

CITY OF FORT COLLINS
LOCAL ACTION PLAN TO REDUCE
GREENHOUSE GAS EMISSIONS



November 1999

Prepared by

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LIST OF ACRONYMS

AC	air conditioning	LEED	Leadership in Energy Efficiency and Design
BTU	British thermal unit	LPG	liquid propane gas
C	degrees Celsius	MSW	Municipal Solid Waste
CF	compact fluorescent bulb	NAECA	National Appliance Energy Conservation Act
CCF	100 cubic feet	NG	natural gas
CFC	chlorofluorocarbons	NLC	National League of Cities
CML	Colorado Municipal League	NSR	New Source Review (part of the City's Development Review process)
CO ₂	carbon dioxide		
CO ₂ e	carbon dioxide equivalent (methane is converted to CO ₂ e)	P2	Pollution Prevention
CCP	Cities for Climate Protection	PRPA	Platte River Power Authority
CNG	compressed natural gas	PSCo	Public Service Company
CSU	Colorado State University	PSD	Poudre School District
DOE	U.S. Department of Energy	PV	photovoltaic
EkWh	equivalent kWh (nat. gas + elec)	RFP	request for proposal
F	degrees Fahrenheit	STAPPA	State and Territorial Air Pollution Program Administrators
FTE	Full time employee	ALAPCO	Association of Local Air Pollution Control Officials
GHG	greenhouse gases	TAFS	Transportation Alternatives Feasibility Study
HBA	Home Builder's Association	TDM	Transportation Demand Management
HVAC	heating ventilation air conditioning system	ULEV	ultra low emission vehicles
IAC	Industrial Assessment Center	VMT	vehicle miles traveled
ICLEI	International Council for Local Environmental Initiatives	W	Watt
KWh	kilowatt hour	ZEV	zero emission vehicles
LAW	Land and Water Fund	ZILCH	Zero Interest Loans for Conservation Help
LED	light emitting diode		

The Challenge

Even achieving a 30% reduction below 2010 levels will be challenging, much less a larger reduction target. It will take each new and existing measure to reach it. It will take the commitment of the City government to provide adequate funding to implement the actions outlined here. It will take the commitment of businesses, small and large, to pay attention to energy consumption and waste generation, and strive to reduce it. It will take the commitment of each individual citizen to make the choices to drive less, conserve energy, produce less garbage, and recycle more. No one entity has the responsibility or the ability to do it alone. Together, if we embrace the actions laid out in this plan, we can achieve our greenhouse gas reduction goal and realize the multiple additional benefits of improved air quality, reduced energy consumption and associated cost savings.

Table D. Greenhouse Gas Reduction Potential of all Measures

TYPE OF MEASURES	Greenhouse Gas Reductions Tons CO ₂ reduced in 2010	Cumulative Greenhouse Gas Reductions Tons CO ₂ reduced in 2010	2010 Emissions Rate Tons CO ₂ in 2010	Cumulative Percent Reduction from 2010 predicted emissions levels
In the Absence of Actions	0	0	3,523,000	0 %
EXISTING	603,000	603,000	2,920,000	17 %
PENDING	373,000	976,000	2,547,000	28 %
NEW	135,000	1,112,000	2,411,000	32 %

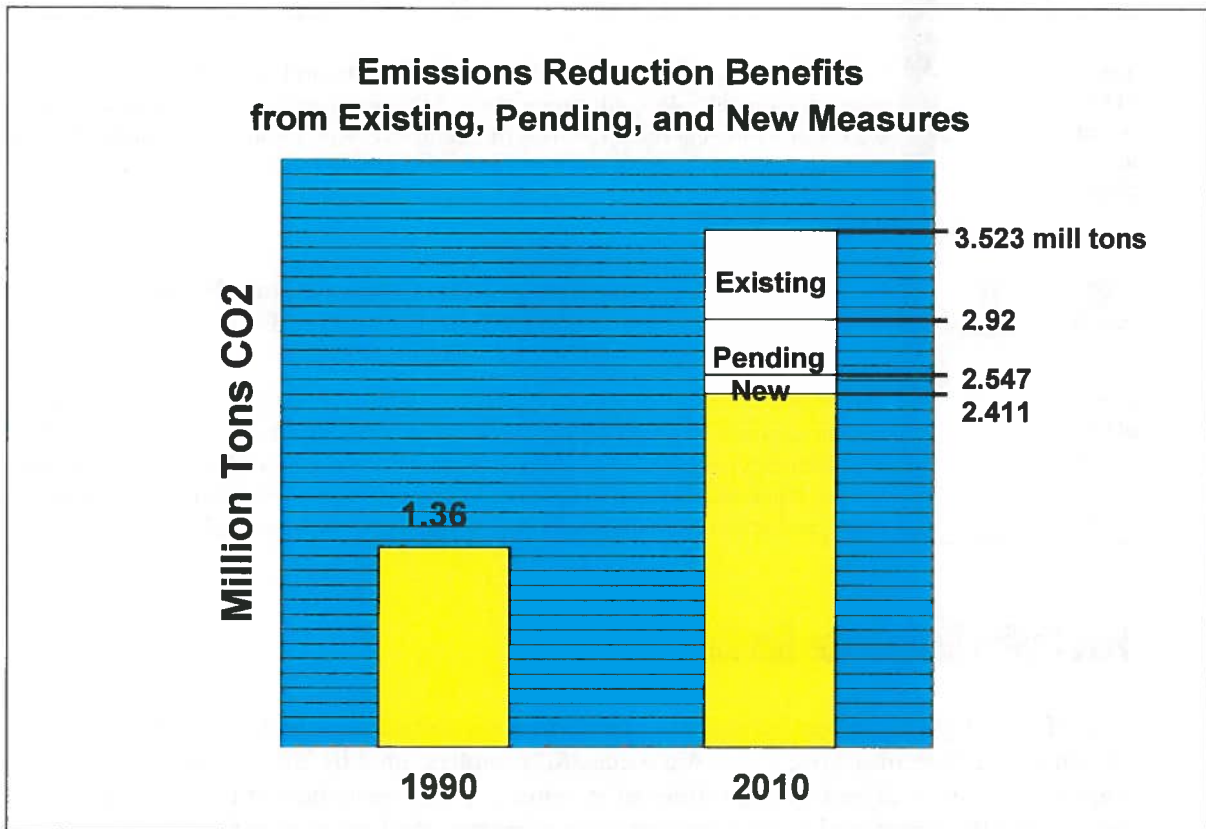


Figure B. Emissions Reduction Benefits from Existing, Pending, and New Measure

PENDING MEASURES (Continued)

7 Staff	4 Citizen	Larimer County Landfill Gas-to-Energy Project <i>NATURAL RESOURCES</i>
Tons of CO ₂ Saved in 2010	84,308	The Larimer County landfill has initiated a process of sampling and evaluation to determine whether a gas collection system will be required. If installation is required, it would be useful to evaluate the cost effectiveness of installing a system that creates energy (gas to energy), rather than simply flaring off the piped methane. This measure recommends that the City work with the County to locate funding assistance for the installation of a gas-to-energy system for the landfill.
6 Staff	3 Citizen	Expand Larimer County Recycling Center <i>NATURAL RESOURCES</i>
Tons of CO ₂ Saved in 2010	18,834	This initiative calls for the expansion of the Larimer County Recycling Facility. The expansion would also allow Larimer County to consider adding new streams of material at the processing plant and more opportunities for citizens to recycle. Since the City requires trash haulers to charge by volume (pay-as-you-throw rates), the expansion could help reduce residential trash bills as well.
1 Staff	7 Citizen	Expand Central Recycling Drop-off Site or Add Second Site <i>NATURAL RESOURCES</i>
Tons of CO ₂ Saved in 2010	1,095	A new, expanded drop-off site is proposed that would increase the range of the materials that are currently collected through Fort Collins drop-off programs, and also to serve as a recycling education center.
4 Staff	9 Citizen	Increased Voluntary Energy Efficiency Training for Builders <i>BUILDING AND ZONING</i>
Tons of CO ₂ Saved in 2010		Increased training opportunities on energy efficiency construction would help local homebuilders implement existing City energy codes for residential and commercial construction. The City's Building and Zoning Department would be interested in offering more training opportunities to builders.
8 Staff	5 Citizen	Develop a Residential Green Building Program <i>BUILDING AND ZONING</i>
Tons of CO ₂ Saved in 2010	1,665	standards Under this new measure, the City would establish a program for builders to integrate environmental features into the design and construction of new residential buildings. The measure would establish a "green" certification program for new residential buildings, allowing builders to chose from a list of Green design, as well as an education and outreach effort to stimulate the market for "green" homes.

NEW MEASURES (Continued)		
11 Staff	6 Citizen	Lobby for Mandatory Renewables in Deregulation (or Comparable Energy Conservation Measures) <i>UTILITIES</i>
Tons of CO ₂ Saved in 2010	71,561	Production of energy from renewable sources such as wind, solar, or hydropower does not produce CO ₂ in the course of generating electrical power. In the near future, utility companies will become deregulated and the market will open up to power producers in the private sector. By requiring utilities to provide a certain percentage of power from renewable resources, CO ₂ reductions can be obtained. The Fort Collins Utility has the mandate to provide low-cost, reliable power to the citizens of Fort Collins. Arguments have been made that energy conservation is a more cost-effective way to reduce the environmental impacts of electric power generation than is the use of renewable energy. This debate should actively be carried out by City elected officials, with input from citizens and City staff. If a decision was made to support a renewable portfolio standard, changes could be adopted in the City's 2000 Legislative Policy Agenda to designate a lobbyist, with the responsibility to identify relevant bills and actions at the state and national legislature and to draft the City's responses.
9 Staff	9 Citizen	Increase tree-plantings citywide so restocking equals mortality/removal <i>FORESTRY</i>
Tons of CO ₂ Saved in 2010	125	Recent calculations by the City Forestry Department suggest the number of tree plantings needed to maintain current stocking and storage levels are estimated to be 16,500 and that about 12,800 trees were planted citywide in 1998. Therefore, the number of additional tree-plantings needed to maintain current storage levels is about 3,600. Recommendations to support more planting citywide include offering matching funds for tree-planting grants, conducting an education campaign, conducting a study to identify appropriate species for planting and optimal planting locations and to identify percent cover by trees, citywide.
10 Staff	11 Citizen	Distribute Bids and Proposals Electronically <i>PURCHASING</i>
Tons of CO ₂ Saved in 2010	3	The Purchasing Department is required by ordinance to maintain a list of all vendors requesting to be placed on the City bid list. This process involves receiving vendor applications from contractors and then mailing either notices or the entire bid and proposal packages to these vendors. A change in ordinance would place the burden on the vendors to look at an electronic means of receiving information and copies of City bids and proposals electronically or by fax. It would allow Purchasing to save significant money through reduced printing and mailing costs.
12 Staff	12 Citizen	Increase Mortality Age of Trees on City-owned Property <i>FORESTRY</i>
Tons of CO ₂ Saved in 2010	???	The City's Forestry and Horticulture Program has responsibility for the care, maintenance, and perpetuation of all City property trees. Recommended actions to increase the age of trees include expansion of funding of urban tree maintenance, and focusing on planting in open planting sites.

New Measures

1 Staff	1 Citizen	Replace Incandescent Traffic Signals with Light Emitting Diodes <i>TRANSPORTATION SERVICES</i>
Tons of CO ₂ Saved in 2010	3,137	The conversion of traffic signals' red light bulbs from incandescent lamps to LED's is a growing practice across the nation. Red LED's consume less energy, have a longer life, and require less maintenance. Generally, LED's pay for themselves in three to four years, and have a seven to ten year lifetime.
3 Staff	2 Citizen	Increasing Utility Commitment to Wind Energy through Green Pricing Programs <i>UTILITIES</i>
Tons of CO ₂ Saved in 2010	10,256	Continue to expand the City's wind program. It is assumed that voluntary support and legislative standards will enable the project to grow by an average of one additional turbine every other year beginning in 2002. If implemented at this rate, a total of five more turbines would be installed between 2002 and 2010.
2 Staff	5 Citizen	Conduct Climate Change Education and Outreach <i>CROSS-DEPARTMENTAL</i>
Tons of CO ₂ Saved in 2010	40,829	The City of Fort Collins has stressed the importance of public education and outreach in all of its activities. An extremely important component of the Cities for Climate Protection Campaign is to get the "messages" out to the citizens of the community. A central education coordinator could be established and housed either within the City Manager's Office or the Natural Resources Department. This person would coordinate climate change outreach activities, and assist with outreach as requested by individual departments, as well as act as lead for assisting applicants to the Development Review process to use P2.
4 Staff	4 Citizen	Optimization of City's WasteWater Treatment System <i>UTILITIES</i>
Tons of CO ₂ Saved in 2010	961	By upgrading to high efficiency motors and pumps, the Fort Collins water reclamation and water treatment plants would reduce electrical load. This reduction in electrical energy translates into CO ₂ savings from reduced coal consumption by power suppliers.

