TABLE OF CONTENTS

Executive Summary

I. Status of Climate Change Science

II. Fort Collins Greenhouse Gas Emissions

III. Status of Climate Protection Actions

Transportation

VMT Goal
Mason Street Project
TDM Program
Consider Accelerated TDM Program; Disincentives for Driving
Promote Telecommuting
Alternative Fueled City Fleet Vehicles
Fuel Consumption by City Departments
ULEV/ZEV Vehicles for City Fleet
Clean Cities Program
Fort Collins – Denver Commuter Rail
Parks Satellite Shops
Push for Tighter Fuel Efficiency Standards
Hydrogen Task Force

Energy

Fort Collins Electricity Distribution System Improvements
CSU Energy Conservation Programs
1996 City Energy Code
Climate Wise for Local Businesses
CSU’s Industrial Assessment Center
Wind Power Phase II
Wind Power for City Facilities
Zero Interest Loans for Conservation Help (ZILCH)
Replace Incandescent Traffic Signals with LED’s
Lighting Upgrades in City Buildings (‘93-‘98)
City Buildings Use Variable Frequency Drives
Pollution Prevention in the Commercial Sector
Reduce City Building Energy Use 15% per s.f.
Green Building Program
Increase Energy Efficiency Training for Builders
Lobby for Mandatory Renewable Energy

Solid Waste

50% Waste Reduction Goal
Business Recycling
Curbside Recycling
Methane Flaring and Heat Recovery................................. 16
Larimer County Wood Waste Diversion Project ................. 16
Construction Debris Recycling Pilot............................... 16
Second Centralized Recycling Drop-off Site ................... 16
Expand Larimer County Recycling Center ....................... 17
Landfill Gas to Energy ................................................. 17
Vegetation ......................................................................... 17
Increase Tree-planting citywide .................................... 17
Natural Areas Shrub and Tree-Planting ......................... 17
Purchasing .......................................................................... 18
Distribute Bids and Proposals Electronically.................. 18
Pilot Environmentally Preferable Products ................. 18
Climate Change Education and Outreach ................... 18

IV. Recommendations ......................................................... 19

APPENDIX A – Data Sources

LIST OF ACRONYMS

CO² carbon dioxide
CO₂e carbon dioxide equivalent (methane is converted to CO₂e)
CCP Cities for Climate Protection
CH₄ methane
CIP capitol improvement projects
CMAQ Congestion Mitigation & Air Quality
CNG compressed natural gas
CSU Colorado State University
EPA Environmental Protection Agency
F degrees Fahrenheit
GGE gallon of gas equivalent
GHG greenhouse gases
HVAC heating ventilation air conditioning system
IAC Industrial Assessment Center
ICLEI International Council for Local Environmental Initiatives
ICMA International City/County Management Association
IPCC Intergovernmental Panel on Climate Change
kWh kilowatt hour
LAP Fort Collins Local Action Plan to Reduce Greenhouse Gas Emissions
LED light emitting diode
LUTRAQ Land Use, Transportation, and Air Quality
MSW Municipal Solid Waste
NRD City of Fort Collins Natural Resources department
NSR New Source Review (part of the City’s Development Review process)
P2 Pollution Prevention
PRPA Platte River Power Authority
PSD Poudre School District
RFP request for proposal
TAFS Transportation Alternatives Feasibility Study
TDM Transportation Demand Management
ULEV ultra low emission vehicles
VMT vehicle miles traveled
ZEV zero emission vehicles
ZILCH Zero Interest Loans for Conservation Help
Executive Summary

Background
In 1997, Fort Collins joined over 300 cities (now over 400) in the international Cities for Climate Protection Campaign. In doing so, the City made a commitment to conduct a greenhouse gas inventory for the baseline year of 1990, set a greenhouse gas reduction target, and develop a plan for meeting the target. A Staff Technical Team and a Citizen Advisory Committee spent over 18 months developing a climate protection plan for the city.

In 1999, Fort Collins City Council adopted the Fort Collins Local Action Plan to Reduce Greenhouse Gas Emissions (LAP). The City’s greenhouse gas reduction target was established as “30 percent reduction of predicted 2010 levels”. The City Council also called for formation of an Energy Management Team to facilitate implementation of the LAP, and a biennial report to evaluate the progress of City staff on greenhouse gas reduction efforts and recommend future climate protection actions. This is the first biennial “Climate Protection Status Report” that the Energy Management Team has prepared for the City Manager.

Greenhouse Gas Emissions Level
In the last decade, greenhouse gas emissions across the city rose from 1.33 million tons of CO₂e in 1990 to 2.041 million tons in 2000, a 153% increase. During the same time, population increased by 135%. However, between 1997 and 2000, there was a slight (0.6%) decrease in per capita emissions.

