

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

**Fort Collins Local Action Plan to Reduce Greenhouse Gas Emissions**

City Department	List of Existing or Planned Measures	References
<b>Transportation Services (continued)</b>	<p><u>VMT Reduction (Parking)</u></p> <ul style="list-style-type: none"> <li>• Develop Park-and-Ride facilities (Harmony interchange)</li> <li>• Other multi-modal transfer centers</li> <li>• Increase parking charges for regular parkers or employees</li> </ul> <p><u>Switch to Public Transit</u></p> <ul style="list-style-type: none"> <li>• Identify transit funding options</li> <li>• Expand Transfort routes and hours (CSU/night service)</li> <li>• Bikes on buses</li> <li>• Free bus pass to City employees</li> <li>• Youth ride bus free</li> </ul> <p><u>Car or Van Pooling</u></p> <ul style="list-style-type: none"> <li>• Commuter Pool matching</li> <li>• School Pool (Began in '96)</li> <li>• VanGO Commuter Van</li> </ul> <p><u>VMT Reduction (Walking /Biking)</u></p> <ul style="list-style-type: none"> <li>• Level of Service standards for pedestrians and bikes</li> <li>• Expand bike path network (by x miles)</li> <li>• Bike Right-of-Way committee</li> <li>• Ped Right-of-Way ordinance planned</li> <li>• Mason Street Transportation Corridor</li> <li>• Bike Month</li> <li>• Free Wheels (bike loaner program)</li> <li>• Use of bikes by other City depts. (Police, Natural Resources)</li> </ul> <p><u>Other VMT Reduction</u></p> <ul style="list-style-type: none"> <li>• SmartTrips – regional TDM program</li> <li>• Employee Trip Coordinator Network – City working with businesses to reduce VMT</li> <li>• City telecommute policy</li> <li>• City flex-time options</li> </ul>	
<b>Streets</b>	<p><u>Streetlights</u></p> <ul style="list-style-type: none"> <li>• Energy efficiency: lamp and ballast</li> <li>• Energy efficiency: reduce hours of operation</li> <li>• Use solar electricity (four solar-powered school crossing signals)</li> <li>• Reduce the number of lights</li> </ul> <p><u>Traffic Signals</u></p> <ul style="list-style-type: none"> <li>• Signals optimization being done Fall '98</li> <li>• Few LED traffic signals, desire for more</li> </ul> <p><u>Waste Reduction</u></p> <ul style="list-style-type: none"> <li>• Asphalt recycling</li> </ul>	

**EXISTING MEASURES**

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

**Fort Collins Local Action Plan to Reduce Greenhouse Gas Emissions**

City Department	List of Existing or Planned Measures	References
<b>Utilities (continued)</b>	<ul style="list-style-type: none"> <li>• ZILCH – zero interest loans for home energy improvements</li> <li>• Compact fluorescent light bulb lending library</li> <li>• Distribute “<i>How to Reduce Your Energy Costs</i>”</li> <li>• Offer integrated design assistance fore new commercial construction</li> </ul> <p><u>Energy Efficiency</u> 1991 Improvements to Fort Collins Electricity Distribution System (through use of oversize conductors)</p> <ul style="list-style-type: none"> <li>• PRPA in Climate Change Program/voluntary reporting</li> </ul> <p><u>Water and Sewage Treatment</u> Energy Efficient Treatment Process</p> <ul style="list-style-type: none"> <li>• Methane flaring</li> </ul> <p><u>Water Conservation</u></p> <ul style="list-style-type: none"> <li>• Ordinance prohibiting wasting water</li> <li>• Mandatory water metering program (9/97)</li> <li>• Water conservation requirements for commercial development covering landscaping and irrigation systems</li> </ul>	
<b>Fleet Services</b>	<p><b>GOAL:</b> 75% of City vehicles will meet ULEV standards by 2008</p> <p><u>Changes in Fuel Type</u> Alternative Fuels for City vehicles</p> <p><u>Increase Fuel Efficiency</u></p>	
<b>Forestry</b>	<ul style="list-style-type: none"> <li>• Support tree plantings</li> <li>• Promote tree stewardship</li> </ul>	
<b>Purchasing</b>	<p>“Buy Recycled” procurement policy</p>	
<b>Building and Zoning</b>	<p><u>Energy Efficiency: Buildings</u></p> <ul style="list-style-type: none"> <li>• Adoption of Model Energy Code, 1997</li> <li>• Economic incentive (\$75 off building permits) to use E-Star and ENERGY SCORE rating systems for new homes</li> <li>• Training for builders on the City’s Energy Code</li> <li>• Distributes “<i>Builder’s Guide to Energy Efficient Home Construction</i>”</li> </ul>	

