for meeting a target of a 50 percent increase in ridership by 2005.

The Cities should work with the Metropolitan Transit Commission and the Regional Transit Board (MTC-RTB) in an effort to increase transit ridership from the current 2.5 percent of all trips in Minneapolis and Saint Paul, to 3.75 percent by 2005.

¹² This means less money leaves the local economy. Only about 15 cents of every dollar spent for gasoline stays in the local economy. Morris, David. "A Rational Transportation System: Getting From Here to There," Institute for Local Self Reliance, Saint Paul, Minnesota, May 4, 1991.

To do this, the Cities should:

- promote the use of tax-free transit passes by employers worth up to \$60 a month, as permitted by the new federal energy law¹³.
- increase the subsidy to transit in order to keep fares low and improve service
- develop more designated lanes for buses to decrease travel time
- conduct a joint MTC-City government education campaign promoting transit as convenient and inexpensive

2. Take Actions to Increase Auto Occupancy Rates by 20 Percent and Double Multi-Occupancy Vehicle Commuting by 2005

The Metropolitan Council's Transportation Plan calls for an increase in the proportion of multi-occupant vehicles (MOV) during peak periods to increase from 14 percent to 27 percent by 2010. This objective calls for meeting the same target by 2005. The plan also calls for an increase in auto occupancy rates from 1.16 persons per vehicle to 1.3 persons per vehicle. This objective calls for a slight increase in this target to 1.39 persons per vehicle by 2005.

As one of the mandatory elements of the Local Comprehensive Plans required by the Metropolitan Council's Transportation Plan, travel demand management strategies must be put in place to discourage SOV use during peak periods. The plan suggests many tools that MSP could use including legislation and community ordinances for incentives such as: parking fees for solo drivers; preferential parking for poolers; taxing employers for each SOV space (using fees for MOV users); passenger waiting areas at major employment centers; ramp bypass lanes; and MOV lanes.

The Cities also should increase the number of streets in the downtown area reserved exclusively for buses and/or high occupancy vehicles¹⁴. A study to determine downtown

¹³ Energy Policy Act of 1992, Conference Report, H.R. 776, Title XIX, Subtitle A, Sec. 1911 - Treatment of employer provided transportation benefits.

¹⁴ Minneapolis and Saint Paul currently employ one-way streets controlled by computerized traffic signal timing systems in order to reduce congestion and unnecessary fuel consumption, increase the efficiency of transportation modes, and to minimize the degradation of air quality. Room for expansion of the systems exists.

lanes most effective for such a conversion should be directed by the Cities, with a report to the City Council to be presented by Spring 1994¹⁵.

3. Support Transportation Management Organizations (TMOs)

The Local Comprehensive Plan required by the Metropolitan Council's Transportation Plan encourages the formation of TMO's. In the plan, the Metropolitan Council and the Regional Transit Board (RTB) pledge to devote additional resources to provide increased technical assistance to communities and employers to help them form TMO's.

Downtown employers (public and private) could effectively reduce CO₂ emissions through transportation demand management. Downtown Minneapolis and Saint Paul have a workforce of over 450,000¹⁶. This number is expected to increase by about 15 percent by 2005. Concerns over worsening congestion and air quality in the downtown prompted the Minneapolis City Council, in June 1991, to become one of the first in the nation to establish a transportation management organization in a central business district. The TMO is run by representatives of the City; downtown retailers, developers, service industries, and parking facilities; the Downtown Council; and the Minneapolis Building Owners and Managers Association. The goal of the TMO, a public-private partnership, is "to promote efficient and environmentally sound transportation networks in order to assure the continued growth and prosperity of the downtown area."

The Cities should support the development and expansion of the TMO program to assist businesses in providing personalized, in-house carpool matching, priority parking and discounts for carpools, incentives for transit, bicycle facilities and promotion.

¹⁵ Downtown Minneapolis is criss-crossed by reverse flow bus lanes. With the addition of the Nicollet Mall Shuttle systems, expected within one or two years, this system of exclusive bus lanes will be adequate for the city for a number of years. Additional streets have been identified for future bus lanes. In the near future, all freeway entrances from the downtown area will have exclusive lanes for buses and/or HOV use. The city is in the process of reserving hundreds of stalls in the public parking ramps that fringe the downtown for exclusive HOV use.

¹⁶ First and Second Quarter 1991 data from the Minnesota Department of Labor and Industry, St. Paul, Minnesota.

4. Establish a Travel Reduction Pilot Program

The Local Comprehensive Plans required under the Transportation Plan also urge communities to develop and coordinate travel reduction ordinances. The Cities should enlist the cooperation of about 30 to 40 businesses of different sizes within their downtown areas to participate in this pilot program. The participants will determine the present commuting patterns of their employees, set a reduction goal and create a plan to reach the goal, and collect data relating to actual reduction achieved, cost, and savings involved.

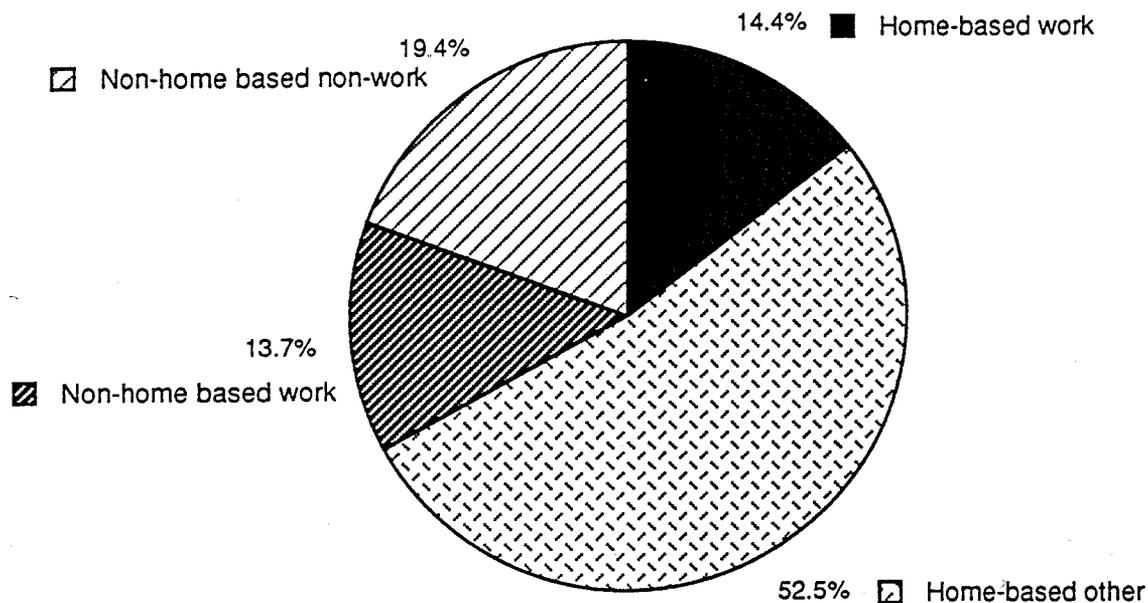
Elements of these plans should include a mix of car- and van-pools, some type of guaranteed ride home program, public transit incentives, bicycling facilities, variable work schedules, and telecommuting. Results from this pilot program could then be used to determine what kind of measures work best for businesses in terms of actual reduction and cost.

5. Reduce Non-Commuting Trips

In the Twin Cities, only about 28 percent of all trips made are work-related. The other 72 percent consist of various errands or recreational trips, Figure 7. This type of trip, though far outnumbering any other, is rarely included in any transportation management plan. Strategies exist to reduce these types of trips indirectly through land-use planning, price disincentives, and education. However, little is known about the effects these methods might have on non-commuting trips.

The cities of Minneapolis and Saint Paul should include non-commuting trips in their travel reduction goals. A study and implementation plan should be directed by the City Council's to be completed by Spring 1994.

Figure 7
Minneapolis - Saint Paul Trip Purpose Data, 1990



Graph based on data from the Metropolitan Council's Travel Behavior Inventory for the Twin Cities: Personal communications with Steve Alderson, Metropolitan Council, St. Paul, Minnesota.

6. Require Transportation Planning to Address CO₂

One of the most critical elements of the Regional Transit Facilities Plan of the Metropolitan Council is "more efficient and transit friendly land uses". Coordinating land use strategies and zoning with transit planning would not only help reduce the need for single occupancy vehicle trips and reduce CO₂ emissions, but would also result in less local air pollution, less energy consumption, less need for and less costly urban services, and less traffic generation.