EXISTING MEASURES (Continued)

		10% Reduction of Municipal Solid Waste in 2010 <i>FLEET SERVICES</i>
Tons of CO ₂ Saved In 2010	139	In 1997, the City of Fort Collins joined WasteWi\$e, a U.S. Department of Energy program designed to assist local governments in reducing the municipal waste generation. The City established goals for itself in the areas of waste prevention and reduction, recycling, and buying recycled products. If the City were to reduce its municipal waste stream 10% by 2010, 139 tons of Co2 would be eliminated in 2010.
		Natural Areas Shrub Plantings <i>FLEET SERVICES</i>
Tons of CO ₂ Saved In 2010	58	Since 1991, the Natural Resources Department has planted an estimated 28,500 native shrubs and 525 native trees on City-owned natural areas. Much of this vegetation was planted in an effort to restore the area's native vegetation. Recently, many of the shrub planting have been intended to create barriers to discourage the movement of prairie dogs onto private property. It has been roughly estimated that this vegetation can sequester (store) between 15 and 100 tons of CO2 in 2010.
		City Government Converting to Variable Frequency Drives <i>FACILITY SERVICES</i>
Tons of CO ₂ Saved In 2010	48	The City recognizes the benefit of replacing variable frequency drives with more energy efficient models once they burn out. Since 1990, variable frequency drives have been upgraded at Police Services, the public library, and at Mulberry Pool, for a total annual energy savings of 42,526 kWh. These completed projects will result in a CO2 reduction of 48 tons in 2010.
		Consider Accelerated TDM Program; Disincentives for Driving <i>TRANSPORTATION SERVICES</i>
Tons of CO ₂ Saved In 2010	Unknown	<p>The <i>Transportation Demand Management Program</i> adopted by the North Front Range Transportation and Air Quality Planning Council in April 1996 outlines five levels, or "strategy packages", for consideration in to achieve regional modal shift goals.</p> <ul style="list-style-type: none"> I. Voluntary programs and transit improvements II. Developer requirements and subsidy program III. Regional parking pricing and High Occupancy Vehicle (HOV) study IV. Mandatory Program and Distance-based Fee V. Comprehensive program <p>Levels I and II are largely being implemented now. This measure recommends accelerated evaluation and implementation of TDM measures outlined above.</p>

EXISTING MEASURES (Continued)

		Colorado State University Energy Conservation Upgrades <i>COMMUNITY</i>
Tons of CO ₂ Saved In 2010	12,524	According to CSU's 1997 Utility and Energy Management Report, 29,819 tons of CO ₂ were reduced in the 1996-1997 school year. CSU staff have indicated that approximately 42% of those projects were implemented after 1990, and thus credit could be taken as part of the Cities for Climate Protection project.
		Colorado State University's Industrial Assessment Center <i>COMMUNITY</i>
Tons of CO ₂ Saved In 2010	4,429	Since inception, the IAC has performed assessments at 25 Fort Collins businesses. The savings calculated here represent savings from the approximately 140 projects implemented in Fort Collins since 1990. These projects include recommendations made for several of the major energy consumers in Fort Collins.
		Wind Pilot Power Program <i>FORT COLLINS UTILITIES</i>
Tons of CO ₂ Saved In 2010	4,103	In 1997, the Fort Collins Utilities offered customers the opportunity to subscribe to wind power for an additional \$0.02/kWh, or an estimated average increase of \$12/month on utility bills. Through the initial subscription program, over 600 residential customers and 13 commercial customers signed up to buy all their electricity power from wind, and two 600 kW and one 65 kW turbines were installed at the Medicine Bow, Wyoming farm.
		Wind Power Program – Phase II <i>FORT COLLINS UTILITIES</i>
Tons of CO ₂ Saved In 2010	5,128	In 1999, the Fort Collins Utility committed to adding 2.5 more turbines to the existing two turbines at the Platte River Medicine Bow site, making Fort Collins Utility the Colorado leader in per capita wind energy investment. New Belgium Brewing Company has set a leadership example of employee-based decision-making by committing to purchase wind-power from one of the new turbines. Fort Collins Utilities will work with other local employers to propose a wind power donation program modeled on United Way's charitable donations system. Employees could elect to subsidize green power, demonstrating a shared commitment between employer and employee to support renewable energy.
		Promote Telecommuting <i>TRANSPORTATION SERVICES</i>
Tons of CO ₂ Saved In 2010	3,076	The City's "Employee Trip Coordinator Network" has already established a good avenue for encouraging employees at large businesses to telecommute. The Mobility Report Card indicates that the average employee drives 42 miles per day. Assuming that in 2010, 5% of all citizens telecommuted twice a month, 3,076 tons of CO ₂ would be saved in 2010. Leading by example, the City has just established its own Teleworking Policy.

Existing Measures

Vehicle Miles Traveled (VMT) Goal: VMT Growth Rate Not to Outpace Population Growth Rate *TRANSPORTATION SERVICES*

Tons of CO ₂ Saved In 2010	337,676	Both the Fort Collins Master Transportation Plan and the Transportation Demand Management Plan contain the Council-approved goal of keeping the Vehicle Miles Traveled (VMT) growth rate from exceeding local population growth rate. However, the 1998 Mobility Report Card indicates that Fort Collins' VMT is rising at a rate of about 8% per year, more than double the approximate 3.5% per year population growth rate. Assuming that population grows at the historic rate of 2.2% per year, the Transportation Department estimates that it is still possible to achieve this goal by the year 2010 if successful VMT reduction strategies are implemented. Implementing priority programs in the Bicycle and the Pedestrian Plans as well as construction of the Mason Street Transportation corridor will aid in achieving this goal.
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Business Recycling *COMMUNITY-WIDE*

Tons of CO ₂ Saved In 2010	41,735	In 1999, the Natural Resources Department conducted a study to identify the full extent of waste diversion taking place throughout Fort Collins. Seventeen businesses and materials processors engaged in recycling activities that diverted over 20,000 tons of material from landfill, representing about 60% of all Fort Collins' material recycled in 1998. Applying the 1998 per capita business' recycling rate to the predicted 2010 population, business recycling activities would reduce 41,735 tons of CO ₂ e in 2010.
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1997 City Energy Code (Existing Model Energy Code) *BUILDING AND ZONING*

Tons of CO ₂ Saved in 2010	10,379 ('97-'99) 30,057 - future construct. to 2010	In 1997, the City of Fort Collins enacted a more progressive version of the Model Energy Codes for both residential and commercial/industrial new construction, which asks builders to consciously consider energy saving alternatives throughout construction. Code revisions were developed with much public input, especially from residential home builders. To calculate the effectiveness of, It was assumed that the 1997 Model Energy Code reduces 2ekWh per square foot per year of energy use.
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Residential Curbside Recycling *NATRUAL RESOURCES*

Tons of CO ₂ Saved In 2010	39,732	The City influences solid waste management by requiring haulers to 1) apply variable trash rates, and 2) provide recycling at no extra charge for residential customers. Since these ordinances were passed, haulers have reported an increase in residential curbside recycling from 53% to 86% participation, as well as a slight decrease in trash volumes. Applying the 1998 per capita curbside recycling rate to the predicted 2010 population of 143,450, it is estimated that the curbside program would be responsible for reducing 39,732 tons of CO ₂ e in 2010.
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Table A. Existing Quantified Measures

EXISTING MEASURES	Tons CO₂ reduced in 2010
VMT Goal: not exceed pop. growth rates	337,676
Business Recycling (apply '98 per capita rate to 2010 pop)	41,735
1997 City Energy Code (existing and projected benefits)	40,436
Curbside Recycling (apply '98 per capita rate to 2010 pop)	39,732
Climate Wise for businesses	38,390
Methane Flaring & Heat Recovery at City's water reclamation plant	35,607
Sequestration of CO ₂ by all trees in Fort Collins	21,071
FC Electricity Distribution System Improvements	15,189
CSU Utility System (Energy Conservation Programs) - Benefit from existing programs	12,524
CSU's Industrial Assessment Center (savings in 2010 from existing projects)	4,429
Wind Power Pilot Program	4,013
Wind Phase II (2.5 more turbines)	5,128
Promote Telecommuting	3,076
Poudre School District Energy Conservation Programs (Existing and projected benefits)	2,552
ZILCH w/ Energy Score (Existing and projected benefits)	652
ZILCH - without Energy Score (Existing and projected benefits)	291
Lighting Upgrades - City Buildings: 1990-1998	257
Propane City Fleet vehicles (assume 1998 use rates)	139
10% Reduction of Municipal Solid Waste in 2010	121
Natural Areas Shrub Plantings	58
Converting to Variable Frequency Drives (City gov. actions through 1998)	48
Consider Accelerated TDM Program; Disincentives for Driving	Unknown
ULEV and ZEV Vehicles for City Fleet; Including Electric Vehicles	Unknown
Clean Cities Program	Unknown
Pollution Prevention (P2) to Promote Energy Efficiency in the Commercial Sector	Unknown
Municipal Pilot of Environmentally Preferable Products	Unknown
"Green Building" for the New City Office Building	Unknown
EXISTING MEASURES TOTAL	603,124

By joining the campaign, the City of Fort Collins committed to:

- conducting a greenhouse gas emissions analysis for 1990 and a forecast for 2010,
- setting a greenhouse gas reduction target, and
- developing a plan to meet the target.

Fort Collins Greenhouse Gas Emissions Analysis

A greenhouse gas emissions inventory was conducted for the baseline year of 1990. This inventory includes only carbon dioxide, generated by combustion of fossil fuel, and methane from landfill waste decay. The inventory covers residential, commercial, and industrial and transportation sector emissions of CO₂, and Fort Collins' portion of landfill gas generation. In 1990, Fort Collins was responsible for approximately 1,360,000 tons of CO₂, or 15.5 tons per person. By 2010, in the absence of actions to reduce emissions, our emissions are predicted to increase 159% to 3,523,000 tons, or 24.56 tons per person.

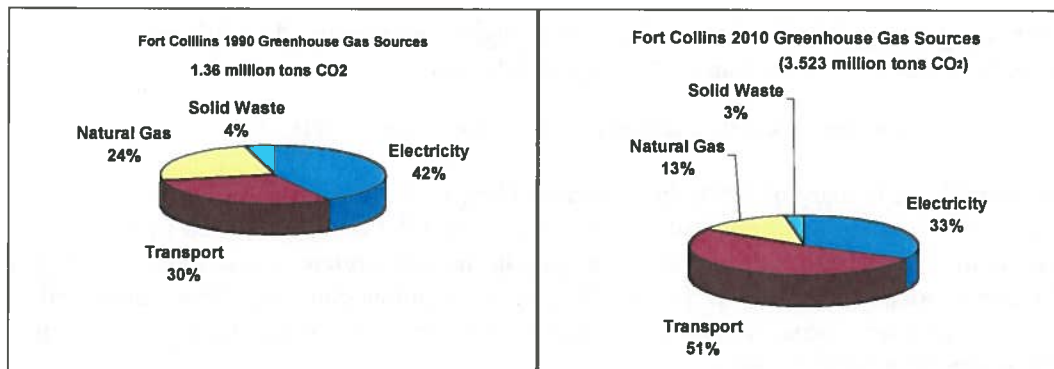


Figure A. Fort Collins Greenhouse Gas Emissions Estimates for 1990 and 2010

Role of Project

The role of this project is not to debate the issue of global warming. In recent years, the scientific community has reached a nearly unanimous consensus that global warming is occurring and the potential consequences could be severe. The role of this plan is to identify local actions we can take to reduce greenhouse gas emissions caused by human activity in and around Fort Collins.

Despite the fact that Fort Collins greenhouse gas emissions only account for approximately 0.037% of the U.S. 1990 greenhouse gas emissions and a much smaller fraction of global emissions, it is incumbent upon any responsible City to consider efforts to reduce the emissions we are responsible for.

INTRODUCTION

Consensus Grows . . . Climate Change is Real

The Earth's climate is changing. The United Nations Intergovernmental Panel on Climate Change (IPCC), a group of over 2000 leading scientists and technical experts from 130 countries around the world have said,

"We are certain of the following. . . Emissions resulting from human activities are substantially increasing the atmospheric concentrations of greenhouse gases: CO₂, methane, CFC's, and nitrous oxide. These increases will enhance the greenhouse effect, resulting on average in an additional warming of the Earth's surface." -- IPCC, 1990.

This change is likely to have negative impacts on both the local and global environment with consequences for human health. A 1990 U.S. EPA Science Advisory Board report identifies global climate change as one of the highest environmental risks, higher even than toxics and pesticides.

More recently, in January of 1999, the American Geophysical Union (AGU), one of our nation's leading science professional societies, reaffirmed the findings of their previous assessments—that greenhouse gases are increasing in the atmosphere, impacts could be highly disruptive to society, and there is a compelling basis for public concern. More importantly, the AGU report warns that scientific uncertainty over the details of climate change does not justify inaction by policy makers.

Many large U.S. companies now acknowledge the very real threat of global warming and argue that some kind of early response is appropriate. American Electric Power Company's Vice President for Environmental Affairs says, "It is no longer possible to say there is not a problem." Consequently they are working with the Nature Conservancy to conserve 5 million forested acres in Bolivia because trees are so effective at scrubbing CO₂ from the air. Both British Petroleum and Royal Dutch Shell plan to reduce their greenhouse gas emissions 10% below 1990 levels within the next decade. Dupont intends to reduce emissions 40% domestically and 50% globally from 1990 by 2000. Mobile Corporation also feels climate change abatement activities are justified.

"People should not confuse our opposition to the Kyoto Protocol with a lack of willingness to take action. I've said the concern about climate change is legitimate. . . . Responsible companies should take actions which, within the framework of good economic sense, reduce greenhouse emissions."

-- Mobil Corporation's Chairman and Chief Executive Officer Lou Noto, October 1998.

"Climate science is provisional and perhaps always will be. . . . There are large areas of uncertainty – about cause and effect and about the consequences. But it would be unwise and potentially dangerous to ignore mounting concern. That's why I've argued consistently . . . that we need to take precautionary action now."

--John Brown, CEO
British Petroleum
Corporation

**Our City Taking
Responsibility**

kind of reduction target the City should implement and our community would embrace. Throughout the rest of this document, we will explain the process used to develop recommendations, and provide details on recommended actions.

Plan Development

Two committees were formed to review the energy audit and forecast and to oversee the development of the greenhouse gas reduction plan. An interdepartmental staff team with representatives from ten City departments was formed, along with a Citizen Advisory Committee having representatives from Council Boards, local businesses, an environmental group, and technical experts.