Table 5 outlines the existing greenhouse gas reducing activities that we were able to quantify. These quantified measures are estimated to reduce approximately 603,000 tons of CO2 in 2010.

## 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
<b>EXISTING MEASURES TOTAL</b>	<b>603,124</b>

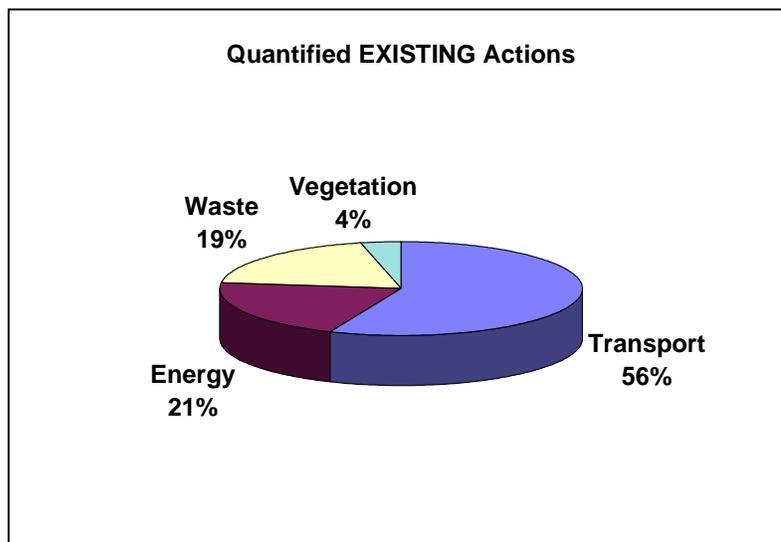


Figure 12. Estimated CO2 savings in 2010 from “existing” actions, attributed to emissions categories.

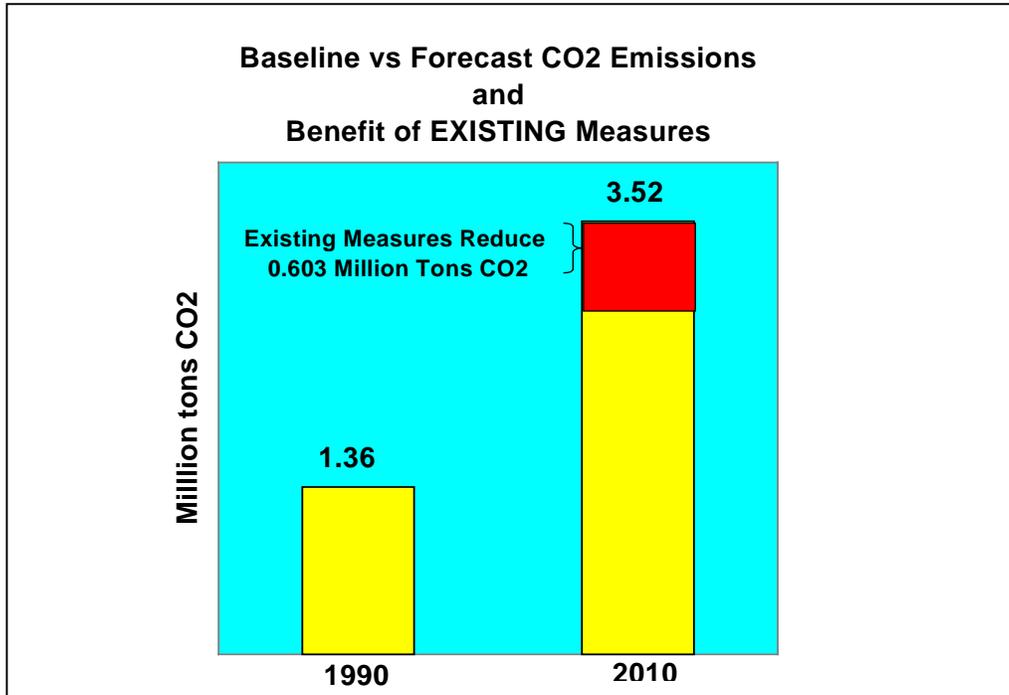


Figure 13. 1990 Emissions vs 2010 Forecast, and Greenhouse Gas Reduction Benefits from Existing Measures.