In its Transportation Plan, the Metropolitan Council requires integrated planning for land use and transportation for regional business concentrations to optimize use of and minimize need for investment of regional highway and transit systems. The plan encourages mixed-use facilities and development, parking reduction ordinances for developers, and traffic impact fee ordinances.

The Cities should implement these strategies and require all plans and zoning reports by city agencies that relate to transportation, including new building and parking ramp construction, to include a plan as to how the proposals will contribute to the cities' objectives for CO₂ reduction beginning in Fall 1993.

The Cities should request their planning departments and the Metropolitan Council to study and develop energy-efficient land-use that promote mixed-use development and densification by Spring 1994.

7. Aggressively Promote Bicycling as a Major Transportation Mode

Under the guidelines for the Local Comprehensive Plan required of Minneapolis and Saint Paul by the Metropolitan Council, cities should encourage bicycle use through the provision of safe access, passage and storage facilities.

The Cities should include a bicycle transportation policy in the comprehensive transportation policy to encourage the use of bicycles as an alternative form of transportation¹⁷. A bikeway system plan should be developed for consideration of the Council's to be constructed by the end of 1995¹⁸.

MSP should continue to assist in securing funding for a bicycle highway in the area. Members of the Minneapolis Environmental Commission are leading an effort to bring bicycle highways to the Twin Cities but need help to secure funding from federal transportation funds. The Minneapolis Department of Public Works is assisting on this effort. Saint Paul has already begun a pilot project using Summit Avenue as a test bike route for commuters.

8. Reflect the True Cost of Driving Through Alternative Pricing and Fees

A number of strategies exist to reflect better the true cost to society of driving automobiles and to support alternative modes. In the Twin Cities, about 28 percent of the locally generated revenue spent on streets, highways and bridges

17 One percent of all trips in Minneapolis are taken by bicycle. In Madison, WI, the number is nine percent. Los Angeles also has one percent of all trips taken by bicycle, but in Davis, CA it is 23 percent.

18 The Minneapolis City Council passed a Commuter Bikeway System Plan in 1992.

during 1990 by counties, cities and townships came from property taxes¹⁹. In addition to the direct costs of motor vehicle use are the indirect costs, or externalities, paid by the public, outside the transportation system. In 1990, air pollution is estimated to have cost the Twin Cities area about \$78.2 million, road salt damages (estimated by MNDOT) were estimated at \$10.6 million, and the Twin Cities share of petroleum subsidies came to about \$83 million. The following are some possible reduction measures.

- require parking validation systems to be more modal-neutral and offer free bus tokens as an alternative to paid parking. If parking benefit is offered, require a cash-equivalent commuting allowance for workers who use other modes.
- encourage employers to reduce parking subsidies provided to employees²⁰ and only offer free parking to those who car- or van-pool.
- research the institution of preferential high occupancy vehicle (HOV) pricing strategies in public and private parking spaces²¹.

9. Develop a Public Education Campaign to Reduce Automobile Use

One promotion that could be used in this campaign is voluntary no-drive days. The day to leave your car at home would be determined by the license plate number on the car. These days could occur once a month for each car, or once a week during the worst

19 Welbes, Matthew. "Selected Motor Vehicle Related Subsidies in the Twin Cities Metropolitan Area: A Preliminary Assessment" July 1992.

20 The Canadian federal government increased parking rates for federal employees in Ottawa, resulting in a 23% reduction in employees driving to work, 16.6% increase in transit ridership and an increase in average vehicle occupancy from 1.33 to 1.41 passengers.

21 Minneapolis has subsidized 900 MOV stalls (6 percent) of City owned parking systems for downtown. The purpose of these special stalls is to encourage people to car pool, especially on I-394 which contains exclusive MOV lanes and direct access from these lanes to the facilities. MOV users pay only \$10 a month to park while others pay \$80 per month.

Preferential HOV pricing strategies in Montgomery County Maryland have achieved over 75% MOV stall use of public spaces. Seattle has achieved 95% MOV space use in public spaces and 35% in private space.

pollution season (a once a week substitution could result in a 20% reduction in individual emissions). City Hall should be used as a model employer in the campaign.

Objective 2:

Reduce Transportation Energy Use of Non-Passenger Vehicles

(0.754 MMT potential reduction)

In 1988, about half of all transportation-related CO₂ emissions originated from non-passenger vehicles such as fleet vehicles, delivery trucks, and the local share of long-haul trucking.

Actions

1. Institute an Idling Ordinance Within the City Limits

As much as one half of the total energy used for non-passenger vehicles is being wasted because of idling. Although some sectors may be able to achieve a reduction of 50 percent, many would find it difficult, if not impossible. For example, City recycling collectors would find it impossible to turn off their engines between every house. On the other hand, trucks making deliveries or pickups could easily shut down during that time. The Cities should create an ordinance restricting idling in the city in order to reduce unneeded energy use and pollution by Spring, 1994.

2. Promote Driver Training With Fuel Efficiency as the Goal

It has been demonstrated in studies that just by teaching drivers to drive safely and economically, a 30 percent short term reduction in fuel consumption can be realized with persistent reductions of about 15 percent²². The Cities should promote these efficiency-oriented driving techniques to businesses and industry while at the same time demonstrating its effectiveness within their own departments.

22 Bock, M., NOVA PRO, Denmark, "Improved Driving Techniques." CADDET Newsletter, No. 2. 1992.

3. Maintenance Program

Improving vehicle maintenance and operation offers a potential reduction in emissions of about one to five percent²³. The short start-up time and small to no capital investment requirements of this measure are great advantages. Possible measures include efficiency inspections on trucks, fleet and government vehicles, and requiring high efficiency tires and oils.

Objective 3:

Encourage the Use of Alternative Fuels

(0.150 MMT potential reduction)

Actions

1. Displace 10 Percent of the Gasoline Sold in Minneapolis-Saint Paul with Alternative Fuels

An effort should be made to displace at least 10 percent of the gasoline sold in Minneapolis and Saint Paul with alternative fuels that have less environmental impact than gasoline. Where possible, these fuels should be produced with renewable feedstocks, used in efficient vehicles, and require minimal infrastructural changes.

Already, proven alternatives exist such as compressed natural gas (CNG), ethanol, and electricity. CNG emits much less carbon dioxide than conventional gasoline, vehicle conversion is relatively easy, and the fuel is cheaper than gasoline. Ethanol can also have lower carbon dioxide emissions provided it is produced with renewable feedstocks, and when mixed with gasoline, no vehicle conversion is required. The substitution of ethanol for gasoline has already happened to some extent due to government incentives for gasohol production, and it has now been mandated during winter months to reduce local air pollution problems, but a total year-round shift to gasohol use may increase the benefits considerably. Electric vehicles, while requiring a more drastic infrastructure change, have many potential benefits. There are zero tailpipe emissions, with the only

²³ U.S. Congress, Office of Technology Assessment, Changing by Degrees: Steps to Reduce Greenhouse Gases, OTA-O-482 (Washington, DC: U.S. Government Printing Office, February 1991).

associated emissions being the fuel used in the production of electricity. The more 'clean' or renewable fuel used in the production of electricity, the better these vehicles become. However, even with MSP's fuel mix, these vehicles would save in emissions over conventional gasoline-powered vehicles.

2. Promote the Purchase of Low CO₂ emitting Vehicles by Businesses and Other Governmental Fleets

Fleet vehicles hold a relatively large market share and have high turnover rates.. Because of this, fleet vehicles are a useful market for alternative fuel vehicles. For the past couple of years, Minneapolis and Saint Paul have been demonstrating various alternative fueled vehicles in their fleets. This experience will be broadened under the Municipal Action Plan and can be used to promote the purchase of alternative fueled vehicles by other fleet owners across the city. Two promising vehicles being demonstrated presently include compressed natural gas and electric vehicles. Electric vehicles are particularly promising for short range delivery use when a gas vehicle would otherwise spend a large percentage of the time idling.

By October 1993, DOE shall establish a low-interest loan program, directed to small business operating fleets, for alternative fueled vehicle conversion, incremental cost of purchasing these vehicles, and incremental costs of purchasing non-road vehicles and engines using alternative fuels. Funding is authorized at \$25 million for each of the years 1993, 1994, and 1995²⁴.

The Cities should increase their alternative fuel demonstrations and encourage local businesses and industries to take advantage of the DOE program.