After completing efforts to identify and quantify the greenhouse gas reduction benefit of existing actions, the Staff Technical Team and Citizen Advisory Committee developed a list of potential new actions to reduce greenhouse gases. A variety of approaches were used to develop a list of measures for consideration, including brain-storming, talking with various professionals and experts, discussion with Council advisory boards, and soliciting public input through open houses and the Internet.

Appendix C lists the range of measures that were initially identified for consideration. Information was compiled, to the extent possible, on the costs and impacts of the measures under consideration. Based on available information about the technical, economic, and political/social aspects of the measures, a final list of measures was developed that was considered acceptable to the Staff Team and Citizen Committee. These recommended measures are identified as “New” or “Pending” and are discussed in more detail later in this document.

The Greenhouse Effect

The earth’s temperature is determined by the level of greenhouse gases in the atmosphere. As sunlight passes through our atmosphere, the incoming solar radiation is re-radiated from the earth’s surface as heat energy. Greenhouse gases like carbon dioxide, methane, nitrous oxide, chlorofluorocarbons, and water vapor trap some of this reradiated energy. This trapped heat energy

Fort Collins Citizen Advisory Committee Mission Statement:

“To identify and recommend cost-effective, environmentally beneficial measures to reduce Fort Collins’ greenhouse gas emissions.”

warms the earth, much as the glass of a greenhouse traps reradiated energy from sunlight and thereby warms the interior of the structure, as illustrated in Figure 1. The temperature at the Earth’s surface is about 60° F warmer than it would be without

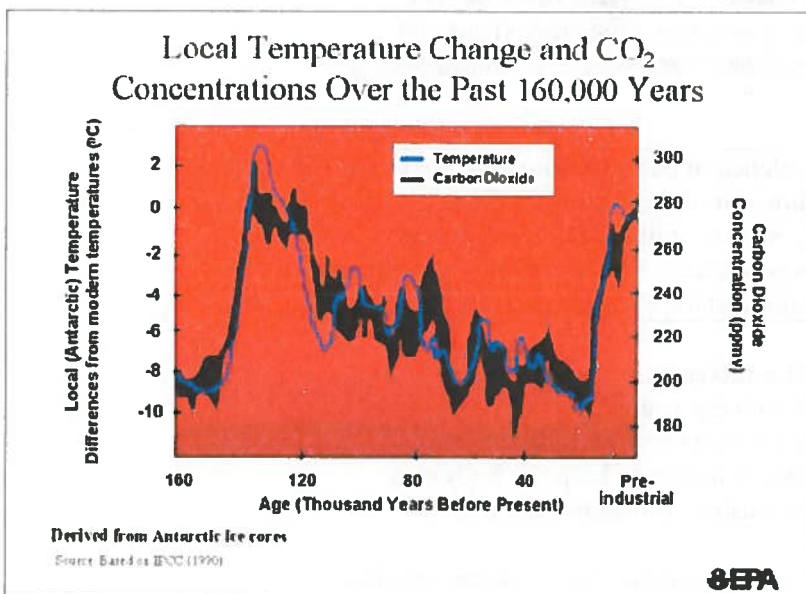
I'm Only Human

By participating in the Cities for Climate Protection Campaign, we are accepting the reality that **WE**, humans, are the major greenhouse gas contributor—especially of carbon dioxide, CO₂. Since the industrial revolution in the middle 19th century, greenhouse gas concentrations have risen to levels higher than any yet seen while humans have existed on this planet.

The atmospheric CO₂ concentration has increased from 280 ppm to over 360 since 1860. If emissions continue at current levels, concentrations are projected to rise above 700 parts per million by the year 2100, a level not experienced on Earth since about 50 million years ago. It is anticipated that if the CO₂ concentrations increase to this level, then the global average temperature will rise between 1.8 and 6.3° F by the year 2100 (Kattenberg et al. 1996/EPA Website).

For perspective, this projected climate change is of the same magnitude (but in the opposite direction) as the last ice age when continental ice caps penetrated well into Europe and North America... The difference is that the global warming may occur over the next few decades, whereas the ice-age changes occurred over thousands of years!

(On Global Climate Change Policy, Adopted by the American Meteorological Society Council on September 27, 1990)



F

Por Que? Warum? Why? Proè? Hvorfor? Paham?

Why Worry? Why bother? The nations of the world have scrutinized these question: “Why should we worry about global warming?” Skeptics ask: “What if we do nothing?” “Are we sure anything will happen?” “What difference can a small city make on such a large, global issue? Let’s take a look at doing nothing, or...THE NULL ALTERNATIVE.

INTRODUCTION

cause a significant northern shift in Western equine encephalitis outbreaks.

**mental Panel on
Climate Change and
results from the
United Kingdom
Hadley Centre's
climate model and
winter.**

AGRICULTURE

The success or failure of a harvest has always depended on climate, with the most important factor being a sufficiently moist soil during the growing season. Some climatologists suggest that such conditions could become more widespread due to the drier soils that may accompany changing climate. Increased heat stress, more frequent flooding, and salinization of soils due to sea level rise could also threaten agriculture in some areas.

- Half of Colorado's crop acreage (corn, wheat, hay) is irrigated. Climate change could reduce yields 8-33%. Hay and pasture yields could fall by 6% or rise by 13% depending on whether irrigation is used, leading to changes in acres farmed and production. For example, yields could fall while production rises because of an increase in acres farmed.

WATER RESOURCES

Changing climates are expected to increase both evaporation and precipitation in most areas of the United States. In those areas where evaporation increases more than precipitation, soil will become drier, lake levels will drop, and rivers will carry less water.

- A warmer climate would lead to earlier spring snowmelt. Because most of Colorado's reservoirs are small in relation to total mountain water runoff, an earlier snowmelt could reduce the reliability of many water supplies within the state by limiting the amount stored for use in summer.
- Decreased river flows and higher temperatures could harm the water quality of the nation's rivers, bays, and lakes. In areas where river flows decrease, pollution concentrations will rise because there will be less water to dilute the pollutants.

FORESTS

Global warming could shift the ideal range for many North American forest species by about 300 km (200 mi.) to the north. If the climate changes slowly enough, warmer temperatures may enable the trees to colonize north into areas that are currently too cold, at about the same rate as southern areas became too hot and dry for the species to survive. If the earth warms 2°C (3.6°F) in 100 years, however, the species would have to migrate about 2 miles every year.



- The extent of forested area in Colorado could change little or decline by as much as 15-30%. If conditions become drier, the current range and density of forests could be reduced and

“By 2100, temperatures in Colorado could increase by 3-4°F in the spring and fall and 5-6°F in summer ...based on projections made by the Intergovern-

INTRODUCTION

treaty committed to cut emissions of their greenhouse gases an average of five percent below 1990 levels beginning in 2008. The U.S. became the 60th and last industrial nation to sign the treaty, agreeing to a seven (7%) percent reduction in greenhouse gas emissions below 1990 levels between 2008 and 2012.

The two-week negotiations resulted in an action plan that was approved by 160 countries. The plan established a 2000 deadline for the development of specific strategies to implement the Kyoto Protocol, including provisions for the international trading of emissions credits as well as mechanisms to monitor compliance and assess penalties. The plan also includes the creation of a Clean Development Mechanism that will enable wealthier nations to fund emissions reduction projects in developing countries.

Before signing the Protocol, the United States required that certain objectives be met. These objectives included:

1) Realistic Targets and Timetables

The United States was committed to achieving realistic targets and timetable among developed countries that would represent a credible step in slowing the accumulation of greenhouse gases in the atmosphere, yet be measured enough to ensure continuous economic prosperity.

2) Flexibility and Market Mechanisms

The United States insisted that the Protocol include flexible, market-based provisions designed to permit our environmental objectives to be accomplished at least cost.

These same concepts of setting a realistic target and incorporating flexibility and market mechanisms were embraced when developing Fort Collins' greenhouse gas reduction plan.

The Benefits of Reducing Greenhouse Gases

There are many benefits of reducing greenhouse gases that go beyond simply doing our part to stem the tide of climate change. Many actions outlined in this plan have significant local environmental and economic benefits. These benefits range from reduced air pollution, reduced energy bills for businesses and families, expanded recycling opportunities, new jobs, reduced urban sprawl and traffic congestion, decreased reliance non-renewable

Union of Concerned Scientists have stated that U.S. can meet the Kyoto Protocol through domestic actions that will have zero or negative net costs.

- UCS, Tellus, 1998

energy sources. If implemented, these actions will help preserve and even improve the quality of life in our community.

unanimous consensus that global warming is occurring and the potential consequences could be severe. **The role of this plan is to identify local actions we can take to reduce greenhouse gas emissions caused by human activity in and around Fort Collins.** Many who have contributed to the development of this plan believe it would be unwise, irresponsible even, for our city not to take proactive steps to reduce greenhouse gases today. The evidence that climate change is occurring is significant, and the benefits of energy conservation and solid waste reduction are compelling.

The Target

The combined benefits of Existing, New, and Pending measures identified in this plan, if fully implemented, would result in approximately a 30% reduction of Fort Collins' 2010 predicted emissions levels.

The Challenge

Even achieving a 30% reduction below 2010 levels will be challenging, much less a larger reduction target. It will take each new and existing measure to reach it. It will take the commitment of the City government to provide adequate funding to implement the actions outlined here. It will take the commitment of businesses, small and large, to pay attention to energy consumption and waste generation, and strive to reduce it. It will take the commitment of each individual citizen to make the choices to drive less, conserve energy, produce less garbage, and recycle more. No one entity has the responsibility or the ability to do it alone. Together, if we embrace the actions laid out in this plan, we can achieve our greenhouse gas reduction goal and realize the multiple additional benefits of improved air quality, reduced energy consumption and utility costs, etc.

GREENHOUSE GAS EMISSIONS INVENTORY

The first step in developing a plan to reduce greenhouse gases was to identify sources and quantities of greenhouse gases emitted in Fort Collins. An emissions inventory was conducted for the baseline year of 1990. This inventory included only carbon dioxide and methane (together represented as a CO₂ equivalent, or CO₂e). The inventory did not cover a small subset of emissions that are not readily controlled by local government actions including large engine sources (locomotive and aircraft) and agricultural sources (fertilizer and livestock). This section presents a “baseline” greenhouse gas emissions analysis for 1990, an interim year emissions analyses (1995 and 1997), and a projection of greenhouse gas emissions for 2004 and 2010.

CO₂e = Carbon Dioxide Equivalent; Global Warming Potential

To make relative comparisons between carbon dioxide and methane possible, the Global Warming Potential for both has been calculated. Since methane is 21 times more potent a greenhouse gas than carbon dioxide, the relative global warming potential of carbon dioxide = 1, and methane = 21. When methane and carbon dioxide emissions are summed, they are referred to as CO₂(e), indicating the methane has been converted to CO₂ equivalent.

City-wide Baseline Emissions Inventory (1990)

The emissions inventory covers residential, commercial, industrial and transportation sector emissions of CO₂ that result from the combustion of fossil fuel. It also covers methane that is emitted from solid waste decay from Fort Collins' contribution to the Larimer County Landfill. Details of the emissions inventory, including data sources and assumptions, are discussed in “Fort Collins Greenhouse Gas Emissions Analysis” in Appendix B.

In 1990, Fort Collins generated approximately 1,360,000 tons of CO₂e. Figure 3 shows CO₂ emissions by source. The largest source (42%) of local CO₂ emissions is electricity generation. Approximately 60% of Fort Collins' electricity is provided by the Rawhide Energy Station (the cleanest coal-fired power plant in Colorado), and approximately 35% of the city's power is hydroelectric. A small fraction of Fort Collins electricity is from wind energy purchased by voluntary subscription.

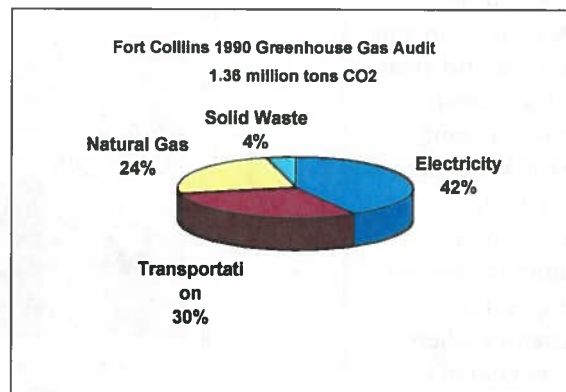


Figure 3. Fort Collins 1990 Greenhouse Gas Emissions, by Source

Fort Collins Local Action Plan to Reduce Greenhouse Gas Emissions

Interim Year Emissions Inventory (1995)

A greenhouse gas emissions inventory was also conducted for 1995. In 1995, Fort Collins total CO₂ emissions were 1,621,000 tons, a 19% increase over 1990 levels. Per capita CO₂ emissions increased by 5% from 15.5 tons per person in 1990 to 16.3 tons per person in '95.

Interim Year Emissions Inventory (1997)

A greenhouse gas emissions inventory was also conducted for 1997. In 1997, Fort Collins total CO₂ emissions were 1,861,000 tons, a 37% increase over 1990 levels. Per capita CO₂ emissions increased from 15.5 tons per person in 1990 to 17.5 tons per person in 1997.

Figures 6 and 7 show how Fort Collins' CO₂ emissions increased by source and end-use sector between 1990 and 1997.