Figure 13 illustrates that quantified existing actions are expected to reduce Fort Collins' predicted 2010 emissions by approximately 17 %. A discussion of these existing actions is presented below.

**“Estimated CO<sub>2</sub> Savings in 2010” means...**

It is important to understand that this project ONLY calculates the CO<sub>2</sub> benefits expected to occur from actions in the year 2010 alone. Our calculations do not sum the benefits from actions between 1990 and 2010. Calculations are done this way in order to compare the benefits of actions in 2010 to the estimated emissions in 2010.

## 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.

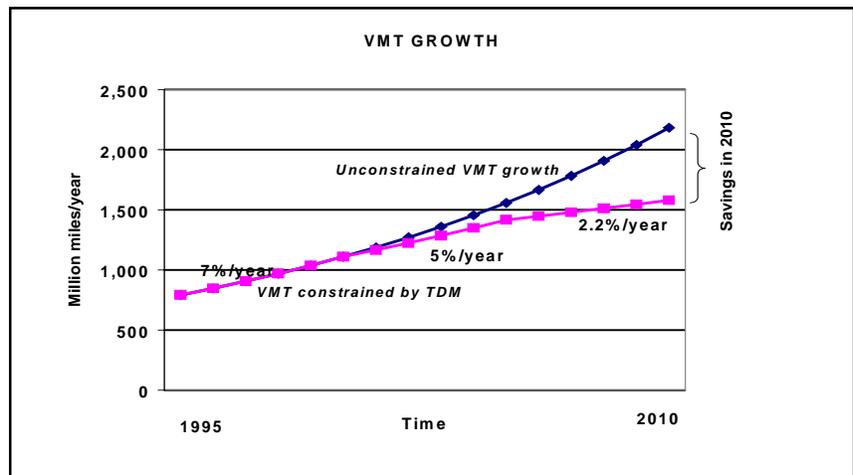


Figure 14. Predicted VMT growth, with and without measures to slow it.

VMT REDUCTION MEASURES

There are numerous programs and activities underway through the City's Transportation Demand Management Program, as well as the Regional SMART *Trips* program, to promote use of alternative modes. Implementation of the actions listed below.

**Implement Priority Pedestrian Plan Actions**

Specific pedestrian projects given top priority for 2000-2001 are:

- Pedestrian Safety Campaign
- Design Study for Grade –separated bicycle/ped crossings

**Implement Priority Bicycle Program Plan Actions**

The highest priority bicycle projects identified for 2000-2001 are:

- Downtown Bike Depot Feasibility Study
- Construction of five miles of bike/ped multi-use trail portion of Mason Street multimodal corridor
- Mulberry Street – bicycle/ped bridge improvement
- Evaluation of bike/ped connections at the bridge between Mulberry Street over the Poudre River
- Bike/ped underpass under College Avenue at Pitkin Street, connecting CSU Main campus to new academic facilities

**Mason Street Transportation Corridor**

The adopted Bikeway Program Plan for the City of Fort Collins identified the urgent need for a connecting north-south-route that is friendly to bicycles. There is currently no transportation facility dedicated to the north-south flow of bikes, buses, and pedestrians. The Mason Street Transportation Corridor Project will plan how to dedicate a corridor along Mason Street for the use of alternative modes of transportation.

The North Front Range Transportation Alternatives Feasibility Study sponsored by the Colorado Department of Transportation identified the Mason Street corridor as critical to providing regional rail service for the Front Range. Fort Collins is the only community where there are two recommended rail stations, both of which are on the Mason Street Transportation Corridor.

Total revenue collected from the voter-approved sales tax for the Mason Street Corridor Project over an eight year period is anticipated to be \$7.2 million. In addition, the City is providing funds for construction of the north terminus transit/rail center at Laporte and Mason Streets.