The Good News…..
It is estimated that 190,000 tons of CO₂e were reduced in Fort Collins in 2000, based on all measures that could be quantified for the year 2000. This means quantifiable climate protection activities have reduced citywide emissions by 9% in the year 2000! Emissions would have been 2.231 million tons instead of 2.041 tons in the absence of actions to reduce emissions. However, it is too early to make a meaningful evaluation of whether the City is on target to reach its goal of 30% reduction of predicted 2010 levels by 2010.
2000 Highlights
2000 was a banner year for climate protection activities in Fort Collins.

February 2000
• Climate Wise program kicked-off with a successful business recruitment breakfast.

May 2000
• Fort Collins Utilities and Platte River Power Authority won the Utility Leadership Award from the American Wind Energy Association.

June 2000
• One 660 kW wind turbine installed at Medicine Bow site to supply wind for municipal facilities.
• Municipal Energy Management Team first convened by City Manager.
• Ground-breaking occurred for the new City administration building, with the intent to implement the Green Building Criteria.
• Facility Services hired a new HVAC Control Technical position.
• Doubly energy efficient new chiller installed at City Hall.

July 2000
• Construction Debris Recycling Pilot project kicked off, with eight participating businesses. In all, 37.5 tons of wood waste were diverted from the landfill through this feasibility project.

August 2000
• “Climate Protection: Fort Collins Likes the Idea” published in the ICMA journal, Public Management.
• City Fleets received first Ultra Low Emissions Vehicle (ULEV), a hybrid electric Toyota Prius. (A second Prius arrived in December.)

September 2000
• City received Climate Protection Award from White House.
• SmartTrips won Creative Excellence Award from the Association for Commuter Transportation.
• “Forum for Converting to a Hydrogen Economy” held in Fort Collins.

October 2000
• City Council approved Mason Street Transportation Corridor Master Plan.

November 2000
• City Council approved lease purchase agreement enabling complete retrofit of traffic signals to LEDs.
• City Council approved a new contractual position to continue climate protection efforts with local businesses, and within City government.
• Climate Wise partners acknowledged by City Manager and City Council.

December 2000
• Climate Wise program featured in the City of Fort Collins Annual Report to the Public.
I. Status of Climate Change Science……the need for climate protection continues

This section of the report offers highlights of recent mainstream, credible scientific assessments regarding climate change.

March 2001
First direct observational evidence of a change in the Earth’s greenhouse effect documented. Scientists from Imperial College, London show there has been a significant change in the Earth’s greenhouse effect over the last 30 years. These finding are based on changes in levels of longwave (outgoing) radiation measured by Earth-orbiting spacecraft in 1970 and 1997. Previous studies in this area have depended on theoretical simulations because observational data have been lacking.

January 2001
Internationally renowned scientists predict Earth's temperature will rise 2.5 to 10.4° F by 2100. The Intergovernmental Panel on Climate Change’s (IPCC) scientific working group formally accepted its summary of current understanding of the global climate system. The scientific document reports the Earth's average surface temperature is predicted to rise 2.5 to 10.4 degrees Fahrenheit between 1990 and 2100. This projection is higher than the 1995 projection in IPCC's Second Assessment Report of a rise of 1.8 - 6.3° F.

December 2000
Pew Center report describes how climate change may profoundly alter the natural environment. The Pew Center for Global Climate Change released a report describing how, as the earth warms, climate change is likely to alter the functionality of ecosystems. For example, climate change may alter the ability of ecosystems to filter air and water pollutants, and to control soil erosion.

November 2000 National Assessment report released.
The First U.S. National Assessment, Climate Change Impacts on the United States: The Potential Consequences of Climate Variability and Change became available November 11, 2000. The report is a national-level synthesis of key findings from the U.S. Global Change Research Program's National Assessment effort. It was drafted by a chartered federal advisory committee under the National Science Foundation. Key findings for the western region of the Unites States, including Colorado, include:

Water Resources
- It is likely that some current reservoir systems will be inadequate to control early spring runoff.

Natural Ecosystems
- Fire frequency will increase.
- Under two modeled scenarios, plant growth will increase, desert area will be reduced.
- Species will have much difficulty adapting to climate change due to diverse topography.
- Some alpine ecosystems in the region will disappear entirely.

Agriculture and Ranching
- Crop production may increase.
- Forage may increase and the growing season may lengthen.
- Increased flooding and animal disease may affect ranching.