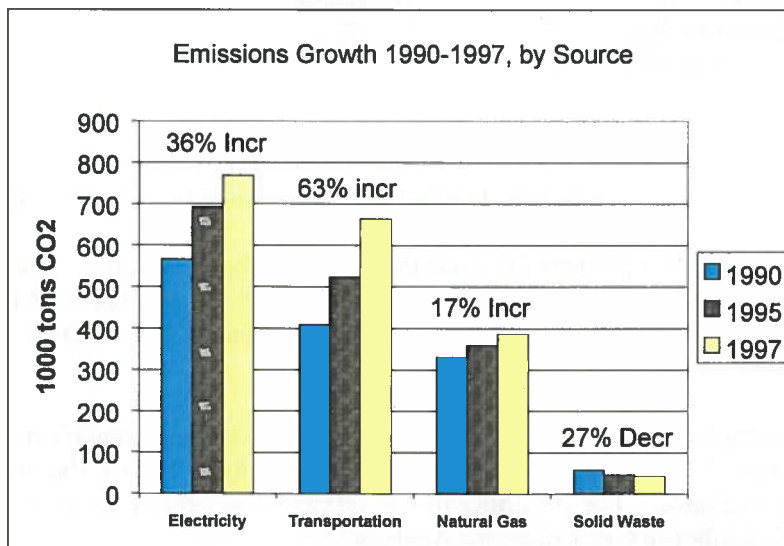


Figure 6. 1990 – 1997 Increase in Greenhouse Gas Emissions by Source

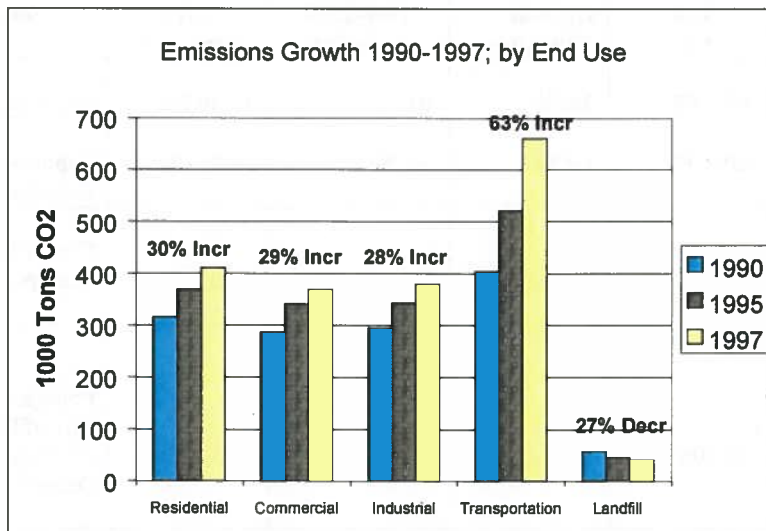


Figure 7. 1990 – 1997 Increase in Greenhouse Gas Emissions by End Use Sector

Fort Collins Local Action Plan to Reduce Greenhouse Gas Emissions

City-wide Greenhouse Gas Emissions Forecast (2004)

The same forecast assumptions are used to create a nearer-term forecast for the year 2004. Fort Collins is predicted to emit 2.536 million tons of CO₂ in 2004, or an estimated 23.9 tons per person. Figure 9 shows predicted emissions by source categories for 2004.

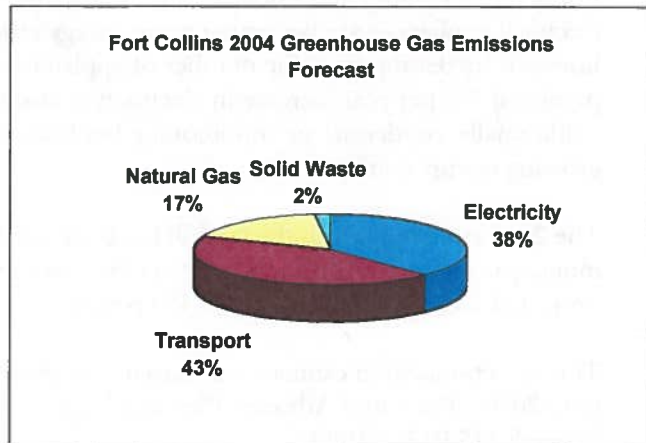


Figure 9. Forecast 2004 Greenhouse Gas Emissions by Source

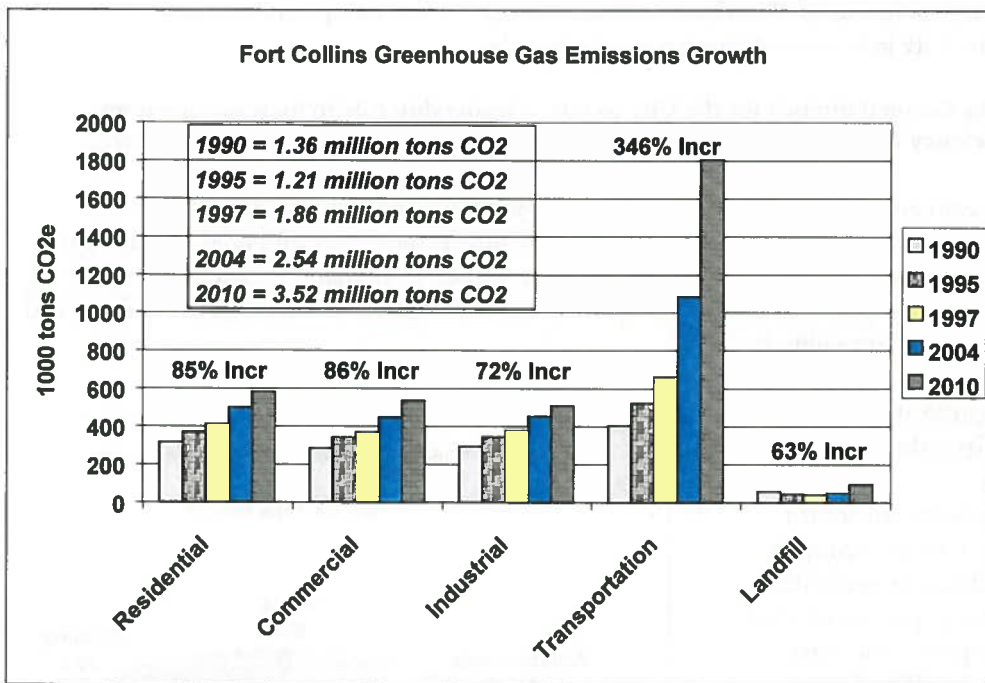


Figure 10. Greenhouse Gas Emissions Increase from 1990 - 2010

Figure 10 illustrates the growth in CO₂ emissions by end use sector between 1990 and 2010. Based on the above assumptions, Fort Collins' CO₂ emissions are predicted to increase 159 % by 2010. This increase is higher than most other U.S. cities participating in the CCP campaign, and is attributed to the expected continuation of rapid growth rates experienced in the recent past. The largest jump by far is predicted for the transportation sector, which is forecast to increase nearly 350% above 1990 levels. This prediction is based on results of the 1998 Mobility Report Card for Fort Collins, which indicated that vehicle miles traveled (VMT) rose 25% between 1995 and 1998.

Fort Collins Local Action Plan to Reduce Greenhouse Gas Emissions

Figure 11 and Table 3 list City operations' share of CO₂ emissions.

Table 3. 1990 Fort Collins City Government CO₂ Emissions

	Tons CO2 (e)	Percent CO2(e)	Energy Million BTU's
Buildings	12,577	31.7 %	86,852
Vehicle Fleet	3,167	8 %	39,880
Streetlights	8,545	21.5 %	25,584
Water Treatment and Reclamation	14,743	37.1 %	60,021
Waste	703	1.8 %	
TOTAL	39,736	100 %	212,337

EXISTING EMISSIONS REDUCTION MEASURES

Preparation of a Local Action Plan has provided an important opportunity to gather information about the numerous actions to reduce greenhouse gases that are already being carried out by both the City government and members of the community, and where possible, to quantify the benefit of these measures. Enough data exist for some activities to allow quantification of their greenhouse gas benefits. Other activities that are not being quantified are still known to be responsible for reducing greenhouse gases to varying extents. This section provides an overview of existing measures, defined as existing projects, plans, or goals (not necessarily completed), as well as completed actions.

MEASURES = Actions, strategies, or programs, to reduce greenhouse gases

Existing Measures (Completed and Projected to the Future)

The City of Fort Collins conducts numerous energy efficiency and solid waste reduction measures. Many of these involve outreach to the community and encourage community participation in order to achieve success. Table 4 lists greenhouse gas reducing activities that were identified. It is very likely that there are additional greenhouse gas reducing activities conducted by members of the community that were not identified or quantified.

Table 4. List of Existing Greenhouse Gas Reducing Measures

City Department	List of Existing or Planned Measures	References
Transportation Services	<p>Vehicle Use GOALS</p> <ul style="list-style-type: none"> • VMT growth rate should not exceed population growth rate • 14% modal shift away from single occupancy vehicles by 2015 <p>Transit Goals</p> <ul style="list-style-type: none"> • Increase ridership from 1.05 million/yr to ~2.0 million/yr between 1996 and 2002 • Bus travel time ≤ 2.5 x auto travel time • Provide transit to 70% of population <p>MEASURES</p> <p><u>Land Use Related Measures</u></p> <ul style="list-style-type: none"> • New zoning and development regulations promote higher density and transit • Site design standards • Adequate public facilities policies • Street construction standards (accommodate bike and ped) • Transportation Level of Service Standards • Transportation impact study required for new developments • Intergovernmental agreements • Sub-area plans 	<ul style="list-style-type: none"> • City Plan • Transportation Master Plan • Congestion Management Plan • Transit Development Plan • Pedestrian Plan • Bicycle Program Plan • Transportation Web-site

EXISTING MEASURES

City Department	List of Existing or Planned Measures	References
<p>Facility Services</p>	<p><u>Energy Efficiency: Buildings (applies to whole building)</u></p> <ul style="list-style-type: none"> • Considering LEED certification for new admin building • Energy efficiency and LCC considerations in Building Design Standards <p><u>Energy Efficiency: Equipment and Lighting</u></p> <ul style="list-style-type: none"> • HVAC Variable frequency drive upgrades • Inventory of lighting upgrades • Convert EXIT signs to LED's • Install occupancy sensors • Work order summary of energy conservation measures in city buildings (e.g., motion detectors) 	<ul style="list-style-type: none"> • Building Design Standards • LEEDs Program
<p>Natural Resources (Solid Waste, Air Quality, Natural Areas)</p>	<p><u>Recycling (divert waste from landfill)</u></p> <ul style="list-style-type: none"> • Pay-As-You-Throw trash rates • Haulers required to offer curbside recycling at no extra charge • City gov. goal of instituting construction debris recycling program for on-site demolition crews and office remodeling efforts. • Decrease hazardous solvent use in vehicle maintenance shops city-wide • WasteWi\$e goal of City gov. increasing recycling volumes by 10% • Internal City government recycling collection service <p><u>Waste Composting (divert waste from landfill by composting)</u></p> <ul style="list-style-type: none"> • WasteWi\$e goal of increasing composting within City gov. 25% from 11/97 to 11/2000 • Compost bin sales to residents • Leaf drop off and Christmas tree recycling programs <p><u>Waste Reduction Measures (reduce waste to begin with)</u></p> <ul style="list-style-type: none"> • WasteWi\$e goal of using e-mail for City gov. employee education • WasteWi\$e goal of internal policy for recycling and waste reduction <p><u>Natural Areas Preservation and Restoration</u></p> <ul style="list-style-type: none"> • Shrub plantings <p><u>Education Campaigns</u></p> <ul style="list-style-type: none"> • Promote use of low polluting lawn mowers • Support alternative modes of transportation <p><u>Pollution Prevention (P2) Pilot Project</u></p> <ul style="list-style-type: none"> • Implement pilot P2 program in New Source Review 	<ul style="list-style-type: none"> • 2000-2003 Air Quality Action Plan • Resolution 95-63 (Policy direction on trash collection and waste stream reduction) • Natural Areas Management Plan
<p>Utilities</p>	<p>ELECTRICITY</p> <p><u>Change in Energy Source</u></p> <ul style="list-style-type: none"> • Wind Pilot Program – 2 turbines/600 residential customers + six industrial customers <p><u>Energy Efficiency: Buildings</u></p> <ul style="list-style-type: none"> • REACH – home weatherization program 	

EXISTING MEASURES

Table 5. Existing Quantified Measures

EXISTING MEASURES	Tons Co2 saved in 2010
VMT Goal: not exceed pop. growth rates - savings in 2010	337,676
Business Recycling (apply '98 per capita rate to 2010 pop)	41,735
Existing Model Energy Code (existing and projected benefits)	40,436
Curbside Recycling (apply '98 per capita rate to 2010 pop)	39,732
ClimateWise for businesses	38,390
Methane Flaring & Heat Recovery at City's water reclamation plant - projected for 2010	35,607
Sequestration of Co2 by all trees in Fort Collins	21,071
FC Electricity Distribution System Improvements	15,189
CSU Utility System (Energy Conservation Programs) Benefit from existing programs	12,524
CSU's IAC (savings in 2010 from existing projects)	4,429
Wind Power Pilot Program: 2010 Benefits	4,013
Wind Phase II (2.5 more turbines)	5,128
Promote Telecommuting in private business	3,076
Poudre School District Energy Conservation Programs (Existing and projected benefits)	2,552
ZILCH w/ Energy Score (existing and projected benefits)	652
ZILCH - without Energy Score (Existing and projected benefits)	291
Lighting Upgrades - City Buildings: 1990-1998	257
Propane City Fleet vehicles (assume 1998 use rates)	139
10% Reduction of Municipal Solid Waste in 2010	121
Natural Areas Shrub plantings (est 15 - 100)	58
Converting to Variable Frequency Drives (City gov. actions through 1998)	48
EXISTING MEASURES TOTAL	603,124

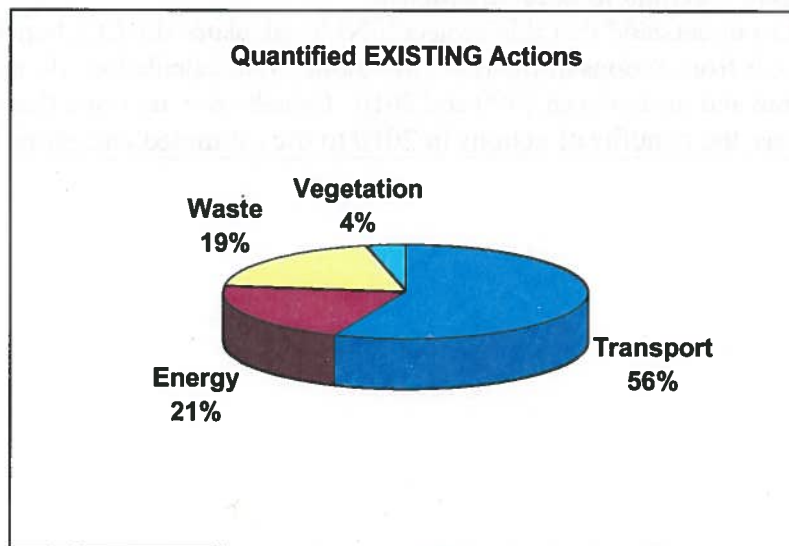


Figure 12. Estimated CO2 savings in 2010 from “existing” actions, attributed to emissions categories.