Objective 4:

Higher Fuel Efficiency Standards for Vehicles

(0.395 MMT potential reduction)

²⁴ Energy Policy Act of 1992, Conference Report, H.R. 776, Title IV - Alternative Fuels - Non-Federal Programs.

Actions

1. Corporate Average Fuel Economy (CAFE)

The Cities should advocate for an increase in the federal auto and truck efficiency standards, known as the CAFE, from the present 27.5 miles per gallon(mpg) by 2005. The Cities should lend their weight to lobbying efforts to pass a higher federal fuel efficiency standard for new vehicles.

2. Feebates

The Cities should advocate the adoption of fees and rebates (known as feebates) based on the fuel economy of new vehicles at the state level. Feebates have been adopted by Ontario in Canada and Maryland in the U.S. (although not yet implemented in the latter).

EXPAND URBAN REFORESTATION EFFORTS *CO₂ reduction goal: 0.009 MMT²⁵*

Introduction

Reforestation is the only post-combustion measure that can contribute to reducing the threat of global warming. Although tree planting is not the largest or most cost-effective measure in battling global warming or in addressing energy conservation, strategically planted trees and other vegetation at certain latitudes and in some climates can be an effective, complementary approach to other energy conservation measures.

The long-term warming of cities due to the heat island effect contributes to peak electric loads. These urban heat islands typically occur in cities of 100,000 or more where buildings and pavement comprise much of the land area, such as in Minneapolis-Saint Paul. Temperatures in these cities are about two to eight degrees warmer than the surrounding countryside. Each degree Fahrenheit increase in temperature is responsible for a 1 to 2 percent increase in peak

25 This number does not include savings resulting from the reduction of the heat island effect. This number is believed to be substantial. For information on California numbers, see Abari, Hashem, Haider Taha and David Sailor, "Measured Savings in Air Conditioning from Shade Tree and White Surfaces," ACEEE 1992 Summer Study on Energy Efficiency in Buildings, volume 9, 1992, pp. 1-10. Minnesota specific numbers were not yet available.

cooling loads²⁶. It is expected that if current trends continue, these cities could be 10 degrees hotter within 50 years²⁷.

Trees and other foliage act to shelter buildings and modify climate which effectively reduces fuel consumption needed to heat and cool buildings. Strategic planting of deciduous trees can substantially reduce air conditioning energy demand while minimizing the reduction in winter solar gain (i.e. heating). Studies have shown that in the southern half of the state, tree planting can yield annual net energy savings of 1 to 2 percent overall²⁸. This could be significant considering the benefits from tree shading likely represents only 10 to 30 percent of the total energy benefit expected from trees. Other important benefits will include reductions in wind and in summer temperatures of urban heat islands.

Objective 1:

Promote extensive urban tree planting and expanded maintenance of existing trees
(0.004 MMT potential reduction)

Actions

1. Tree Protection and Preservation

The Cities should adopt a strict tree preservation and protection ordinance by Fall 1993. The Cities should have strict tree preservation standards for any new developments, and should require replacement and maintenance of trees lost to development. A reward or recognition program could be developed for projects which preserve substantial tree cover. To facilitate community education, the Cities could sponsor tree-planting projects with local schools and community groups.

26 Sand, Margaret. Planting for Energy Conservation in the North. State of Minnesota, Department of Natural Resources, 1991.

27 Semrau, Anne. "Introducing Cool Communities" American Forests, July/August, 1992.

28 Carbon Dioxide Budgets in Minnesota and Recommendations on Reducing Net Emissions with Trees. A Report to the Minnesota Legislature, January, 1991. Minnesota Department of Natural Resources, Division of Forestry.

2. Emphasize Trees as an Integral Capital Improvement Budget Item

The Cities should place more emphasis on the planting and replacement of trees in the municipality. Trees should be viewed as an integral part of the municipal infrastructure just as sewers and streets are viewed. Trees have public utility because they provide shade, transpiration, wind breaks, and the conversion of CO₂ into oxygen.

Objective 2:

Promote strategic tree planting to reduce building energy consumption

(0.005 MMT potential reduction)

Actions

1. Participate in "Cool Communities"

Cool Communities is a program of AMERICAN FORESTS, sponsors of Global ReLeaf, and the U.S. Environmental Protection Agency, in cooperation with other governmental and non-governmental agencies. The program is designed to implement strategic tree planting and surface color lightening and monitor their effects on energy consumption²⁹. Minneapolis has signed on to participate in this project. Saint Paul should sign up to participate in the Cool Communities Program by Spring, 1993³⁰.

2. Minnesota ReLeaf Community Forest Program

Under the Minnesota ReLeaf Community Forest Program, local units of government (municipal, township, school district, and other legal local government entity) and non-profit organizations with a 501 (c) (3) status have the opportunity to apply for

29 They are expecting to expand their test program and are very interested in our participation as a northern city. They would like a letter of interest and expect to know more in mid September. Cities currently participating include: Dade County, Florida; Sacramento, California; Tulsa, Oklahoma; Tucson, Arizona; Austin Texas; Frederick, Maryland; and Springfield, Illinois.

30 The City of Minneapolis is in the application process for the Cool Communities Program and has received \$222,000 from the Legislative Commission on Minnesota resources (LCMR) for tree planting.

program funds. In the last round of funding, there was \$300,000 available for the metro area. The application process will be opening again for a second round in the near future.

The Cities should apply for funds under the Community Forest Program for a project promoting strategic tree planting through the Cool Communities Program, and should urge neighborhood groups to apply and assist them in the application and planning process.

The Cities should explore other sources of funding for the expansion of their tree planting programs and participation in Cool Communities. A possibility would be to include tree planting in utility CIP programs. A report of findings should be made by Spring, 1994.

3. Include Strategic Tree Planting and Surface Lightening in Utility Conservation Improvement Programs

The Cities should urge Northern States Power to investigate the possibility of tree planting and surface lightening through utility Conservation Improvement Programs.

ENERGY EFFICIENCY

CO₂ reduction goal: 3.386 Million Metric Tons

Introduction

Use of utility-provided electricity and natural gas are among the leading sources of CO₂ emissions. Utilities currently have extensive contact with energy consumers and large conservation programs that could be redefined to include an emphasis on CO₂ reduction. Their role in CO₂ reduction is therefore very critical. The Cities should advocate state policies which reduce utility-related emissions in as profitable and as cost-effective a manner as possible. The Cities should also urge utilities to implement specific actions to reduce CO₂ emissions. However the utilities should not be expected to take these actions alone. Efforts will have to be

made by all sectors in Minneapolis-Saint Paul. Businesses also have a potentially large role to play, both with respect to improving the efficiency of their own operations as well as through increased business opportunities.

Northern States Power, Minneapolis and Saint Paul's electricity supplier and Minnesota's largest, is currently projecting a growth in the demand for electricity of two percent annually through the year 2008. This growth takes into account the results of NSP's planned demand-side management efforts which amount to a 727 GWH energy savings by 2005³¹, and a 0.475 MMT reduction in CO₂ emissions. In order to reduce CO₂ emissions in the electricity sector by 20 percent of 1988 levels with demand-side management alone, however, a 3,261 GWH energy savings would need to be achieved. In keeping with the approach established for this project, the measures recommended for utility action must save energy and be cost-effective. Therefore, this plan sets as reduction goals, those determined technologically and economically feasible in the report by the Alliance to Save Energy, et al, "America's Energy Choices: Investing in a Strong Economy and a Clean Environment." Using these feasible reduction goals, NSP's target reduction becomes 2,543 GWH, or a 1.661 MMT CO₂ reduction. Although this level of conservation is considered feasible, it will require an almost 250 percent increase in NSP's current conservation goal³².

Minnegasco and NSP are Minneapolis and Saint Paul's natural gas suppliers. Natural gas utilities currently do not file resource plans, so planned demand-side management up to the year 2005 is not known. However, currently the cumulative affects of Minnegasco's and NSP's natural gas CIP programs continued at the current funding level would yield savings of about 4,409,460 MCFs by 2005. In order to reduce the CO₂ emissions in the natural gas sector by 20 percent of 1988 levels with demand-side management alone, however, a 20,295,000 MCF energy savings would be needed. However, under this scenario, the feasible target becomes 14,113,000 MCF, or a 0.751 MMT CO₂ reduction. Although this level of conservation is considered feasible by many national studies, it will require a 220 percent increase over current conservation efforts.