**Promote Telecommuting**

**Estimated CO<sub>2</sub> Savings in 2010:** 3,076 tons

- A. For all Private businesses.** The TDM Department's Employee Trip Coordinator Network has already established a good avenue for encouraging employees at large businesses to telecommute. Raising awareness of the benefits of telecommuting with

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 CO<sub>2</sub> 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 CO<sub>2</sub> 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 CO<sub>2</sub> 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 CO<sub>2</sub> 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

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CO2 savings will increase with these acquisitions, so the CO2 savings presented here represents a very conservative estimate.

### ***City of Fort Collins FLEET SERVICES Goal Statement***

The City of Fort Collins Fleet Services has established a goal that by the year 2008, 75% of light duty vehicles in the City fleet exceed the 1998 ULEV (ultra low emission vehicle) standards. In addition, Fleet Services will work with the Purchasing Department and the Equipment Board to ensure that information about fuel efficient vehicles and equipment is available and has been considered by departments making purchases.

### **ULEV and ZEV Vehicles for City Fleet; Including Electric Vehicles**

The City of Fort Collins Fleet Services has established a goal that by the year 2008, 75% of light duty vehicles in the City fleet exceed the 1998 ULEV (ultra low emission vehicle) standards. In addition, Fleet Services will work with the Purchasing Department and the Equipment Board to ensure that information about fuel efficient vehicles and equipment is available and has been considered by departments making purchases.

Fleet Services has expressed interest in purchasing electric vehicles, as part of their commitment to improving air quality and meeting their 75% ULEV goal by 2008. A pilot project to evaluate the use of electric vehicles is being considered.

### **Clean Cities Program**

In May 1996, the Weld/Larimer/Rocky Mountain National Park coalition (W/L/RMNP) received the nation's 47th Clean Cities designation. The City of Fort Collins played an instrumental role in creating the coalition. Now, the W/L/RMNP is part of one of the nation's longest clean fuels corridor and extends from Colorado Springs to the Wyoming Border. The coalition promotes the use of alternative fueled vehicles, which typically emit less CO2 per mile than gasoline or diesel powered vehicles.



**Promote DOE’s “Climate Wise” Program to Local Businesses**

**Estimated CO<sub>2</sub> Savings in 2010:** 38,390 tons

Recognizing that industrial energy use accounts for nearly 30% of total greenhouse gas emissions, DOE began the Climate Wise program in 1994. Climate Wise is a voluntary partnership program designed to assist businesses in turning energy efficiency and environmental performance into corporate assets. Since its inception in 1994, over 400 companies across the nation have joined the program. Participation entails 1) signing a partnership agreement with DOE, 2) developing a Climate Wise Action Plan, and 3) recording the results of achievements and striving for continuous improvement.

In 1999, the City of Fort Collins received a grant from ICLEI to assist in recruiting Fort Collins businesses to join the Climate Wise program. Under this grant, we will be responsible for recruiting eight local businesses to the program, and providing technical assistance to ensure that at least three companies file action plans for reducing greenhouse gas emissions.

The greenhouse gas benefits from this program have been estimated based on the assumption that it would reduce 5% of the industrial sector greenhouse gas emissions predicted for 2010.

***City of Fort Collins UTILITY  
Goal Statement***

The City of Fort Collins Utilities strives to serve their customers through an environmentally friendly operation. We are dedicated to serving the community by balancing service operations through quality and economic products.

**Fort Collins Electricity Distribution System Improvements**

**Estimated CO<sub>2</sub> Savings in 2010:** 15,189 tons

The Fort Collins Utilities has made substantial investments to keep distribution losses low even as population growth necessitates system expansion. Fort Collins’ entire system uses oversized conductors to reduce normal operating losses and to provide enough system capacity to allow backfeeds in the event of system failures. Additionally, Fort Collins factors into account these losses when it evaluates transformer bids as part of its system expansion decisions.

The general industry value for distribution losses is often in the range of 5% to 7%. Distribution losses for the Fort Collins system is typically under 3%. Based on analysis of about 2,000 utilities, a conservative estimate of distribution system loss is 5%. Relative to this reference, Fort Collins’ investments and activities can be viewed as improving system-wide efficiency by about 2%.