Tourism and Recreation
- Higher temperatures mean a longer season for summer activities, but recreation days may be limited by heat.
- Ski areas at low elevations will be at risk from shorter seasons and rising snow lines.
II. Fort Collins Greenhouse Gas Emissions for 2000

In 2000, Fort Collins generated approximately 2,041,000 tons of carbon dioxide equivalent (CO$_2$e). By comparison, 1,330,000 tons of CO$_2$e were generated in 1990, the baseline year against which Fort Collins climate protection efforts are measured. Data sources are discussed in Appendix A.

![Figure 1. Fort Collins GHG Emissions, 1990 - 2000](image)

Figures 2 and 3 compare 1990 and 2000 greenhouse gas emissions, by source. The transportation sector shows a 4% increase in its emission share between 1990 and 2000, while the natural gas share dropped by five percent.

![Figure 2. 1990 GHG Emissions](image)

![Figure 3. 2000 GHG Emissions](image)

1 CO$_2$e = Carbon dioxide equivalent. Since methane is 21 times more potent a greenhouse gas than carbon dioxide, the relative global warming potential of CO$_2$ = 1 and of methane = 21. When methane and carbon dioxide emissions are summed, they are referred to CO$_2$e, indicating methane has been converted to CO$_2$ equivalent.

2 The Fort Collins greenhouse gas (GHG) emission analysis for 1990 and 2000 has been updated to reflect new EPA emission factors for municipal solid waste (MSW). Revised MSW emission factors are about half of the emission factor rate used when the City first conducted its audit in 1998. Therefore, 1990 citywide emissions drop from 1.360 millions tons CO$_2$ to 1.330 million tons.
Figure 4 illustrates that 2000 per capita emissions show a slight decrease when compared to 1997 emissions, which is an encouraging sign.

![Fort Collins Per Capita Emissions](image1)

Figure 4. Per Capita Emissions

Figure 5 shows a comparison of actual emissions in 2000 versus projected emissions done in the year 1998. Actual transportation emissions in 2000 are calculated using a 6.3% annual vehicle miles traveled (VMT) growth rate from 1998 VMT levels. This growth rate factor was derived by calculating the historic relationship (1990 to 1998) between VMT and other data such as population, vehicle registration, total fuel sales, and service station fuel sales.

![2000 Emissions - Actual vs Estimated](image2)

Figure 5. Actual vs. Estimated 2000 Emissions
III. Status of Climate Protection Efforts

Table 1 summarizes the greenhouse gas (GHG) reduction benefit of all measures that could be quantified for the year 2000. In total, 190,000 tons of CO\textsubscript{2}e were reduced during the year 2000. Total 2000 emissions would have been 2.231 million tons instead of 2.041 tons in the absence of actions to reduce emissions. Thus, quantifiable climate protection activities have reduced citywide emissions by 9% in the year 2000.

### Table 1. GHG REDUCTION MEASURES (March 2001)

<table>
<thead>
<tr>
<th>Quantifiable Measures</th>
<th>Tons CO\textsubscript{2} e reduced in 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRANSPORTATION</strong></td>
<td></td>
</tr>
<tr>
<td>TDM Programs, including VAN GO</td>
<td>1,679</td>
</tr>
<tr>
<td>City employee Teleworking</td>
<td>3</td>
</tr>
<tr>
<td>Alternative Fueled City Fleet Vehicles</td>
<td>382</td>
</tr>
<tr>
<td>Fuel Consumption by City Departments</td>
<td>47</td>
</tr>
<tr>
<td><strong>ENERGY</strong></td>
<td></td>
</tr>
<tr>
<td>FC Electricity Distribution</td>
<td>14,639</td>
</tr>
<tr>
<td>CSU (programs from 1990 - 1997)</td>
<td>12,524</td>
</tr>
<tr>
<td>1996 City Energy Code</td>
<td>10,799</td>
</tr>
<tr>
<td>Climate Wise for Businesses</td>
<td>7,253</td>
</tr>
<tr>
<td>CSU's Industrial Assessment Center</td>
<td>4,206</td>
</tr>
<tr>
<td>Wind Power Pilot</td>
<td>3,535</td>
</tr>
<tr>
<td>Wind Phase II</td>
<td>2,916</td>
</tr>
<tr>
<td>Wind Power for City Facilities</td>
<td>1,944</td>
</tr>
<tr>
<td>ZILCH ('90 - '00)</td>
<td>431</td>
</tr>
<tr>
<td>Replace Traffic Signals with LEDs</td>
<td>405</td>
</tr>
<tr>
<td>Lighting Upgrades – City Buildings: ‘90-’98</td>
<td>237</td>
</tr>
<tr>
<td>City Convert to Variable Freq. Drives (thru ’98)</td>
<td>45</td>
</tr>
<tr>
<td><strong>SOLID WASTE</strong></td>
<td></td>
</tr>
<tr>
<td>Business Recycling</td>
<td>38,155</td>
</tr>
<tr>
<td>Curbside Recycling</td>
<td>36,671</td>
</tr>
<tr>
<td>Methane Flaring and Heat Recovery</td>
<td>29,925</td>
</tr>
<tr>
<td>Larimer County Wood Waste Diversion</td>
<td>2,490</td>
</tr>
<tr>
<td>Construction Debris Recycling</td>
<td>20</td>
</tr>
<tr>
<td><strong>VEGETATION</strong></td>
<td></td>
</tr>
<tr>
<td>CO\textsubscript{2} Sequestration by Trees</td>
<td>21,071</td>
</tr>
<tr>
<td>Increase Citywide Tree Planting</td>
<td>482</td>
</tr>
<tr>
<td><strong>PURCHASING</strong></td>
<td></td>
</tr>
<tr>
<td>Distribute Bids and Proposals Electronically</td>
<td>5</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>189,864</td>
</tr>
</tbody>
</table>