³¹ The 727 GWH energy savings is based on Minneapolis and Saint Paul's share (approximately 20% of NSP's total energy use) of NSP's total planned demand-side management for Minnesota of 3,634 GWH as found in Northern States Power. "Application for Resource Plan Approval, 1994-2008," p. VIII - 2, Table VIII - 1, June 30, 1993.

³² The assumption made here is that the Cities recognize that to reach their CO₂ reduction target, it will be necessary for NSP to retain their nuclear plants throughout the plants current lifetime. This will allow a sufficient time period in which to develop alternatives to both new coal and nuclear power plants. This assumption does not include relicensing of the plants.

Improving efficiency in both production and end use not only reduces CO₂ emissions, but also saves society money, manages our resources more effectively, and reduces emissions of other harmful gases and metals such as SO₂ and mercury³³. This strategy of energy efficiency and the next involving supply strategies illustrate just one scenario of how the necessary reductions could be achieved.

Three major energy using sectors contribute very different amounts of CO₂ emissions and will therefore require varying emphases. Table 2 shows the forecasted emissions for 2005 and the target reduction needed to meet this project's stated goal from increased energy efficiency in each sector. The energy efficiency goal represents a combined reduction of almost 30 percent of total emissions from these sectors and falls within the range of achievable savings.

Table 2
Target Reductions for 2005 from Energy Efficient Measures by Sector
(Million Metric Tons)

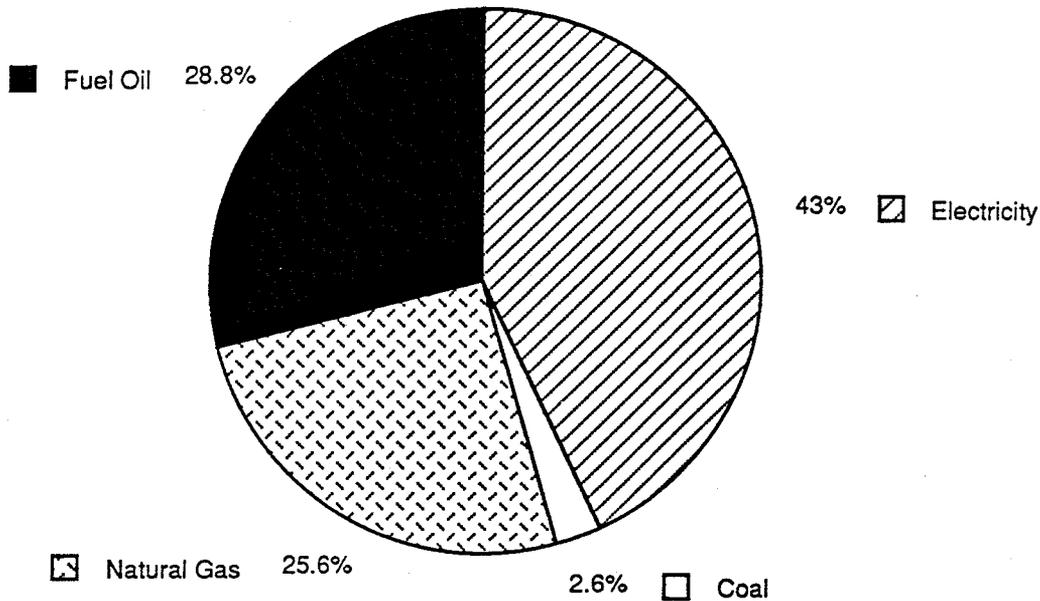
<u>Sector</u>	<u>2005 CO₂ Emissions</u>	<u>2005 CO₂ Reduction</u>	<u>Percent Reduction</u>
Residential	2.445	0.611	25
Commercial	2.765	0.608	22
Industrial	6.189	2.166	35
Total	11.399	3.386	29.7

As shown in Figure 8, electricity, natural gas and fuel oil are the major contributors to emissions in these sectors. Table 3 illustrates necessary energy reductions needed from energy efficiency measures by energy source and sector.

33 According to a study prepared for the Midwest Office of the Isaaq Walton League of America by Economic Research Associates (February 1993), energy efficiency produces broader economic benefits than just energy bill savings. The study examines potential employment and income benefits from aggressive electric utility demand-side management scenarios in Minnesota. According to the study, a climate stabilization scenario would produce a net positive gain to the Minnesota economy of \$157 million. This would mean about 5,693 additional jobs in 2005.

Figure 8

Carbon Dioxide Emissions by Fuel Type (nontransportation) in 1988



This figure illustrates carbon dioxide emissions by fuel type supplying energy to the residential, commercial, and industrial sectors.

Table 3

Energy Reductions From Energy Efficient Measures by Energy Source and Sector
(Million Metric Tons)

Energy Source	2005 CO ₂ Emissions	Residential CO ₂ Reduction	Commercial CO ₂ Reduction	Industrial CO ₂ Reduction	Total CO ₂ Reduction (% of 2005 emissions)
Electricity	5.365	0.244	0.203	1.214	1.661 (31)
Natural Gas	3.019	0.366	0.268	0.117	0.751 (25)
Fuel Oil	2.764	0.001	0.082	0.835	0.918 (33)
Coal	0.251	-----	0.055	-----	0.055 (22)
Total	11.399	0.611	0.608	2.166	3.386 (30)

Objective 1:

Capture significant energy savings and reduce carbon dioxide emissions from electricity, natural gas, and petroleum fuels used by homes, the public sector, businesses, and industry through utility programs and government actions

(3.670 MMT potential reduction)

Actions

1. Cut forecast 2005 residential CO₂ emissions by 25 percent

America's Energy Choices estimated that feasible reductions of between 21 and 30 percent of energy consumption in the residential sector can be achieved. There are many existing utility programs that should be expanded and new directions that should be taken.

a. Utility-sponsored demand-side management programs. The Cities should urge the Department of Public Service to increase the level of conservation-related demand-side management that they require of the electric and natural gas utilities to achieve these savings. In order to obtain savings of this magnitude, a comprehensive array of conservation programs must be aggressively pursued, including programs directed at all major sectors, end-uses, and market types.

Targeted Conservation Programs. The MSP Multifamily, Single Family, and Low Income Residential Energy Conservation Programs should expand to not only include more units, but also to include efficient electricity measures as well.

New programs include an Energy Efficiency Neighborhood Program. The Cities should also work with gas and electric utilities to improve the efficiency of public housing. Existing stock should be brought up to standard and the building of low quality housing should be discontinued. Lighting, space and water heating, and large appliances such as refrigerators present the largest energy saving potential.

b. Home Energy Rating Systems. The Cities should work with the real estate and utility industry to develop a system to rate housing energy use. Home energy rating systems would provide information to home buyers or renters to help them make intelligent decisions about how much energy features, or the lack thereof, should cost. These ratings should be based on a scale, should be understandable by someone with little knowledge of home energy efficiency and be disclosed before the sale of

buildings. Rating design should also take into account consumer energy behavior. There are many possible ways of designing and implementing a system. Many examples of working home energy rating systems exist upon which MSP could base theirs³⁴. In addition, the 1992 National Energy policy Act includes a mandate the federal government to issue voluntary guidelines for residential energy efficiency rating programs by Spring 1994 that may be used by state and local governments, utilities, builders, lenders, etc.³⁵ It also includes a program to provide technical assistance to state and local organizations to encourage the adoption and use of these rating systems.

Such a rating should be developed for the Cities by Summer, 1994. Other municipalities, such as San Francisco, require housing energy improvements before re-sale. San Jose, California recently began offering energy ratings to residents which include an incentive of a larger mortgage if they purchase more efficient homes³⁶. This program could also be tied to energy efficient mortgage programs from area financial institutions.

c. Energy Efficient Mortgages. The Cities should advocate the adoption of energy efficient mortgages which relax qualifying rules for buyers on energy-efficient homes and lets home buyers include the cost of efficiency improvements in their mortgages. This would add a small amount to the mortgage payment, but would be offset by lower utility bills. Barriers currently exist that prevent most refinancers and buyers of existing homes from including the cost of energy conserving improvements and renovations in their mortgages. The rules should be amended to allow loan applicants to include 100 percent of the cost of needed, cost-effective energy improvements into a home mortgage at the time of purchase or refinance of an existing home, when the improvements can be documented to pay for themselves.