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 CO<sub>2</sub> Savings in 2010:** 12,524 tons/year

According to CSU's 1997 Utility and Energy Management Report, 29,819 tons of CO<sub>2</sub> 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 CO<sub>2</sub> 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 CO<sub>2</sub> savings from IAC activities, the average CO<sub>2</sub> reduction from past IAC projects (442.9 tons CO<sub>2</sub>/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 CO<sub>2</sub> 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

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time periods, the City Council has supported this approach. The conclusion has been that non-participants are at a minimum risk, and even with anticipated turnover in participation it is assumed that adequate support will be maintained. Support for the additional turbines in Phase 2 is projected as follows:

- 1.5 Turbines: Voluntary Subscriptions
- 1.0 Turbines: Based on a ten-year contract with New Belgium Brewing Company

New Belgium Brewing Company set a leadership example of employee-based decision-making in favor of environmental values. In keeping with their practice of open book management, the owners of New Belgium Brewing Company did not make the financial commitment to wind power alone. The choice of wind power was presented to the entire New Belgium staff and, although its additional cost diminished the size of their bonuses (which are paid out on costs-per-barrel), the 70-person vote was unanimously in favor.

Under this measure, Fort Collins Utilities would work with other large employers in Fort Collins to propose a wind power donation program modeled on United Way's charitable donations system. In this program employees elect to subsidize green power, demonstrating a personal commitment to renewable energy and a shared commitment between employer and employee.

The Utility would provide information on the benefits of wind for employee promotional efforts and support administrative aspects of the program, such as book keeping and automatic payment deductions. Contractual commitments to the wind program would be required between the commercial customer and the City.

### Wind Power Pilot Program (Phase I)

**Estimated CO<sub>2</sub> Savings in 2010:** 4013 tons/year

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 electrify power from wind, and two 600 kW and one 65 kW turbines were installed at the Medicine Bow, Wyoming farm.

Based on six months of operation, the turbines generate, on average, 32% full capacity.  $(600+600+65)\text{kW} \times 8760 \text{ hours} = 11,005,500 \text{ kWh full capacity} \times .32$ . The turbines are expected to continue to provide wind energy at 32% full capacity in 2010.

### Poudre School District Energy Conservation Upgrades

**Estimated CO<sub>2</sub> Savings in 2010:** 1,143 tons from completed projects from '95 – '98  
1,409 tons from projected future actions '99-2010

Twenty energy efficiency projects were implemented at Poudre School District schools between 1995 and 1998. These projects resulted in a total annual savings of 971,195 kWh/year and 53,073 CCF/year. If Poudre School District were to continue implementing energy efficiency projects that resulted in energy savings of 100,000 kWh per year and 700

## EXISTING MEASURES

CCF per year (slightly below the average savings of the preceding years) for twelve years between 1999 and 2010, a total of 1,200,000 kWh and 8,400 CCF would be saved.

### Zero Interest Loans For Conservation Help (ZILCH)

#### A) ZILCH with Energy Score (E-Score) Ratings

**Estimated CO<sub>2</sub> Savings in 2010:**     254 tons for '92 – '98 projects  
  398 tons for projected projects from 2000-2010

The Zero Interest Loans for Conservation Help (ZILCH) program, started in 1992, makes zero interest loans available to residents for energy upgrades to homes. If the E-Score energy rating method is used, higher loan amounts are available.

Based on data provided by Fort Collins Utilities, which administers the program, 45 residences used ZILCH Energy Score loans between 1992 and 1998. Assuming that projects were conducted in natural gas-heated homes, the resulting CO<sub>2</sub> saving in 2010 are estimated to be 253.7 tons.

To estimate future savings from the ZILCH program, average annual savings from ZILCH projects between 1992 and 1998 were calculated at \$2,414. Annual dollar savings were converted to natural gas savings by dividing by natural gas prices (\$ 0.43/therm). Therms saved were then converted into annual CO<sub>2</sub> savings (33 tons CO<sub>2</sub>/year), and summed for the eleven years between 1999 and 2010.