Existing Measures - Transportation

**City of Fort Collins TRANSPORTATION SERVICES
Goal Statement**

Transportation Services strives to 1) insure adequate and timely delivery of day-to-day transportation services through operations and projects; and 2) plan the acquisition and implementation of future transportation requirements in accordance with the City Council's policy agenda. Specific emphasis is given to enhancing multi-modal transportation opportunities to lessen traffic congestion and improve air quality, and to secure permanent funding to meet the objectives of adopted service plans and standards

Vehicle Miles Traveled (VMT) Goal: VMT Growth Rate Not to Outpace Population Growth Rate

Equivalent CO2 Savings in 2010: 337,676 tons

Both the Fort Collins Master Transportation Plan and the Transportation Demand Management Plan contain the Council-approved goal of keeping the Vehicle Miles Traveled (VMT) growth rate from exceeding local population growth rate. Although this is an existing goal, the community has not yet begun to meet it. The 1998 Mobility Report Card indicates that Fort Collins' VMT is rising at a rate of about 7% per year, double the approximate 3.5% per year population growth rate. Because of the importance of meeting this goal, and the desire to increase the focus on this issue, the Citizen Committee rated this as one of the draft plan's most important goals for reducing greenhouse gases.

Assuming that population grows at the historic rate of 2.2% per year, the Transportation Department estimates that it is still possible to achieve this goal by the year 2010 if successful VMT reduction strategies are implemented. The greenhouse gas savings are estimated based on the VMT growth rate declining to 5% year from 2000-2005 and to 2.2% per year from 2006 to 2010.

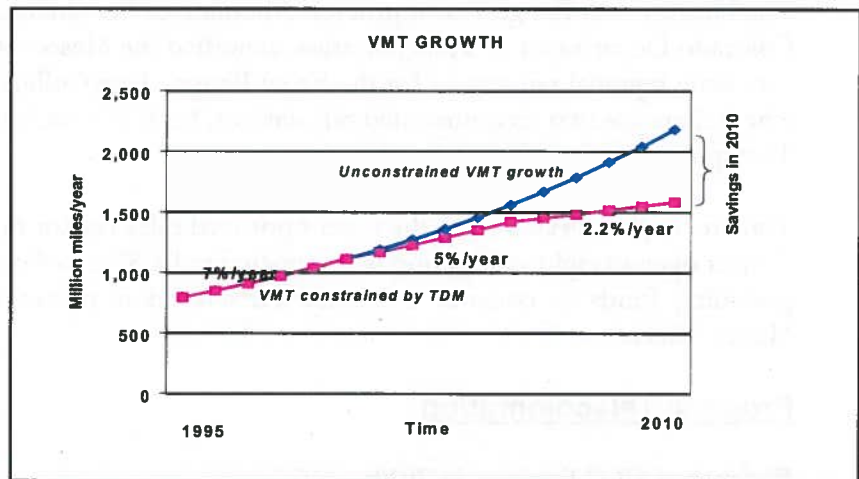


Figure 14. Predicted VMT growth, with and without measures to slow it.

employees and employers could increase the number of people who telecommute. The Mobility Report Card indicates that the average employee miles drives 42 miles per day. Assuming that in 2010, 5% of all citizens telecommuted twice a month, 3,076 tons of CO₂ would be saved in 2010.

B. Within City government: The TDM Department is working on establishing an official City government Teleworking Policy. They are also developing a "How To" packet for use by City departments. The policy is expected to be reviewed and implemented in 1999. If the round-trip commute of City government employees is conservatively estimated at 10 miles, and if 16% of employees telecommute twice a month (based on actual survey data), a savings of 39 tons of CO₂ would occur in 2010 from City telecommuting activities.

Consider Accelerated TDM Program; Disincentives for Driving

A 1999 Mobility Report Card identified that VMT has risen over 25% in Fort Collins in the last three years. In order to deal with unprecedented VMT growth rates, this measure recommends accelerated implementation of TDM measures outlined in the *Transportation Demand Management Program* report adopted by the North Front Range Transportation and Air Quality Planning Council in April 1996. The Regional TDM program states a goal of 10% reductions in single occupancy vehicle trips by 2015, and identifies five levels, or "strategy packages", for consideration in achieving this goal.

- I. Voluntary programs and transit improvements
- II. Developer requirements and subsidy program
- III. Regional parking pricing and High Occupancy Vehicle (HOV) study
- IV. Mandatory Program and Distance-based Fee
- V. Comprehensive program

Based on a TDM evaluation model run in 1995, Level III would be necessary to meet the TDM goals. Levels I and II are largely being implemented now. Implementation of more stringent measures was to be considered with the whole TDM program evaluation scheduled for 2006. This evaluation is now likely to begin before 2006.

Propane City Fleet Vehicles

Estimated CO₂ Savings in 2010: 139 tons

The City of Fort Collins Fleets Services has demonstrated a longtime commitment to alternative fuel vehicles. As an example, in 1997, 152 (34%) of the City's fleet of 450 vehicles was powered by propane. In 1998, the municipal fleet consumed 166,245 gallons of propane fuel. This translates to 139 tons of CO₂ eliminated in 1998 through the use of propane fuel.

It is likely the composition of alternative fueled vehicles in the City's fleet will change between 2000 and 2010, depending on the price and availability of fuels. The fleet will grow and may acquire more compressed natural gas, electric, or hybrid vehicles. In any case, the

EXISTING MEASURES

Calculations of greenhouse gas benefits were taken directly from PRPA's 1997 report to the Energy Information Administration. 1990 was established as a base year, against which system improvements in subsequent years were estimated. The Utility provided MWh savings estimates for 1991 through 1997, which ranged from ~ 4,700 MWh to ~15,000 MWh, with the eight-year average being 13,323 MWh.

Colorado State University Energy Conservation Upgrades

Estimated CO₂ Savings in 2010: 12,524 tons/year

According to CSU's 1997 Utility and Energy Management Report, 29,819 tons of CO₂ were reduced in the 1996-1997 school year. CSU staff have indicated that approximately 42% of the projects responsible for those reductions were implemented after 1990, and therefore the reduction credits were counted as part of this report.

CSU's Industrial Assessment Center (IAC)

Implementing Organizations: U. S. DOE and Colorado State University
Estimated CO₂ Savings in 2010: 4,429 tons/year from existing projects
5,208 tons/year for projected future activities

Since inception, the IAC has performed assessments at 25 Fort Collins businesses. The savings calculated here represent savings from the approximately 140 projects implemented in Fort Collins since 1990. These projects include recommendations made for several of the major energy consumers in Fort Collins.

When projecting future CO₂ savings from IAC activities, the average CO₂ reduction from past IAC projects (442.9 tons CO₂/year) was used to estimate a future reduction rate. If the Industrial Assessment Center were to continue implementing energy efficiency projects at the annual average rate of 100,000 kWh per year savings and 700 CCF per year savings for twelve years between 1999 and 2010, a total of 1,200,000 kWh and 8,400 CCF would be reduced.

Wind – Phase II (Add 2.5 More Turbines)

Estimated CO₂ Savings in 2010: 5128 tons

In 1999, the Fort Collins Utility committed to adding 2.5 more turbines to the existing two turbines at the Platte River Medicine Bow site. (The remaining half of one turbine will be acquired by the City of Loveland, CO.) As viewed from the perspective of wind turbines per capita served, FCU will have 3.8 times the investment of Public Service Company (PSCo Phase 1 and Phase 2) and 9.5 times the investment of UtiliCorp, which serves southern Colorado. Fort Collins is clearly the leader in providing wind energy in Colorado.

As with the original two turbines, a full turbine life commitment (20 years) is required by the Utility for the new turbines. Although green pricing support for these turbines is for shorter

EXISTING MEASURES

The City's New Source Review Project is intended to offer new businesses in the community an opportunity to benefit from the use of P2 practices. The program targets businesses of the "process type" and those with potential chemical usage and subsequent waste generation. Since it is important to minimize pollution of all media, the program focuses on reducing air emissions, wastewater discharges, solid and hazardous waste, and energy and water consumption. Phase I of the New Source review Project involves identifying new businesses as part of the development review process, preparing and distributing tailored education packets to candidate businesses, serving as an information broker, and conducting a P2 recognition program. Phase II is being defined as a more mandatory program and will be considered after two years, dependent on the effectiveness of Phase I.

Free Energy Audits, Advice, Technical Assistance: Both PRPA and Fort Collins Utilities offer free energy audits and technical assistance to their customers. PRPA helps covers 80 key accounts in all four owner cities; Fort Collins Utilities covers key accounts medium, and small in Fort Collins. There is no quantitative data on number of businesses assisted or resulting energy conservation. With the economy booming, utility bill savings are not a top priority for businesses and there is a general feeling is that businesses aren't taking full advantage of the services currently offered. The challenge will be to identify and illustrate incentives for businesses to participate. A focus on lighting upgrades for small and medium size customers such as office buildings, strip malls, restaurants is recommended. For businesses, lighting projects are relatively easy to develop corporate support for because they are very straightforward with regard to savings.

Integrated Design Assistance Program: Fort Collins Utilities offers up-front design assistance for new (commercial?) construction around the city. One of the largest challenges is that those who construct the facility and make the design decisions are often not those lease the facility and pay the utility bills.

CSU Industrial Assessment Center: DOE funds this effort is to provide free energy and pollution prevention assessments for small and medium sized manufacturers. At least twenty-five Fort Collins businesses have benefited from an IAC assessment, resulting in over 4,000 tons CO2 eliminated in the year 2010 as a result of facility improvements.

Residential Curbside Recycling

Estimated CO₂ Savings in 2010: 39,732 tons

The City influences solid waste management through two ordinances that became effective in 1995 and 1996. These require haulers to 1) apply variable trash rates, and 2) provide recycling at no extra charge for residential customers. City ordinance requires that haulers collect aluminum, glass, newspaper, plastics 1&2, and steel/tin cans. Since these ordinances were passed, haulers have reported an increase in residential curbside recycling from 53% to 86% participation, as well as a slight decrease in trash volumes. As part of the requirement for licensing, trash haulers are also required to report data on residential trash and recycling collection every six months, to track trends and progress.

Based on data reported by the haulers, over 12,000 tons of material were recycled in 1998. Applying the 1998 per capita curbside recycling rate to the predicted 2010 population of 143,450, it is estimated that the curbside program would be responsible for reducing 39,732 tons of CO₂e in 2010.

Methane Flaring and Heat Recovery at Waste Water Treatment Plant

Estimated CO₂ Savings in 2010: 35,607 tons
(if all CH₄ flared, with the addition of another CH₄ -powered digester)

The City's main wastewater treatment plant currently uses approximately eighty-five percent of all methane (CH₄) produced from water treatment processes to power boilers located at the facility. The City is considering adding another methane-powered boiler to power the NW digester at the plant. If this is installed, all the CH₄ generated from the digesters would be consumed for energy generation. This process of using the heat energy generated by methane combustion for power generation is estimated to reduce greenhouse gas emissions by over 35,000 tons in 2010.

10 % Reduction of Municipal Solid Waste in 2010

Estimated CO₂ Savings in 2010: 121 tons

In 1997, the City of Fort Collins joined WasteWi\$e, a U.S. Department of Energy program designed to assist local governments in reducing the municipal waste generation. The City established the following goals for itself:

Waste Prevention and Reduction

1. Increase yard waste composting. Identify three main sources of yard waste and take measures to increase composting by 25% in three years.
2. Institute a construction debris recycling program for on-site contractors of City government projects.
3. Decrease the use of hazardous solvents in vehicle maintenance shops city-wide.

Recycling

1. Use electronic mail system for employee education.
2. Develop an internal policy for recycling and waste reduction.

EXISTING MEASURES – VEGETATION

*City of Fort Collins FORESTRY
Goal Statement*

The City of Fort Collins Forestry Department will strive to increase the health, stability, and diversity of the urban forest through the maintenance of, at least, the same stocking level with the encouragement to increase the level; increasing average age of trees through tree stewardship, and increased plantings in strategic locations to provide assistance to building heating and cooling as well as wind speed reductions.