34 Two reports which describe home energy rating systems are: Hendrickson, P.L., "Review of Existing Residential Energy Efficiency Certification and Rating Programs, PNL-6080, Pacific Northwest Laboratory, November, 1986; and Vine, E., et al. "Home Energy Rating Systems: Program-Descriptions, LBL-22919, Lawrence Berkeley Laboratory, February, 1987.

35 Energy Policy Act of 1992, Conference Report, H.R. 776, Title I - Energy Efficiency, Sec.102.

36 Sylvester, David A., "Energy Ratings offered for Homes," San Francisco Chronicle. Friday, February 19, 1993.

The 1992 National Energy Policy Act includes provisions for a five-state energy efficient mortgage pilot program to promote the purchase of existing energy efficient residential buildings and the installation of cost-effective improvements in existing residential buildings³⁷. The provision allows for nation-wide expansion two years after the pilot program begins and to include new housing as well.

d. Better Code Enforcement Building codes and efficiency standards offer an opportunity to ensure that new investments in buildings meet the cities' long-term CO₂ reduction goals. There is great opportunity for the cities to play a productive role in writing and enforcing standards. Building code enforcement, especially in new buildings to avert 'lost opportunities', should be strengthened by the Cities. In addition, funds for training inspectors and for more frequent inspections should be increased to ensure compliance.

e. Enforce Rental Energy Standards The state has voluntary rental energy efficiency standards, and these standards are not currently being strongly enforced in Minneapolis. Saint Paul lacks any enforcement mechanism. The Cities should make these standards mandatory, and emphasize them as a priority the enforcement of rental energy standards to their inspections departments.

2. Cut forecast 2005 commercial and institutional CO₂ emissions by 22 percent

Reduction potential in the commercial sector is estimated to be between 20 and 38 percent. Lighting is one of the most effective reduction measures in this sector. MSP has a Small Commercial Lighting Program underway that could be effectively expanded. High efficiency lighting is a measure that pays for itself in a couple of years.

The Cities should encourage local businesses and institutions to participate in the EPA programs "Green Lights" and "Green Buildings."

The Cities should also mandate that all new construction meet the illumination code (national standard adopted by Minnesota).

37 Sec. 106 Energy Efficient Mortgages Pilot Program.

The Cities should encourage the utilities to expand the existing residential audit program to include businesses and institutions, with electricity reduction measures included.

3. Cut forecast 2005 industrial CO₂ emissions by 35 percent

Industry is by far the highest energy consumer among the three sectors and requires the largest reduction in emissions. It has also been targeted as the most promising sector for substantial energy savings. The best opportunities for reductions are in industrial processes, more efficient motors, refrigeration technologies, energy recovery systems and boilers. The National Energy Policy Act of 1992 includes an industrial program intended to achieve some of this potential while promoting industrial competitiveness. The program promotes a new partnership between utilities and their industrial customers and includes a federal grant program as an incentive for states to provide regulatory support for energy-efficiency improvements in industrial processes³⁸. Process equipment and manufacturing configuration account for about 90 percent of an industrial firm's overall energy use.

The Cities should encourage utilities to offer individualized initiatives to industry. Utilities should be encouraged to undertake comprehensive, well-funded demand-side management programs for industrial customers that include high quality technical assistance as well as financial incentives. Also, these programs should target process energy use as well as lighting and motors.

The Cities should encourage industry to increase the efficiency of their energy production by utilizing cogeneration technology.

Industries should also be encouraged to participate in the EPA's "Green Lights" and "Green Buildings" Programs.

38

Energy Policy Act of 1992, Conference Report, H.R. 776, Title I, Subtitle D, Sec. 132 - Process oriented industrial energy efficiency.

4. Joint Utility/Government Program

The Cities should urge Minnegasco, the electrical and natural gas divisions of Northern States Power, and City and State agencies presently operating energy conservation programs to work together to coordinate their respective programs in order to guard against duplication of effort and to ensure that all cost-effective opportunities for energy efficiency improvements are promoted.

5. Initiate Integrated Resource Planning

The Energy Policy Act of 1992 mandates IRP for electric utilities, and encourages it for gas utilities - the state should require gas utilities to do IRP's and provide for financial incentives. These resource plans should include environmental externalities in the analysis to determine new supply sources. In addition, a "distributed utility " planning concept should be reviewed to encourage utility investments that minimize the cost and maximize the efficiency of both electrical generation and transmission and distribution. T & D costs generally represent about half of a major utility's total capital expenditure, and T & D systems are also responsible for substantial losses.

Although natural gas utilities are not required to complete integrated resource plans to evaluate long-term supply, distribution, and conservation options, the Cities should also encourage a move in this direction.

6. Provide Utilities with Financial Incentives to Implement all Energy Efficient Measures that are Cost-Effective

The Cities should press the Public Utilities Commission to reform utility regulations so that utility investment in cost-effective efficiency measures is just as cost-effective as investment in power or gas supply. This has been done in New England, California, Wisconsin and elsewhere, leading to much greater willingness to do effective DSM on part of the utilities. Specifically, the Cities should advocate that the PUC:

- review the effectiveness of current utility incentive programs to make sure that the incentive the utility receives bears a close relation to their actual program results

- decide on the adequacy of incentives to promote effective demand-side programs
- consider further regulatory changes to promote increased energy savings

7. Consider Incentive Ratemaking to Promote Energy Savings

Current ratemaking design presents barriers to effective and efficient levels of conservation. Given this, financial incentives for conservation programs may not be enough to encourage effective levels of conservation. The Cities should advocate that a new rate design should be considered by the PUC to eliminate the negative incentives and provide positive incentives for utility-sponsored energy conservation programs. A new policy should include a frequent adjustment mechanism such as decoupling or annual or biennial rate cases. Necessary components include:

- maintenance of the financial viability of the utility
- maintenance of rate stability for energy consumers with choices and fair and reasonable rates for others
- equitably shared risk between the utility and the customers
- treatment of demand-side management as just as important as supply-side resources (recovery of all DSM expenses with minimal lag time and an earned return on conservation-related DSM expenses)
- administrative feasibility

8. Participate in "Golden Carrot" Programs

Minnegasco and NSP (and all utilities in the state) should participate in all "Golden Carrot" programs that encourage development and commercialization of efficiency products.

9. Education

Improving utility regulation is difficult. This difficult job can be made easier if policy makers and the public share a common view of the overall goals for utility regulation. This can be achieved through an educational campaign which will help create awareness among policy makers, regulators and consumers of the link between energy production and use and environmental degradation. This campaign could be

conducted jointly by Minnesota utilities and state government and would promote energy efficiency as central to the mitigation of this damage. This education program will enhance regulatory measures designed to encourage utilities to invest in effective DSM programs by increasing consumer demand for efficiency.

SUPPLY STRATEGIES
CO₂ reduction goal: 0.708 MMT

Introduction

The OTA identifies three major near-term options for reducing CO₂ emissions in the energy supply sector³⁹:

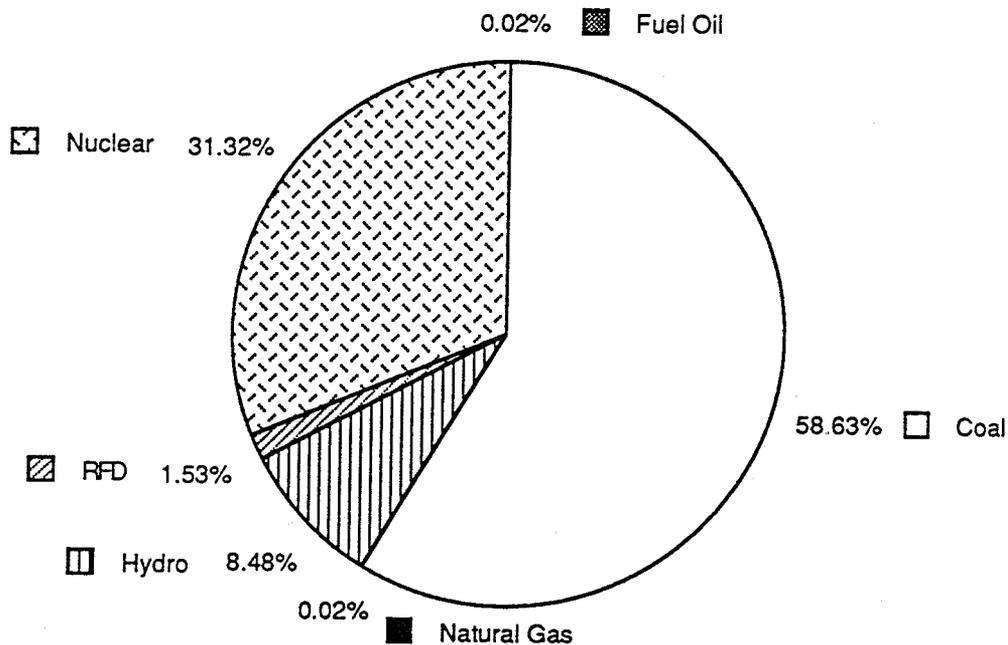
- switch from high-carbon energy sources (i.e., coal) to low-carbon sources (i.e., natural gas);
- switch from non-renewable fossil fuels to renewable fuels;
- convert fossil fuels to usable heat and electricity more efficiently (i.e., district systems and cogeneration)

Electricity makes up about 43 percent of MSP's nontransportation CO₂ emissions, Figure 8. Figure 9 shows the current mix of electricity supply for the MSP area. The CO₂ reductions below is just one scenario based on actions that can be realistically taken beyond what is occurring today and what is in the 2005 regional mix forecast.