#### B) ZILCH with No Energy Score Ratings

**Estimated CO<sub>2</sub> Savings in 2010:**     100 tons for '92 – '98 loan projects  
  191 tons for projected '99 – 2010 projects

Some ZILCH loan recipients did not use the E-Score rating method. Based on data provided by Fort Collins Utilities, 28 loans were awarded that resulted in natural gas savings, and 15 projects resulted in electricity savings. The average annual savings for projects between 1992 and 1998 were calculated at \$728 from natural gas and \$310 from electricity. Annual dollar savings were converted to natural gas saving by dividing by power prices (\$ 0.39/therm for natural gas and \$0.060/kWh for electricity). Co<sub>2</sub> reductions were calculated based on estimated energy savings.

To estimate potential future savings of the ZILCH program for loans that did not include E-Score, the average annual savings for projects between 1992 and 1998 were calculated at \$728 from natural gas and \$310 from electricity. Annual dollar savings were converted to natural gas saving by dividing by power prices (\$ 0.43/therm for natural gas and \$0.060/kWh for electricity). Dollar savings were then converted into annual CO<sub>2</sub> savings, and summed for the eleven years between 1999 and 2010.

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

The City of Fort Collins Facility Services will work to maintain City buildings in an energy efficient manner consistent with budget and funding availability. Additionally, Facility Services constructed buildings will encompass the Department's newly established green building criteria to the maximum extent possible.

**Lighting Upgrades in City Buildings**

**Estimated CO<sub>2</sub> Savings in 2010:** 257 tons for '92 – '98 activities

Twenty-three lighting retrofit projects were implemented between 1993 and 1998 at a number of City buildings. Annual kWh savings from each project were calculated by multiplying kWh savings per day \* 281 days of usage per year. Total annual savings for these projects = 225,576 kWh/year.

If the City continues to implement lighting upgrades at the average annual rate achieved between 1994 and 1998 (9,412 kWh savings/year), it would save an additional 129 tons of CO<sub>2</sub> in 2010. (1993 was not included in the annual average estimate of savings because the savings realized in 1993 were several orders of magnitude higher than those of following years.)

NOTE: Many more lighting upgrades have been implemented since 1990, such as replacement of EXIT signs with LEDs in buildings, but the installations have not been documented well enough to calculate CO<sub>2</sub> benefits.

**City Government Converting to Variable Frequency Drives**

**Estimated CO<sub>2</sub> Savings in 2010:** 48 tons

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.

**Pollution Prevention (P2) to Promote Energy Efficiency in the Commercial Sector**

**Pilot Pollution Prevention Program:** Small businesses contribute the collective majority of pollutants in Colorado. Over 80% of businesses in Fort Collins are considered "small". Survey data indicate that small businesses are less able to access the benefits of P2 than large ones. Thus, educating these businesses about the economic and environmental benefits of P2 may help to reduce the overall pollution in the community.

## **EXISTING MEASURES**

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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 CO<sub>2</sub> eliminated in the year 2010 as a result of facility improvements.

## Existing Measures - Solid Waste Reduction

**CO<sub>2</sub>e = Carbon Dioxide Equivalent; Global Warming Potential**

To make relative comparisons between carbon dioxide and methane possible, the Global Warming Potential for each 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 CO<sub>2</sub>, indicating the methane has been converted to CO<sub>2</sub> equivalent.

***City of Fort Collins NATURAL RESOURCES DEPARTMENT  
SOLID WASTE PROGRAM Goal Statement***

The City will apply efforts both internally (as an organization) and externally, to the community, to help meet publicly adopted goals for reducing the amount of solid waste generated in Fort Collins and sent to landfills for disposal, and for increasing the amount of waste material that is recycled or reused.

### **Business Recycling**

**Estimated CO<sub>2</sub> Savings in 2010:** 41,735 tons

In 1999, the Natural Resources Department conducted a study to identify the full extent of waste diversion taking place throughout Fort Collins. Recycling data were collected directly from commercial businesses and regional processors, forming a baseline analysis for recovery activities. Excluding the six commercial trash haulers, seventeen businesses and materials processors engaged in recycling activities that diverted to over 20,000 tons of material from landfills. This represented about 60% of all Fort Collins' material recycled in 1998. One reason for the higher percentage is that commercial business recycling efforts cover a wider variety of materials (including metal, wood, compost, office paper, and cardboard) than are collected through curbside recycling. For commercial businesses, waste diversion occurs due to the market value of materials and the potential to reduce disposal costs, not because of mandates.