Sequestration of CO₂ by All Trees in Fort Collins in 2010

Estimated CO₂ Savings in 2010: 21,071 tons/year

Urban forests provide a number of benefits to society, including:

- Stormwater management by moderating heavy rainfalls, decreasing soil erosion.
- Increase the amount of unpaved surface, allowing for more rainwater to soak into the ground, rather than running off, aiding aquifer recharging.
- Reduce noise.
- Add beauty to streets and developed areas.
- Air quality benefits by trapping air borne dust particles, and temporarily filtering out NOX and NH₃.
- Provide wildlife habitat.
- Reduce needs for energy to heat and cool buildings.
- Reduce the urban heat island effect by shading paved areas and reducing maximum temperatures of these areas by 10° F.
- Trees along bike paths and walkways reduce summertime temperatures and encourage the use of pedestrian paths and bikeways.
- Provide wind breaks for homes, reducing the amount of heating needed in the wintertime.

In addition to these numerous other benefits, trees also absorb carbon dioxide from the atmosphere as they grow, and thus offset carbon dioxide emissions from other sources. This “measure” calculates the amount of carbon dioxide sequestered annually by all of Fort Collins’ trees. The amount of carbon dioxide sequestered by trees in Fort Collins in 1999 was estimated to be over 21,000 tons. Given that the estimated number of trees in Fort Collins is 604,527, this equates to an average CO₂ sequestration of 69.7 pounds/year/tree.

Natural Areas Shrub Plantings

Estimated CO₂ Savings in 2010: 15 – 100 tons (use 48 tons as average)

NEW and PENDING EMISSIONS REDUCTION MEASURES

After completing efforts to identify and quantify the greenhouse gas reduction benefit of existing actions, the Staff Technical Team and Citizen Advisory Committee developed a list of potential New actions to reduce greenhouse gases. A variety of approaches were used to develop a list of measures for consideration, including formal brain-storming, talking with various professionals and experts, discussion with Council advisory boards, and soliciting public input through open houses and the internet.

Appendix C lists the range of measures that were initially introduced for consideration. Information was compiled, to the extent possible, on the costs and impacts of the measures under consideration. Based on available information about the technical, economic, and political/social aspects of the measures, a final list of measures was developed that was considered acceptable to the Staff Team and Citizen Committee. These measures are identified as “New” or “Pending”, based on the definitions given below.

NEW MEASURES = Measures that emerged initially through Cites for Climate Protection discussions, having the primary intent to reduce greenhouse gases.

PENDING MEASURES = Measures that are not yet approved by the City, but that would be brought forward for departmental or Council consideration anyway under a normal course of business, regardless of their greenhouse gas reducing capabilities.

EXISTING MEASURES = Measures in the community and measures that already exist in the City organization because they stem from an adopted goal or policy, or would be conducted in the normal course of business, despite any GHG reduction benefits. “Existing” does not necessarily mean completed or guaranteed.

The New and Pending measures that are recommended in this plan would result in a CO₂ reduction of 0.509 millions tons in 2010, if fully implemented. Figure 15 shows the reduction from New and Pending measures apportioned to different reduction areas. Table 6 identifies these measures along with their estimated CO₂ reduction potential and the ratings developed by the Staff Team and the Citizen Advisory Committee.

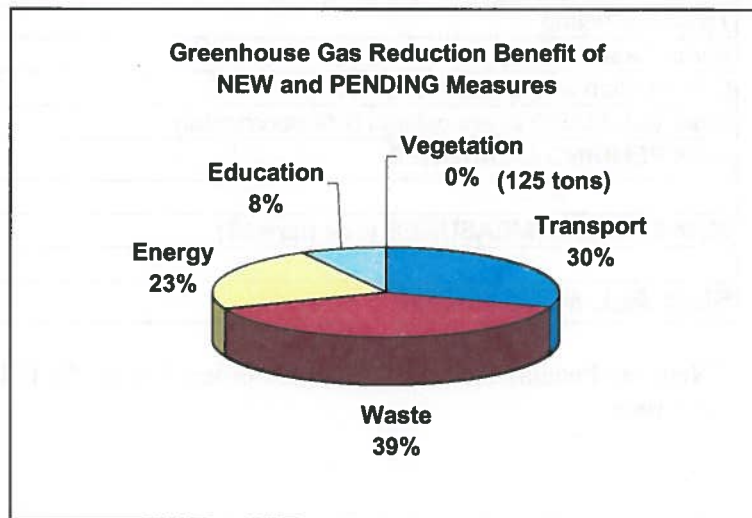


Figure 15. Estimated CO₂ reduction from “New and Pending” Measures

Fort Collins Local Action Plan to Reduce Greenhouse Gas Emissions

Table 7. Greenhouse Gas Reduction Potential of all Measures

	Greenhouse Gas Reductions Tons CO2 reduced in 2010	Cumulative Greenhouse Gas Reductions Tons CO2 reduced in 2010	2010 Emissions Rate Tons CO2 in 2010	Cumulative Percent Reduction from 2010 predicted emissions levels
In the Absence of Actions	0	0	3,523,000	0 %
EXISTING	603,000	603,000	2,920,000	17 %
PENDING	373,000	976,000	2,547,000	28 %
NEW	135,000	1,111,000	2,412,000	32 %

Table 7 and Figure 16 identify the greenhouse gas reduction potential of Existing, Pending, and New measures, if they are successfully implemented by 2010. Full implementation of all measures is estimated to result in a 32% reduction of Fort Collins' predicted 2010 emissions levels.

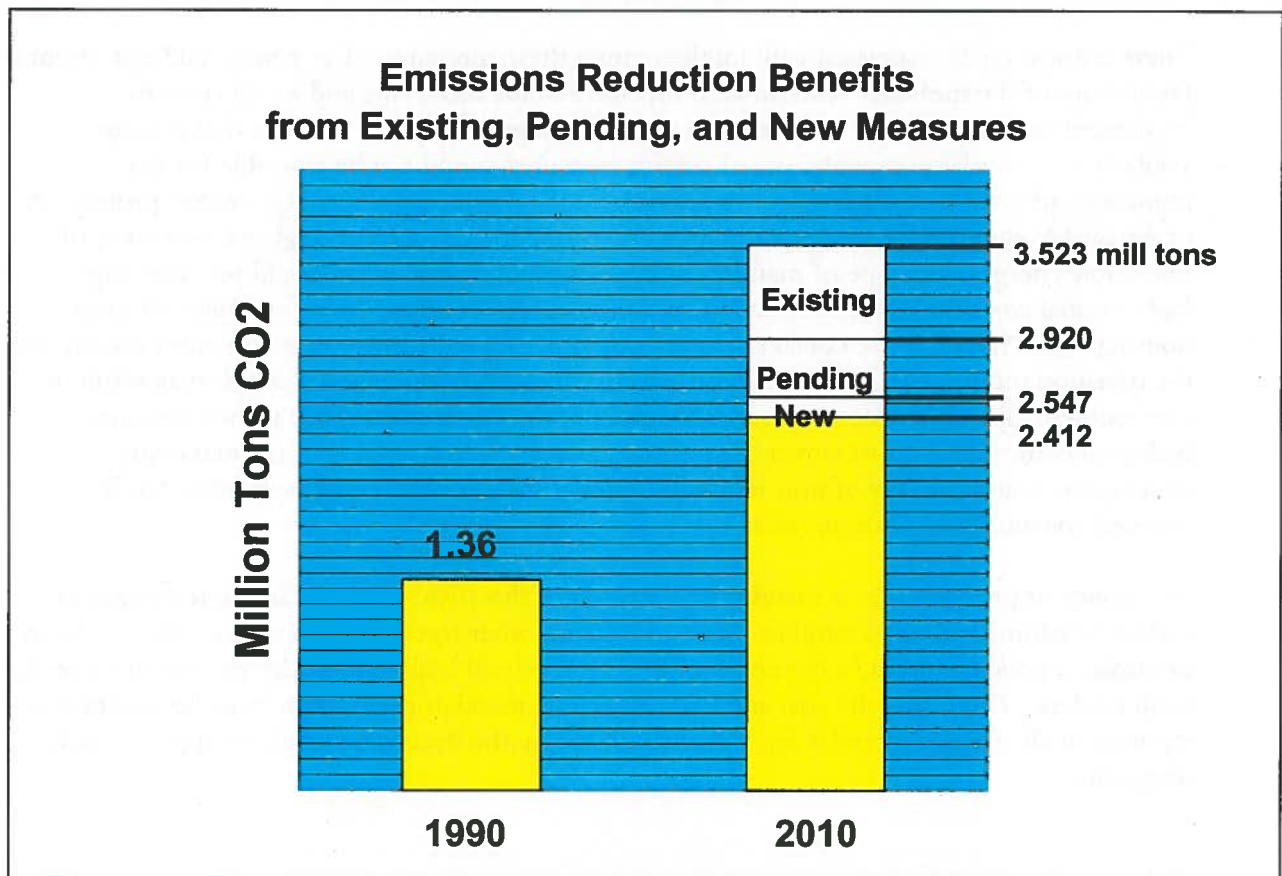


Figure 16. Emissions Reduction Benefits from Existing, Pending, and New Measures.

MEASURES TO REDUCE GREENHOUSE GASES FROM TRANSPORTATION

TRANSPORTATION TRENDS

As the City of Fort Collins continues to grow, the transportation system must keep up with changing demands. This is accomplished through careful planning, proper maintenance and a focus on multimodal transportation. In Fort Collins, transportation is “about” more than roads and cars. The City Transportation Services strives to keep the community bicycle and pedestrian friendly, and to maintain an environment where travel is safe and convenient.

Growth of the city has resulted in growth in the transportation network and use of it. Table 8 indicates various statistics related to population and transportation network growth.

Table 8. Fort Collins Growth and Transportation Statistics

Fort Collins Growth Management Area Data	1990	1995	1998
Population *	87,758	99,726	108,981
Street Miles *	327	373	403
City Area (Sq. Mi.) *	41	44	46
VMT per day **	1,914,491	2,398,614	
1998 Mobility Report Card Data***	1990	1995	1998
Population		117,559	133,735
VMT per day		2,225,000	2,801,000
VMT per housing unit		45	50
VMT per employee		40	42
Bicycle Volumes at 3 locations		19	21
Pedestrian volumes at 3 locations		971	1,387
Transfort Ridership		1,056,161	1,418,469

* Advance Planning “1998 TRENDS” Report

** 1990 VMT source: North Front Range 2015 Regional Transportation Plan

** 1995 VMT Source: North Front Range 2020 Regional Transportation Plan

*** 1998 Mobility Report Card, which covers a an areas slightly larger than the City limits

A very rapid rate in the growth of Vehicle Miles Traveled (VMT) has occurred over the last three years. Increased traffic congestion is beginning to negatively impact the quality of life for many citizens in Fort Collins. The compact development patterns envisioned under City Plan are intended to prevent urban sprawl, but these new land use patterns are only beginning to be constructed.

Many of the transportation measures outlined below support existing City goals to reduce “single occupant vehicle” (SOV) trips, while others focus on increased use of fuel efficient vehicles. Both approaches have benefits of saving money for motorists because of lower fuel consumption, in addition to reducing carbon dioxide tailpipe emissions.

TRANSPORTATION MEASURES

TRANSPORTATION MEASURES

One “New” transportation measure and four “Pending” transportation measures were evaluated by the Staff Technical Team and the Citizen Advisory Committee.

NEW

- Increase Awareness of Fuel Consumption, by City Department

PENDING

- Lobby for More Stringent Fuel Efficiency Standards
- Support Fort Collins – Denver Commuter Rail
- Trash Districting
- Create satellite maintenance areas to minimize Parks employee travel

New transportation measures are presented below in order of their ranking, followed by Pending transportation measures.

TRANSPORTATION MEASURES

Lobby for More Stringent Fuel Efficiency Standards

Status: Pending Measure
Staff Team Ranking: 5th out of 12 Pending Measures
Citizen Committee Ranking: 2nd out of 12 Pending Measures

Estimated CO2 saving in 2004: 22,000 tons (at 10% of the fleet meeting the new std)
Estimated CO2 Savings in 2010: 121,000 tons (at 50% of the fleet meeting the new std)

Supporting Policy:

ENV 1.5 The City will seek to continuously reduce total motor vehicle emissions by employing strategies both to slow the growth of VMT, by providing alternative to motor vehicle travel in single occupant vehicles, and to reduce tailpipe emissions per mile of travel.

Description: Combustion of fuel from vehicles is responsible for 30% of all human-caused CO2 emissions globally. In Fort Collins, the transportation sector is predicted to emit 47% of all CO2 emissions in 2010, by far the largest contributor to emissions. Increasing the fuel economy of vehicles would significantly decrease the amount of fuel burned, and thus lower CO2 emissions.

The CAFÉ (Corporate Average Fuel Economy) standards were last raised in 1975 (with implementation beginning in 1985) to 27.5 MPG for cars and 20.6 MPG for light trucks, in response to the world energy crisis in the early 70's which was triggered by the OPEC oil embargo. Since that time, efforts to raise the standards have not been successful, in part due to resistance by the auto and petroleum industries, which claim that raising fuel efficiency standards would impose an undue economic burden on society. During this decade, however, numerous sources cite that affordable technology exists to increase fuel efficiency without compromising quality or comfort.

The greenhouse gas benefits from this measure are estimated conservatively because local government has little control over the outcome of lobbying activities. CO2 savings are estimated for only a portion of the fleet (half the fleet). It is assumed that the other half would not reflect any change in fuel economy. If 50% of the fleet met improved standards (e.g. 45 MPG for cars and 34 MPG for trucks, rather than 27.5 MPG for cars and 20.6 MPG for trucks), the CO2 savings would be 120,750 tons in 2010.

Implementing Department: City Manager's Office and Natural Resources

Recommended Timeframe for Completion: by 2010

Recommended Approach for Implementation:

- I. Adopt changes to the City's 2000 Legislative Policy Agenda to include language specifically authorizing work on this issue
- II. Designate one individual as having the responsibility to identify relevant bills/debates, actions at the state and national legislature and draft City response to them.