³⁹ U.S. Congress, Office of Technology Assessment, Changing by Degrees: Steps to Reduce Greenhouse Gases OTA-482 (Washington, DC: U.S. Government Printing Office, February 1991).

Figure 9

Minneapolis - Saint Paul Area Electricity Fuel Mix in 1988



This figure illustrates NSP's fuel mix used in the production of electricity. Coal and nuclear sources dominate the mix.

Objective 1:

Substantially Expand the Use of Renewable and Low-Carbon Sources of Energy Production Through City/State/Utility/Business Partnerships

(0.367 MMT potential reduction)

Actions

1. **Expand wind power as an Energy Source in NSP's service area.**

NSP is currently planning to install 100 MW of wind in their service area by 1997, with the first 25 MW turning in 1994. If successful, the Cities should urge NSP to expand up to 500 MW in their service area by 2005.

NSP recently raised their initial commitment of only 10 MW of wind power to 100 MW. This is one example of the type of leadership Minneapolis and Saint Paul will need to reach their goal.

2. Encourage Research and Development of Biomass Energy Projects

The Cities should urge NSP to research and develop biomass energy projects. If it is determined to be feasible, NSP should install a 250 megawatt commercial biomass facility by 2000. Whole Tree Energy technology, which is close to commercialization readiness, would create many local jobs to grow, harvest and transport the fuel to the plant. These types of plants will have much lower total emission rates than current fossil fuel sources, and with sustainable tree growing their CO₂ emissions will be recycled back into the renewable fuel stock.

3. Target Natural Gas Substitutions for Coal and Oil

There are many possible applications for natural gas in place of oil and coal, including water heaters and home heating and cooling. Gas cooling may be particularly attractive -- especially if it uses ozone-friendly, non-greenhouse gas coolants -- because it can also cut peak electrical demand. Substitutions should be critically examined to make sure that they are cost-effective and have both environmental and societal benefits before being promoted.

The Cities should advocate that the natural gas utilities initiate substitution of natural gas for coal and oil applications that are cost-effective and that also have environmental and societal benefits⁴⁰.

40 The increase in natural gas use resulting from these substitutions should be kept track of separately from the reductions in use by current market applications resulting from conservation measures so that the natural gas sector is not "penalized" for fuel switching when calculating targeted goals or tracking progress toward those goals..

Objective 2:

Expand District Heating, Cooling and Cogeneration Systems in Minneapolis and Saint Paul

(0.340 MMT potential reduction)

Actions

1. Expand District Cooling Systems in Minneapolis and Saint Paul

Both Minneapolis and Saint Paul have extensive district heating systems, but district cooling systems cover only a small fraction of the downtown area. District heating systems offer great physical potential for cogeneration of heat and electricity. With the addition of district cooling, that potential becomes even greater. Customers benefit from district heating/cooling systems because the thermal extraction equipment is often times less expensive to install than heating/cooling units and requires less maintenance. The extraction equipment is quieter, cleaner, safer and smaller than existing furnaces and chillers. In addition, such a large generating source produces less pollutants than several smaller heating systems. A production ban on the worst ozone-depleting CFCs will take effect in 1995⁴¹. However, the most commonly discussed replacements still have some ozone-depleting potential and contribute to global warming. District cooling systems distribute chilled water, replacing air conditioners using chlorofluorocarbons (CFC's), decreasing electricity demand at peak times, and eliminating ground water cooling systems. The Cities should work with District Energy in Saint Paul and the Minneapolis Energy Center to expand their district cooling systems in an environmentally beneficial way.

41 The municipalities of Minneapolis and Saint Paul collaborated on the development of an ordinance which regulates the sale and distribution of certain products which contain CFC's, regulates the servicing equipment and appliances which contain CFC's, and controls the release of halons into the atmosphere. This effort prompted the State to add its own CFC ordinance modeled on the Cities' version.

2. Expand Cogeneration in the Minneapolis - Saint Paul Area

The typical electricity production efficiency is 35-50 percent. If the waste heat generated in the process can be used (as it is in cogeneration), the overall production efficiency of the heating system and generating electricity can be 70 percent or more. Since less total fuel is burned to obtain the same energy services, the output of pollutants reduces proportionately. Economic barriers, often stand in the way of larger scale cogeneration. The Cities should urge the MPUC to provide incentives to all parties to provide cogeneration.

District Energy in Saint Paul, the Minneapolis Energy Center, the University of Minnesota-Twin Cities, NSP's power plants, and NRG are good candidates for cogeneration. An initial minimum of 83 megawatts (MWe) of cogeneration should be installed in the Twin Cities by 2005.

SOLID WASTE REDUCTION AND RECYCLING CO₂ reduction goal: 0.270 MMT

Introduction

Source reduction, the first 'R' and often the last one considered, should be the first step in any solid waste management plan. Never having to produce the waste in the first place saves far more energy than recycling.

Recycling saves energy because making new products from secondary rather than virgin materials is generally more efficient. These energy savings are compared in three major areas: 1) energy needed to extract and transport secondary materials, 2) energy needed to manufacture products from virgin materials versus that needed when using secondary materials, and 3) energy needed to transport products from processing sites to markets. Using recycled materials in manufacturing processes can cut local air and water pollution. Recycling of petroleum-derived plastics also helps to conserve limited petroleum resources.

The 45 percent level for recycling (Objective 2) is consistent with the State Mandated Regional Recycling Goal which the State Legislature passed in 1991.

Objective 1:

Promote solid waste reduction as the first step in the Cities solid waste plan

1. Business/government partnerships

The Cities should reach agreements with local businesses to reduce packaging and other waste. Incentives and competitions could be used to promote this end. The Cities should advocate that the Office of Waste Management more aggressively pursue this objective.

Objective 2:

Increase solid waste recycling rates from 22 percent to 45 percent of the overall waste stream.

(0.270 MMT potential reduction)

Actions

1. Expand the percentage of currently recycled materials recovered as well as collecting new materials

Recover and market a significantly greater percentage of the materials currently collected, especially corrugated cardboard, plastics, and metals. In addition, the collection and marketing programs should be expanded to include City-wide collection of mixed paper and office paper.

2. Expand Recycling to Reduce Industrial and Commercial Energy Intensity

The Cities do not currently collect industrial and commercial recyclables, but can do much to encourage the expansion of such recycling programs. Market development should be emphasized and special consideration should be given to start-up business in this area. Possibilities include establishing a small grant/loan program to encourage small-scale recycling industries, establishing recycling market development zones to attract recycling operations to the Cities, and advocating that the state establish a cooperative marketing program to encourage cooperative marketing of locally collected recycled materials among municipalities in the state.

III. OVERCOMING BARRIERS

ADVOCACY OPTIONS

To achieve the CO₂ Reduction Plan's goals, the Cities must play a leadership role by advocating specific federal and state energy and environmental policies. Even though their direct effect on the adoption of such policies at the federal level may be small, their effect on the state could be large since they make up about a large proportion of the population. In addition, their example of taking a stand could have impact not only locally, but regionally and even nationally. Some of the main policies that the Cities should advocate include the following measures.

FEDERAL POLICIES

Actions

1. Support Energy Taxes

The Cities should advocate a tax system that ends subsidies of mature, conventional energy technologies and resources that pollute the environment, and begins to encourage energy efficiency and new and emerging resources such as renewables that supply cleaner energy. Taxes such as a gasoline tax would help accomplish this objective.