Applying the 1998 per capita business' recycling rate to the predicted 2010 population of 143,450, it is estimated that business recycling activities would reduce 41,735 tons of CO<sub>2</sub>e in 2010.

**Residential Curbside Recycling**

**Estimated CO<sub>2</sub> 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 CO<sub>2</sub>e in 2010.

**Methane Flaring and Heat Recovery at Waste Water Treatment Plant**

**Estimated CO<sub>2</sub> Savings in 2010:** 35,607 tons  
(if all CH<sub>4</sub> flared, with the addition of another CH<sub>4</sub> -powered digester)

The City's main wastewater treatment plant currently uses approximately eighty-five percent of all methane (CH<sub>4</sub>) 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 CH<sub>4</sub> 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 CO<sub>2</sub> Savings in 2010:** 121 tons

In 1997, the City of Fort Collins joined WasteWiSe, 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.

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## **Fort Collins Local Action Plan to Reduce Greenhouse Gas Emissions**

3. Begin paper board recycling (contingent on market reception).
4. Institute a contest between City departments to improve recycling volumes by 10%.

### **Buy Recycled Products**

1. Purchase 30% recycled content paper and encourage adoption of this guideline.
2. Incorporate contract language with outside vendors to encourage the use of recycled content products.

Additionally, the following activities are suggested to support municipal waste reduction.

#### **1. Waste Prevention**

- a. Encourage use of electronic communication (email, telephone, etc.) instead of paper by City employees and contractors whenever appropriate.
- b. Require use of duplex copying when available.
- c. Encourage use of once-used (clean scrap) paper for internal use.

#### **2. Recycling**

- a. Continue to implement/expand, the City's internal recycling program.
- b. Discourage use of non-recyclable products and materials by City employees and contractors.
- c. Require incorporation of adequate recycling facilities in construction or remodeling of City facilities.

#### **3. Composting**

- a. Increase composting efforts to include all City-generated or City-collected plant debris.

#### **4. Purchasing**

- a. Implement policies to continuously update recycled-content specifications to maximum feasible levels for all products, e.g., printer paper.
- b. Adopt policy of purchasing duplex-capable copiers and computers. Encourage City vendors to adopt similar policies.
- c. Include salvage and recycling requirements in all contracts with demolition or removal firms.

#### **5. Promotion, Education**

- a. Implement/expand ongoing comprehensive waste reduction program for City employees and contractors, e.g., informational flyers, volunteer coordinators, contests.

**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 CO<sub>2</sub> by All Trees in Fort Collins in 2010**

**Estimated CO<sub>2</sub> 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 CO<sub>2</sub> sequestration of 69.7 pounds/year/tree.

**Natural Areas Shrub Plantings**

**Estimated CO<sub>2</sub> Savings in 2010:** 15 – 100 tons (use 48 tons as average)

## **Fort Collins Local Action Plan to Reduce Greenhouse Gas Emissions**

The City of Fort Collins Natural Resources Department manages more than 5,000 acres of land as natural areas. The City is committed to restoring and enhancing these lands in order to provide habitat for native plants and animals. These efforts include eradicating weeds, picking up trash, and planting native species. 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 CO<sub>2</sub> in 2010.

### **EXISTING MEASURES – PURCHASING**

#### **Municipal Pilot of Environmentally Preferable Products**

The City's Affirmative Procurement Plan of 1990 established the requirement to conduct and report on one pilot program for purchasing environmentally preferable products each year by the City government. Products to consider piloting that are in support of WasteWiSe goals include:

- cleaning products
  - re-refined motor oil
  - low emission, high fuel economy vehicles, such as the Honda hybrid vehicle
- Information about the pilot would be included in the annual CCP report and Annual Purchasing report to the Finance Director.

#### **“Green Building” for the New City Office Building**

The City is currently in the process of finalizing a contract for the new City office building at 301 N. Mason. This building will be built using green products where possible, including the use of solar lighting and other energy saving products. In addition, the use of a “design/build” process will be organized so as to reduce construction waste.