TRANSPORTATION MEASURES

Support Fort Collins – Denver Commuter Rail

Status: Pending Measure
Staff Team Ranking: 3rd out of 12 Pending Measures
Citizen Committee Ranking: 6th out of 12 Pending Measures

Estimated CO2 Savings in 2010: 15-50,000 tons

The population of the North Front Range (including Denver) is forecast to increase by 43% between now and 2020, and employment is projected to grow by 35%. If these trends continue, traffic congestion along the North Front Range will increase until most major roads reach their capacities. The North Front Range Transportation Alternatives Feasibility Study (NFRTAFS) will study a variety of "modal" and technology options for improving transportation along the North Front Range. Four passenger rail options are being studied, with the potential of using existing railroad corridors, highway medians, or other rights-of-way.

Recommended Action: Build transportation infrastructure in Fort Collins to accommodate or improve access to potential future rail links.

A commuter rail between Fort Collins and Denver could alleviate a significant number of commuter trips, and appears to have public support.

As of May 11, 1999, 83% of survey respondents indicated they would prefer to travel by rail between Fort Collins and Denver, rather than driving or taking the bus. See the North Front Range Transportation Alternatives Feasibility Study's Web site at www.nfrtafs.org

TRANSPORTATION MEASURES

Satellite Parks Maintenance Shops to minimize Parks employee travel

Status: Pending Measure
Staff Team Ranking: 9th out of 12 Pending Measures
Citizen Committee Ranking: 12th out of 12 Pending Measures

Estimated CO2 Savings in 2010: 13 tons/yr

Supporting Policy Direction:

Resolution 97-51: Section2. That as a user of energy,the City shall also regularly evaluate the latest technologies utilizing alternative fuels for transportation and, to the greatest extent practicable, apply such technologies to the operation of city vehicles in order to provide energy efficient transportation.

Description:

Several years ago, the Parks Department conducted an informal study to identify the amount of extra time employees spent driving from the main Parks Shop to the parks. The results were dramatic, showing that more than a full FTE was spent just driving between Eudora Park and the Parks Shop. For this reason, the Parks Department purchased land adjacent to Eudora to establish a satellite maintenance shop, but funds were not provided to develop this location into a satellite shop.

Currently, the Parks Department is developing a Districting Plan to evaluate the most cost-effective approach for minimizing travel times, taking into account future as well as existing parks. The draft plan should be completed by December of 1999.

Implementing Department: Parks
Recommended Timeframe for Completion: 2010
Estimated Implementation Cost: Unknown
Estimated Annual Operating Cost: Unknown
Potential Funding Source(s): NA

Annual Cost Savings: As an example, if one FTE = 2000 hours, then driving at 20 MPH for 2000 hours equals 40,000 miles driven. At 20 MPG, this uses 2000 gallons of fuel. Reducing the amount driven to 1/3 would save \$35,000 in reduced staff time and reduced fuel costs.

Other Benefits:

- More efficient use of taxpayer dollars.
- Cost savings can be used for other Parks project/needs.
- Reduced consumption of non-renewable resources.

MEASURES TO REDUCE GREENHOUSE GASES FROM ENERGY USE

ENERGY TRENDS

In 1990, the Fort Collins community's consumption of electricity and natural gas accounted for approximately 898,000 tons or 66% percent of all CO₂ locally emitted into the air. This number is expected to nearly double by 2010, in the absence of energy conservation measures. In addition, per capita CO₂ emissions from local energy consumption show a modest increase. In 1990, 10.23 tons of CO₂ were released per person (including residential, commercial, and industrial energy use). In 1995, the number increased 3% to 10.57 tons of CO₂ per person. The 2010 forecast shows per capita greenhouse gas emissions from energy consumption increasing to 11.33 tons per person, an 11% increase over 1990 levels.

Electric Industry Deregulation

With impending deregulation of the electric utility industry in many states, utilities are striving to become as competitive as possible by reducing their expenses. In many cases, this means a decrease in support for energy conservation programs, at a time when evidence of global warming indicates conservation programs are needed. According to an October, 1998 report by the Environmental Working Group and World Wildlife Fund, between 1993 and 1997, U.S. utilities cut their combined investment in energy saving programs by 45%. These cuts forced consumers to spend over \$1 billion more than needed on electric bills (*Home Energy*, Jan/Feb 1999, pg. 7).

Under potential deregulation, utilities are also striving to diversify in order to extend their potential customer base. This often means addition of renewable energy sources such as wind, despite added costs. The Fort Collins Utility has already successfully implemented a Wind Power Pilot program, offering voluntary purchase of wind power at a higher rate.

It is unclear what direction electric deregulation will take in Colorado. What is certain is that customers will be able to choose who provides the electricity they use. The market uncertainties make it more difficult for utilities to commit to programs that will position them unfavorably in a competitive market. However, this concern must be weighed against the financial and environmental losses that may occur in the absence of steps toward increased sustainability and decreased greenhouse gas emissions.

Wind Energy in Fort Collins

Wind as Renewable Energy Source

Wind energy, along with solar energy, is considered a "Tier 1" renewable resource. Both of these renewable resources are more expensive in electric utility applications than conventional resources, however, in most instances wind energy has a significant economic advantage over solar.

The general exception is for situations in which an electric system infrastructure does not exist and the economics of a solar system are improved by avoiding the cost of constructing that

CITY ENERGY POLICY

With passage of the City's comprehensive management plan, *City Plan*, in 1997, a clear commitment to energy conservation was stated in the following policies:

ENV-1.23 Global Climate. The City will employ strategies to increase energy efficiency and the use of renewable energy sources (except residential woodburning), in order to reduce the impact of the Fort Collins community on global warming.

ENV-4. Energy efficiency and use of renewable energy resources will be encouraged, facilitated, and regulated in both the public and private sector through information and educational services, financial incentive programs, requirements and incentives in the planning process, and enforcement of regulations such as the Energy Code.

ENV-4.1. Renewable Energy. The use of solar energy and other renewable resources are recommended energy sources.

ENV- 4.6 Remove barriers to renewable energy use. The City will eliminate unnecessary barriers to utilization of renewable energy resources in new and existing buildings which arise through application and enforcement of City Codes.

ENV-4.7 Renewable energy in new development. The use of renewable energy resources should be considered in the layout and construction of new development.

ENV-4.9 Additional policy development. Comprehensive policies will be developed to encourage the use of alternative forms of energy, such as wind-generated power and solar energy.

In addition, sustainability is one of four core community values articulated in *City Plan*. Sustainability is defined as the long-term social, economic, and environmental health of the community. Energy efficient building practices are cited as one of the approaches that will help make Fort Collins a sustainable community.

In 1997, Fort Collins City Council passed Resolution 97-51, outlining the Utility's role as energy provider, user, and educator. This resolution states:

“That as a user of energy, the City administration shall, in design and construction of all City facilities, emphasize and utilize the latest, available, proven technologies to provide energy efficient and cost effective heating, cooling, lighting and hot water services in buildings owned, co-owned or leased by the City for municipal purposes. In particular, the City will utilize in the construction and remodeling of City facilities the most current solar heating technologies for hot water heating that are suitable for such facilities, using the expertise and resources of the City's electric utility staff in identifying and/or developing such technologies. The City shall also regularly evaluate the latest technologies utilizing alternative fuels for transportation and, to the greatest extent practicable, apply such technologies to the operation of City vehicles in order to provide energy efficient transportation.

Replace Incandescent Traffic Signals with Light Emitting Diodes (LED's)

Status: New Measure
Staff Team Ranking: 1st out of 12 New Measures
Citizen Committee Ranking: 1st out of 12 New Measures

Estimated CO2 Savings in 2010: 3,137 tons/yr (if all 202 intersections have LED's Reds and Don't Walks)

Supporting Policy direction:

Resolution 97-51:

As a user of energy the City administration shall, in the design and construction of all City facilities, emphasize and utilize the latest, available, proven technologies to provide energy efficient and cost effective heating, cooling, lighting and hot water services.....

Resolution 97-97:

“The Council intends for the City to take a leadership role in increasing energy efficiency and reducing greenhouse gas emissions from municipal operations”

PRINCIPLE ENV-4:Energy efficiency and the use of renewable energy will be encouraged, facilitated, and regulated in both the public and private sector

Policy ENV 1-13. Innovations. The City will consider adoption of successful air quality improvement strategies in effect elsewhere, including municipal practices, public information campaigns, incentive/promotion programs, and regulations.

Description:

The conversion of traffic signal red light bulbs from incandescent lamps to LED's is a growing practice across the nation. LED's consume less energy, have a longer life, and require less maintenance.

In 1997, the City conducted a pilot test of red LED's and “Don't Walk” signs. The results indicated that LED's would save \$1.46 /signal/day in electrical costs. Generally, LED's pay for themselves in three to four years, and have a life span of seven to ten years. In Fort Collins, installation of LED's directly supports the Traffic Operations Department's highest priority of preventive maintenance, since they require significantly less maintenance.

As of 1999, the City has already installed 28 intersections (336 LEDs, at 12 signals per intersection) with red LED signals. If the City installs all new traffic signals using LED reds and Don't Walks (an estimated 4 new intersections per year), and retrofits all existing intersections in the next budget cycle (2000-2001), this would cost the City \$286,000 for the retrofits, and \$8,500/year for new signal installation (at a cost of \$2,132 per intersection, each intersection having 12 LED reds and 8 Don't Walks). However, the City would have saved a cumulative \$992,650 by 2010. This cost savings is based on an energy savings of 13,627 kWh/intersection/year (metered results at Drake and Taft) at an energy cost of \$0.043/kWh (traffic signal electric rate).

Increasing Utility Commitment to Wind Energy through Green Pricing Programs

Status:	New Measure
Staff Team Ranking:	3rd out of 12 New Measures
Citizen Committee Ranking:	2nd out of 12 New Measures

Estimated Equivalent CO2 Savings in 2004:	4,103 tons/yr (2 turbines)
Estimated Equivalent CO2 Savings in 2010:	10,256 tons/yr (5 turbines)

Supporting Policy Direction:

ENV-4. Energy Efficiency and use of renewable energy resources will be encouraged, facilitated, and regulated in both the public and private sector through information and educational services, financial incentive programs, requirements and incentives in the planning process, and enforcement of regulations such as the Energy code.

ENV-4.1. The use of solar energy and other renewable resources are recommended energy sources.

ENV-4.9 Additional Policy development. Comprehensive policies will be developed to encourage the use of alternative forms of energy, such as wind-generated power and solar energy.

Description:

Based on the success of the current wind program, additional options for continuing expansion of the wind program would be developed. A sequenced process where successive steps build on information gained from and success of earlier steps will help to ensure an effective renewable energy initiative. Additionally, as the Colorado reregulation process evolves, the City Council will have a better understanding of any legislative requirements or standards that may be relevant to the electric utility.

For purposes of this report it is assumed that voluntary support and legislative standards will enable the project to grow by an average of one additional turbine every other year beginning in 2002. If implemented at this rate, a total of five more turbines would be installed between 2002 and 2010.

Implementing Department:	Utilities
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Recommended Timeframe for Completion:2010

Estimated Implementation Cost:	Additional economic burden of investment risk (about \$3.2 million for 2 turbines)
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Estimated Annual Operating Cost:	\$10,000 in existing staff resources/year
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Potential Funding Source(s):	NA
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Optimization of City's WasteWater Treatment System

Status:	New Measure
Staff Team Ranking:	4th out of 12 New Measures
Citizen Committee Ranking:	4th out of 12 New Measures

Estimated Equivalent CO2 Savings in 2004: 961 tons/yr

Estimated Equivalent CO2 Savings in 2010: 961 tons/yr

Supporting Policy direction:

Resolution 97-51:

As a user of energy the City administration shall, in the design and construction of all City facilities, emphasize and utilize the latest, available, proven technologies to provide energy efficient and cost effective heating, cooling, lighting and hot water services.....

Resolution 97-97:

“The Council intends for the City to take a leadership role in increasing energy efficiency and reducing greenhouse gas emissions from municipal operations”

Description:

Water distribution is often the largest single component of energy use by local governments. Across the United States, energy consumption accounts for 50 to 75% of the costs of operating municipal water systems. Of this, water pumping often consumes 80% or more of the electricity used in water distribution and treatment, and therefore represents a prime opportunity for local governments to save energy and money. Many cities, including Fort Collins, are using Supervisory Control and Data Acquisition (SCADA) systems to slash their energy costs.

The Fort Collins Utility has suggested that an evaluation of motors at its water treatment facilities would be useful for increasing savings. By upgrading to high efficiency motors and pumps, the water reclamation and water treatment plants would reduce electrical load. This reduction in electrical energy translates into CO2 savings from reduced coal consumption by power suppliers.

In 1997, CSU's Industrial Assessment Center completed an audit of the East Drake Water Reclamation Facility that conducts a significant portion of waste water treatment for Fort Collins. Seven assessment recommendations were made. Looking only at the four recommendation that had a payback of 2.7 years or less and that resulted in real energy savings, (not just rate reductions), they would result in a combined energy reduction of 486,000 kWhr/yr in electricity and 69,000 ccf/yr in natural gas. The Utility intends to have an energy engineer evaluate the IAC report and develop recommendations for implementation.

(NOTE: If this type of assessment is conducted at the City's other water treatment facilities, further opportunities for energy savings and greenhouse gas reduction might be identified, beyond the savings estimated here.)

Reduce Energy Use in City Government Buildings by 15% (from 1990 levels), Per Gross Square Foot

Status: New Measure
Staff Team Ranking: 7th out of 12 New Measures
Citizen Committee Ranking: 3rd out of 12 New Measures

Estimated CO2 Savings in 2010: 3,129 tons

Supporting Policy direction:

Resolution 97-51:

As a user of energy the City administration shall, in the design and construction of all City facilities, emphasize and utilize the latest, available, proven technologies to provide energy efficient and cost effective heating, cooling, lighting and hot water services in buildings owned, co-owned or leased by the City for municipal purposes.