2. Higher Fuel Efficiency Standards for Vehicles

The Cities should advocate an increase in the federal auto and truck efficiency standards, known as Corporate Average Fuel Economy, from the present 27.5 miles per gallon (mpg) to 45 mpg by 2005. An equivalent increase in the light truck standard should also be advocated.

If raising the efficiency of vehicles were the only strategy relied upon to reduce energy use in transportation, then a 40 mpg national standard would be sufficient to achieve the 20% savings goal from 1988 levels only if the number of vehicles in the U.S. fleet remains unchanged (See figure 10)⁴². A 35 mpg standard would be sufficient to reduce vehicle CO₂ emissions by about 15.5 percent, with the additional amount to be reduced through transportation demand management. A CAFE standard of 45 mpg would reduce emissions by about 24 percent without a change in fleet size. This extra savings in the transportation sector could potentially offset some emissions in other sectors where savings may be harder to achieve. A revenue-neutral

42 These numbers assume 1) that the historic fleet growth and turnover rates will continue given economic conditions and/or market saturation effects; and 2) "real world fuel efficiency as suggested by historic data is actually 25% less than stated average.

system of gas guzzler fees and gas sipper rebates should be used to provide incentives for continued improvements in efficiency beyond minimum standards. This may be the most effective strategy available for reducing CO₂ emissions in the transportation sector, although it will not solve growing congestion problems as transportation demand management measures could, and should be used in conjunction with those resources. Achieving a new car fleet average fuel economy of 45 mpg by 2005 is technically and economically feasible⁴³.

3. Substantially Expand the Contribution of Renewable Energy and Efficiency Measures

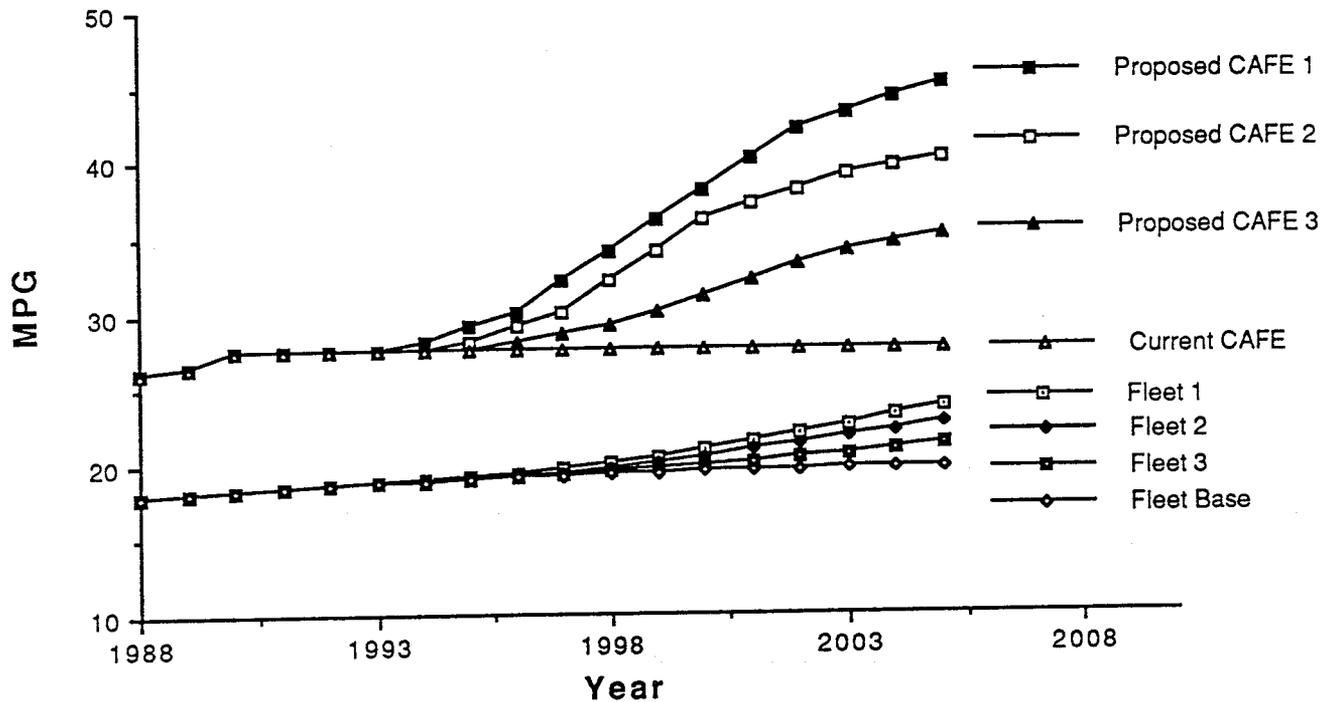
Federal investment in renewable energy and efficiency research is a key to the ongoing development and commercialization of emerging technologies. These measures should be promoted through a series of initiatives addressing access to capital, regulatory barriers, tax equity, information needs, and externalities.

The Cities should advocate a significant increase in investment in renewable energy research (from \$200 million to \$400 million per year) and for expanding energy efficiency research, development, and deployment programs by the Department of Energy. They should also advocate federal, state, and utility funds for projects to demonstrate advanced renewable energy technologies as a complement to more basic research and development.

The Cities should advocate periodic expansion and upgrading of appliance efficiency standards for such end uses as lighting, air conditioning, refrigerators, and furnaces, as well as greater federal support for market-driving processes like the "Golden Carrot" program for high-efficiency refrigerators, air conditioners, and other products.

⁴³ J. DeCicco and M. Ross, "An Updated Assessment of the near-term Potential for Improving Automotive Fuel Economy", Americans for an Energy Efficient Economy, 1993 (Forthcoming).

Figure 10
U.S. Auto Fleet Gas Mileage



This figure illustrates scenarios of the different effects resulting from varying fuel efficiency standards. The proposed CAFE current, 1, 2, and 3 represent a new car CAFE of 27.5, 45, 40, and 35 mpg by 2005. The fleet base, 1, 2, and 3 represent the actual fleet (old and new cars) average of 19.69, 23.65, 22.55, and 21.15 by 2005.

4. Tax-Free Rebates

The Cities should advocate that the rebates that utilities pay their customers should become 100 percent tax-free for commercial and industrial users. Rebates to residential consumers were made 100 percent tax-free in the Energy Policy Act of 1992⁴⁴.

This will make energy conservation measures more attractive as an investment.

44 U.S. Congress, Energy Policy Act of 1992, H.R. 776.

5. Set Stricter National Energy Efficiency Standards

The Cities should advocate tougher national energy efficiency standards for new buildings and products at the highest levels that are technically and economically feasible. In doing so, the federal government should consider full life cycle costs of different efficiency levels including environmental costs associated with energy production and use in their analyses.

STATE POLICIES

1. More Support for Transportation Demand Management

The Cities should advocate stronger state programs in the area of transportation demand management. There are many approaches that could help reduce carbon dioxide emissions, including the following measures.

The Cities should urge the State Legislature to direct new transportation expenditures to result in a safer and more environmentally responsible transportation system. The Cities should urge the State Legislature to:

- direct that no new funds shall be allocated to highway construction or new road projects or parking until alternative modes of transportation (i.e. Light Rail Transit (LRT), HOV lanes, bus right-of-ways) are investigated for that transportation corridor. Decisions should be made on the basis of least-total-cost (including environmental costs).
- amend the Minnesota State Constitution to allow the use of fuel and vehicle taxes for transportation alternatives and advocate for increased and dedicated revenues for transportation alternatives.

Minnesota's constitution limits the use of gasoline taxes and state vehicle registration fees to highway, road and bridge construction, maintenance, and repair. That restriction should be lifted if we are to obtain a least-cost transportation system. In addition, the Federal ISTEA Act requires matching state funds for projects - this money would be easier to qualify for with this change.

Under the Intermodal Surface Transportation Act of 1991, state and local governments are given more flexibility in determining transportation solutions, whether transit or highways, and the tools of enhanced planning and management systems to guide them in making the best choices. Highway funds are available for activities that enhance the environment, such as wetland banking, mitigation of damage to wildlife habitat, historic sites, activities that contribute to air quality standards, a wide range of bicycle and pedestrian projects, and highway beautification.

In Minnesota, transportation alternatives, such as mass transit and carpooling, lack stable, predictable funding. The State should follow the lead of the federal government in allowing more flexibility in determining transportation solutions.

2. Advocate for the passage of a Commuter Trip Reduction Ordinance

In 1992 the Regional Transit Board urged the State Legislature to require businesses with 100 employees or more to prepare trip reduction plans for their employees, if they are located in designated "congested corridors." The goal is to decrease the number of single occupancy vehicle trips made in congested areas. This should first be implemented as a voluntary program. Compliance to such an ordinance would be made easier by the expansion of the Downtown TMO.

The Cities should advocate for the passage of this RTB-sponsored Commuter Trip Reduction Ordinance in the next legislative session.

3. "State-of-the-Art" Efficiency Standards and Enforcement

Efficiency standards and building codes offer a way to ensure that new investments reflect the need to reduce CO₂ emissions. The cities should work with the state Department of Public Service to implement legislation for tougher efficiency and construction standards. Such measures should include ventilation standards for residential construction to match strong efficiency standards and stronger commercial lighting standards.

The Cities should push for the state to promulgate and enforce state-of-the-art efficiency and building standards. In addition, more emphasis should be placed on the training of builders and code officials in order to increase compliance and actual energy savings.

Rule-making on many standards, including lighting and new construction, is underway at the state Department of Public Service.

4. Promote Alternative Fuel Vehicle Purchases for State Fleet

The Cities should urge the use of alternative fueled vehicles in the state fleet.

State governments are being required under the National Energy Policy Act of 1992, to make 10 percent of light duty acquisitions in 1996 alternative fueled vehicles. This requirement increases to 75 percent by the model year 2000. Expenditures of approximately \$500 million are

authorized for use in state programs and joint venture funding of demonstration and R&D projects with local government and industry⁴⁵.

OTHER POLICIES

1. **Address CO₂ Reduction to Metropolitan and State Levels**

The Cities should urge Hennepin and Ramsey Counties, the Metropolitan Council and the state legislature to join in the carbon dioxide reduction effort and to adopt this target reduction of 20 percent of 1988 levels by 2005 in carbon dioxide emissions.

2. **University of Minnesota Steam Plant**

In 1988, the University of Minnesota made the decision to replace their old steam system, which provides heat for the Minneapolis and Saint Paul campuses, with a new or renovated system within 10 years. In April 1991, the University Board of Regents voted to accept a 25-year contract with Foster-Wheeler, which took over operation of the steam plants July, 1992.

The current fuel mix of the new facilities is currently expected to be 63 percent coal, 25 percent natural gas, 7 percent wood chips, and 5 percent oil. ARKLA (the company not chosen) would have burned mostly natural gas. The Foster-Wheeler system was chosen because it allows for fuel flexibility (the burning of many possible fuel sources) and would allow for response to new, or improved environmentally-friendlier fuel sources in the future.

Under the Foster-Wheeler proposal that the University chose (Plan A), 15 MW of cogeneration is available. Had the University chosen Plan B, the cogeneration potential would have been 37 MW. The University is currently undergoing an Environmental Impact Statement (EIS) which could modify specific parts of the contract. Input from the public will be solicited during this process.

The Cities should urge the University of Minnesota to build a facility which maximizes cogeneration and minimizes high carbon fuels to supply their energy needs and locates the facility off the riverbank.

PUBLIC PARTICIPATION AND EDUCATION

The Cities of Minneapolis and Saint Paul should develop, in cooperation with the Twin Cities CO₂ Reduction Implementation Board, an extensive public education

⁴⁵ Oppenheimer, Alissa. "Introductory Information on Alternative Motor Fuels"

campaign aimed at generating high levels of public participation in the reduction measures of this plan. This campaign should make use of and complement existing education campaigns being conducted by the utilities and other groups.

Public education about CO₂ reduction is vitally important to mobilize energy saving action and to increase acceptance of energy saving programs. Recycling programs show that people will voluntarily take actions to help the environment, if they know what to do and it is convenient for them. The Cities should work with neighborhood groups and civic organizations to initiate the following measures.

1. Promote programs to link energy use and environmental damage and energy costs

Behavior creates a wide range of energy consumption. For example, a 1987 study by CEUE showed that low-income, single family households range in electrical consumption from 66 to 1,582 kilowatt-hours (kWh) per month. The middle 50% of households consume between 261 kWh to 622 kWh per month. If the top 10% of all households cut their electrical consumption by 10%, the annual savings would total about 20,000 tons of CO₂.

2. Solicit Support for Utility Conservation Programs

The Cities should work with organizations to promote utility conservation programs. In addition, the Cities should urge the utilities to use their advertising campaigns to vigorously promote energy conservation and its benefits.

3. Promote Transportation Demand Management

The Cities should work through neighborhood groups (such as those participating in the Minneapolis Neighborhood Revitalization Program) to improve transit services and increase carpooling and bicycling. If residents understand the environmental benefits of transportation demand management, then significant actions to reduce vehicle trips may be taken.

4. Pursue Energy Efficient Neighborhood Programs

The cities should invite several neighborhood groups (such as those participating in the Minneapolis Neighborhood Revitalization Program) to become model energy efficient neighborhoods. Existing community energy programs could form partnerships with neighborhoods to achieve significant reductions, through lighting and appliance retrofits, district energy investments, water conservation, and mixed-use developments.

ENCOURAGE LONG-TERM PERSISTENCE

ESTABLISH A TWIN CITIES CO₂ REDUCTION IMPLEMENTATION BOARD

The Board will be created as an outgrowth of the existing Executive Steering Committee of the Minneapolis-Saint Paul CO₂ Reduction Project after the CO₂ Reduction Plan is adopted by the two City Council's by June, 1993. The Board will coordinate the activities of all the different sectors (government, utilities, industry, transportation, residential, and commercial) to facilitate implementation of the plan.

The Cities of Minneapolis and Saint Paul should create a Joint CO₂ Reduction Implementation Board to begin operation in June, 1993.

Members of the Board could include:

- Mayors of both cities
- One Council Member from each city
- Utilities
- Conservation providers
 - Center for Energy and the Urban Environment
 - Energy Resource Center
 - Saint Paul Neighborhood Energy Consortium
- Hennepin County Board of Commissioners
- Environmental Groups
- Other interested parties

Staff for the Board will initially be supplied by the two cities. The Board will be implemented in two phases.

PHASE ONE

The Board will:

- 1.1. **Be responsible for implementing the Urban CO₂ Reduction Strategies** relating to utility, residential, industrial, transportation, and commercial energy reduction and efficiency measures.
- 1.2. **Develop policies and advocate for State and Federal rules and regulations** necessary for effective energy efficiency and reduction.
- 1.3. **Facilitate the promotion of actions through public education programs** to show the link between energy use and environmental damage. The Board could use their influence to complement existing education campaigns and help focus community efforts on energy savings and environmental protection.
- 1.4. **Create a "Ten Percent Club" or "Green Business" Program** to encourage businesses to reduce energy use. Industries and businesses know best how to reduce their energy use. Minneapolis and Saint Paul's businesses have a strong community-orientation. The Mayors should ask them to reduce their energy use to assist the project⁴⁶.
- 1.5. **Organize energy innovation forums** for businesses, industries, and large institutions to help them exchange valuable energy saving information.
- 1.6. **Apply for tax-exempt status** as a 501 (c)(3) organization.

PHASE TWO

After receiving tax-exempt, non-profit status, the Board will also:

46 The Mayor of Minneapolis challenged the Minneapolis business community to join a "Ten Percent Club" of community agencies, including the City, who between April 1991 and Earth Day 1994 pledge to improve their overall environmental performance by at least 10%. This could come in the form of increases in energy efficiency, reductions in hazardous waste production, cutbacks in solid waste production, or any number of other possibilities. The "Ten Percent Award" is to be presented by the Mayor of Minneapolis on Earth Day 1993 and every Earth Day thereafter to businesses and institutions that are most successful in meeting the goal and the spirit of the Ten Percent Club in their day-to-day operations.

1.7. Apply for funding. Possible sources include:

- The McKnight Foundation
- Utility Foundations
- Businesses
- Other sources

1.8. Provide gap financing to complement and enhance ongoing conservation strategies.

This would include programs for neighborhood organizations, schools, community energy agencies, and nonprofit organizations to implement effective CO₂ reduction actions. The Energy Board could provide smaller groups with the clout to get public and private funds.