Resolution 97-97:

“The Council intends for the City to take a leadership role in increasing energy efficiency and reducing greenhouse gas emissions from municipal operations”

PRINCIPLE ENV-4:Energy efficiency and the use of renewable energy will be encouraged, facilitated, and regulated in both the public and private sector

Policy ENV 1-13. Innovations. The City will consider adoption of successful air quality improvement strategies in effect elsewhere, including municipal practices, public information campaigns, incentive/promotion programs, and regulations.

Description:

The goal of 15% reduction per gross square foot can be achieved through implementation of numerous short-term and long-range strategies, outlined below.

Create a focal point for municipal energy management by hiring an Energy Manager or creating an Interdepartmental Energy Management Team.

The Energy Management Team would be responsible for:

- Coordinating with the P2 Assistance for New Source Review applicants.
- Compiling annual progress report that identifies energy conservation measures implemented, capital and operational costs of these measures, dollar savings, greenhouse gas savings, and other environmental impacts.
- Recommending future actions to promote energy efficiency in the City .
- Identifying barriers to meeting the 15% reduction goal.
- Identifying funding options for municipal energy efficiency.
- Evaluating the costs and benefits of incentives for increasing energy efficiency in departments, including:
 - re-establishing an Energy Fund to encourage implementation of

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translate into higher energy costs. Working conjunction with the Purchasing Department, a guideline for purchasing new high efficiency motors would be developed.

Consider joining ENERGY STAR BUILDINGS

Joining ENERGY STAR Buildings would require an agreement between the City government and the U.S. EPA. In this agreement, the City would agree to:

- Designate a Strategic Energy Director and a Communications Director,
- Benchmark municipal building energy performance,
- Upgrade at least one pilot building within two years of the agreement date, and
- Upgrade 60% of municipal facilities within seven years.

The EPA would agree to:

- Assist local government in benchmarking and planning,
- Offer workshops and objective information about energy-efficient technologies and applications,
- Provide analytical tools to calculate potential savings, and
- Communicate successes.

Fund new position for an HVAC Control technician

A request has been made to fund a new position for an HVAC Control Technician . This person would ensure that the City's HVAC system and automated building control systems are operating at maximum efficiency.

Implementing Department: Facility Services

Recommended Timeframe for Completion:2010

Recommended Approach for Implementation:

Consider a policy on energy consumption expectations for municipal operations and facilities. The 2000 Council Policy Agenda raises the question, "What policies would enhance the City's efforts toward energy conservation?"

Estimated Implementation Cost:	Unknown. Energy audits of major City facilities are being conducted in '99 – 2000.
Estimated Annual Operating Cost:	\$60,000 (for HVAC Control Technician)
Potential Funding Source(s):	General fund; Financing; Performance contracting
Annual Cost Savings:	A 15% reduction of both electricity and natural gas leads to a cost savings of \$185,101/yr in 2010.

City Government Purchase of WIND POWER

Status: New Measure
Staff Team Ranking: 5th out of 12 New Measures
Citizen Committee Ranking: 7th out of 12 New Measures

Estimated Equivalent CO2 Savings in 2004: 2,051 tons
Estimated Equivalent CO2 Savings in 2010: 2,051 tons

Supporting Policy Direction:

ENV-1.23 Global Climate. The City will employ strategies to increase energy efficiency and the use of renewable energy sources (except residential woodburning), in order to reduce the impact of the Fort Collins community on global warming.

ENV-4.1. Renewable Energy. The use of solar energy and other renewable resources are recommended energy sources.

Description: Under this measure, the City would commit to wind-generated power from one 660 Watt wind turbine. There are several reasons for the City to consider this measure.

- 1) The adopted policies in City Plan clearly support the use of renewable energy.
- 2) The City of Fort Collins strives to lead by example whenever possible. Examples include the high level of commitment to alternative fueled vehicles in City fleets, offering employees free bus passes to reduce driving, etc. Purchase of wind power by City government sets a good example for other businesses to follow.
- 3) The level of citizen commitment to the Wind Power Pilot Program also shows that many citizens support the use of renewable energy sources. This measure provides the City with an opportunity to reflect a strong community environmental value by supporting clean, renewable energy.

Implementing Department: Utilities

Recommended Timeframe for Completion: 2001

Recommended Approach for Implementation: Commit to one more turbine at Medicine Bow site at the next opportunity. This issue has been identified for resolution in the current Council's Policy Agenda.

Estimated Implementation Cost: Existing staff resources

Estimated Annual Operating Cost: \$47,000 (3.97% of each City department's current utility cost)

Potential Funding Source(s): General Fund

Develop a Commercial Green Building Program

Status: New Measure
Staff Team Ranking: 8th out of 12 New Measures
Citizen Committee Ranking: 8th out of 12 New Measures

Estimated CO2 Savings in 2010: 3,186 tons (assuming a 5% reduction of energy consumption in projected new commercial and industrial construction between 2002 – 2010.)

Supporting Policy Direction:
ENV-4. Energy Efficiency and use of renewable energy resources will be encouraged, facilitated, and regulated in both the public and private sector through information and educational services, financial incentive programs, requirements and incentives in the planning process, and enforcement of regulations such as the Energy code.

Description:
Under this new measure, the City would establish a program for builders to integrate environmental features into the design and construction of new commercial buildings. The measure could be voluntary, mandatory, or some hybrid. The measure could establish a “green” certification program for new commercial buildings as well as an education and outreach effort to stimulate the market. The certification program could be similar to Boulder and Denver’s programs, allowing the builder to choose from a list of green design standards.

Green design standards would apply to areas such as landscaping; construction debris recycling, water conservation, recycled content, resource efficient and less toxic building materials, insulation, active and passive solar design, and energy efficient lighting, appliances, and HVAC systems.

Implementing Department: Building and Zoning

Recommended Timeframe for Completion: This measure could be considered when the City’s energy code is next updated. It could also be considered as an extension (Phase II) of the New Source Review Pollution Prevention Pilot program that interacts with builders during the development review process.

Recommended Approach for Implementation: Education and outreach about green building practices should begin early on, followed by consideration of a more structured program of certifications.

Estimated Implementation Cost: \$15,000 staff time to evaluate this measure and develop a recommendation.

Estimated Annual Operating Cost: \$35,000 (half FTE to administer the program; shared with Residential Green Builder program FTE)

Potential Funding Source(s): General Fund; Governor’s Office of Energy Management and Conservation

Lobby for Mandatory Renewables in Deregulation (or Comparable Energy Conservation Measures)

Status:	New Measure
Staff Team Ranking:	11th out of 12 New Measures
Citizen Committee Ranking:	6th out of 12 New Measures

Estimated CO2 Savings in 2004:	60,000 tons
Estimated CO2 Savings in 2010:	71,561 tons

Supporting City Policy:

ENV- 4.6 Remove barriers to renewable energy use. The City will eliminate unnecessary barriers to utilization of renewable energy resources in new and existing buildings which arise through application and enforcement of City Codes.

ENV-4.7 Renewable energy in new development. The use of renewable energy resources should be considered in the layout and construction of new development.

Background:

Production of energy from renewable sources such as wind, solar, or hydropower does not produce CO2 in the course of generating electrical power. In the near future, utility companies will become deregulated and the market will open up to power producers in the private sector. By requiring utilities to provide a certain percentage of power from renewable resources, CO2 reductions can be obtained. Recently, lawmakers from both houses and both parties have introduced proposals specifying that a gradually increasing percentage of the nation's electricity be generated from renewable resources. These proposed renewable portfolio standards (RPS) range from 4 percent in 2010 to 20 percent in 2020. A 1996 Land and Water Fund report, *How the West Can Win*, projects that Colorado could achieve 16% renewable energy generation by 2015.

Conceptually, renewable energy enjoys significant support, nationally and locally. According to the results of national polls, most households would be willing to pay more than \$2 extra per month for renewables, and would thus appear willing to support a renewables target of 20 percent in 2020. According to a recent poll conducted by Fort Collins Utility, at least 35% of citizens would be willing to pay \$5/ month for wind-generated (renewable) power.

Nationally, studies have been released that look favorably on the economic impact of renewable energy. A recent report by the Union of Concerned Scientists, [A Powerful Opportunity](#), analyzed costs of adopting the 20% by 2020 renewable portfolio standard proposed by the Clean Energy Act of 1999. They found it to be both affordable and achievable, and to be more cost-effective than adopting a lower renewable standard of 5%. Similarly, a U.S Department of Energy report projected that for Colorado customers, deregulation would result in a 19% savings, on average.

In May of 1998, the Colorado Legislature enacted an electric industry study bill (Senate Bill 98 - 152). This law creates a panel to assess "whether restructuring of the retail electric industry is in the best interests of all classes of Colorado electricity consumers and the state as a whole." This panel is studying a number of specific questions related to deregulation. Economic analyses recently

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Other Benefits:

- Reduce air pollution emissions that contribute to visibility degradation and health problems:
 - Reduce 162 tons Nitrogen oxides/yr
 - Reduce 1.5 tons volatile organic compounds/yr
 - Reduce 8.3 tons carbon monoxide/ year
 - Reduce 171 tons of sulfur oxides/yr
 - Reduce 4.5 tons of particulate matter/yr
- The development of domestic renewable energy will keep energy dollars in the US and create jobs.
- Reduces the adverse environmental impacts associated with conventional forms of electricity generation (coal mining, drilling for natural gas, damming rivers, nuclear storage.)

Develop a Residential Green Building Program

Status: Pending Measure
Staff Team Ranking: 8th out of 12 Pending Measures
Citizen Committee Ranking: 5th out of 12 Pending Measures

Estimated CO2 Savings in 2010: 1,665 tons

Supporting Policy Direction:

ENV-4. Energy Efficiency and use of renewable energy resources will be encouraged, facilitated, and regulated in both the public and private sector through information and educational services, financial incentive programs, requirements and incentives in the planning process, and enforcement of regulations such as the Energy code.

Description:

Under this new measure, the City would establish a program for builders to integrate environmental features into the design and construction of new residential buildings. The measure would be modeled after the City of Boulder's "Green Points Program" (mandatory) and the Denver area "Built Green" program (voluntary). The measure would establish a "green" certification program for new residential buildings as well as an education and outreach effort to stimulate the market for homeowners to buy a certified "green" home. The certification program would be similar to Boulder and Denver's programs, allowing the builder to choose from a list of green design standards.

Green design standards would apply to areas such as landscaping, construction debris recycling, water conservation, recycled content, resource efficient and less toxic building materials, insulation, active and passive solar design, and energy efficient lighting, appliances, and HVAC systems.

Implementing Department: Building and Zoning

Recommended Timeframe for Completion: Consider this measure when the City's energy code is next updated.

Recommended Approach for Implementation: The City of Fort Collins could consider developing a Green Builder program during the next update of the Model Energy Code, which will begin in 2000 and be completed in 2001. This evaluation would establish whether to use the voluntary approach used by the Denver Metro Home Builders Association, or the mandatory approach used by the City of Boulder. A hybrid approach might entail increasing permit fees, but providing the opportunity to reduce fees to current levels if a specified level of green building standards were met.

At the same time, the City would help stimulate a local market for green homes through promotional materials, such as articles and demonstration home shows in a Parade of Homes. The Denver Metro HBA resources may be available to use.

APPENDIX D

Resolution 99-137

through increased energy efficiency, and reduced vehicle miles traveled and waste generation can provide multiple local benefits by decreasing air pollution, creating jobs, extending landfill life, and saving money for the City government, its businesses and its citizens; and

WHEREAS, the Council intends for the City to take a leadership role in increasing energy efficiency and reducing greenhouse gas emissions from municipal operations; and

WHEREAS, on July 1, 1997, the Fort Collins City Council adopted Resolution 97-97, thereby joining the Cities for Climate Protection campaign, and committing the City to develop a greenhouse gas inventory, set a greenhouse gas reduction target, and develop a plan for meeting the target, and

WHEREAS, a Staff Technical Team and a Citizen Advisory Committee have worked for over a year to identify and recommend a prioritized list of cost-effective actions to reduce local greenhouse gas emissions that, if fully implemented, would reduce Fort Collins' predicted greenhouse gas emissions in the year 2010 by thirty percent; and

WHEREAS, as a product of such efforts, the **"Fort Collins' Local Action Plan to Reduce Greenhouse Gas Emissions: September 1999"**, (the Plan), which is on file in the City Clerk's office and on the Natural Resources Department Web site and available for public review, has been developed to guide City actions to reduce local greenhouse gas emissions; and

NOW THEREFORE, BE IT RESOLVED BY THE COUNCIL OF THE CITY OF FORT COLLINS as follows:

Section 1. Council hereby declares its intent that the City shall proactively identify and implement actions that will reduce Fort Collins' contribution to total global greenhouse gas emissions, in direct support of City Plan Policy ENV-1.23 on the global climate.

Section 2. The City Manager is hereby directed to form an "Energy Management Team", the role of which will be to establish an implementation schedule for the reduction measures contained in the Plan, so as to implement such measures in a manner consistent with the timeframe of the Plan.

Section 3. The City Manager shall biennially, at least six months in advance of City budget preparation, submit to City Council a report that evaluates the progress of City staff on greenhouse gas reduction efforts, recommends actions for consideration in the upcoming budget cycle, and identifies additional greenhouse gas reducing activities that merit consideration two or more years into the future. The City Manager shall incorporate into this report the energy efficiency evaluation previously required in Resolution 97-51, and this requirement shall supercede and replace the requirement of annual report set forth therein.