These measures are described in varying levels of detail in the rest of this report. There are numerous other municipal and private activities and programs that have not been quantified that also contribute to reducing the citywide carbon dioxide emissions. Some of these non-quantified measures are also mentioned in subsequent sections of the report.
VMT Goal: not to exceed population growth rates

Status In 2000, the LUTRAQ (Land Use, Transportation, and Air Quality) Team was reconvened with members from eight departments in two service areas. The mission of the LUTRAQ Team is to develop a comprehensive program to reduce the growth of vehicle miles traveled (VMT), and see that it is carried out. The Team has prioritized the following eight projects.

<table>
<thead>
<tr>
<th>PROJECT</th>
<th>OBJECTIVE</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transportation Funding</td>
<td>Secure the needed long-term funding for all travel modes, especially transit, cycling, and walking, which are farther behind than streets.</td>
<td>Capital projects list has been prioritized from a VMT-reduction perspective.</td>
</tr>
<tr>
<td>Staff Awareness</td>
<td>Conduct an information campaign to re-ground City staff and Board &amp; Commission members on City Plan and Transportation Plan philosophy, and how the plans are supposed to work, etc.</td>
<td>Outreach materials are being finalized. Staff training to begin Summer 2001.</td>
</tr>
<tr>
<td>Community Readiness</td>
<td>Pilot test CSU’s &quot;community readiness&quot; model, in an information and marketing campaign to increase awareness, understanding, and support for VMT-reduction programs.</td>
<td>To begin in April/May 2001</td>
</tr>
<tr>
<td>Internal Policy Conflicts</td>
<td>Identify policy conflicts that interfere with VMT reduction efforts and bring them forward for resolution by the appropriate authorities.</td>
<td>Resolution process set up. Initial list of conflicts identified.</td>
</tr>
<tr>
<td>Monitoring and Forecasting</td>
<td>Provide for good, consistent data and forecasts of both population and VMT, on a regular basis, to assist in land use and transportation policy, plans and programs.</td>
<td>Resource needs are being outlined to provide for a continuing two-year cycle.</td>
</tr>
<tr>
<td>Regional VMT-reduction Strategy</td>
<td>Work with other communities to place the City’s VMT reduction efforts in a regional context.</td>
<td>To begin in 2001</td>
</tr>
<tr>
<td>Jobs/Housing Balance</td>
<td>Implement the City Plan policy that calls for development of objectives and programs for a jobs-housing balance.</td>
<td>To begin in 2001</td>
</tr>
<tr>
<td>Travel Pricing</td>
<td>Study and develop travel-pricing measures (such as eliminating free parking) that could be used in the 2010 – 2015 timeframe in order to meet the TDM goal of 10% reduction in drive-alone trips.</td>
<td>To begin in 2001</td>
</tr>
</tbody>
</table>

Mason Street Project Approved

Status In the Fall of 2000, City Council approved the Mason Street Transportation Corridor Master Plan, culminating an 18-month planning and public outreach process. This five mile, N-S multi-modal corridor will provide bus rapid transit service and bike and pedestrian facilities, enhance citizen mobility, and implement a critical component of the City’s Structure and Transportation plans. Modeling results indicate that the corridor will reduce 3,000 daily VMT in 2010. The City has funding to construct a portion of the bike and pedestrian paths, and is seeking Federal Transit Authority New Starts funds to begin construction of the bus rapid transit facility.

Transportation Demand Management Program

Status City of Fort Collins Transportation Demand Management (TDM) had a successful, award-winning year in 2000. Both Local and Regional SmartTrips™ jointly won the coveted Creative Excellence Award from the Association for Commuter Transportation for their innovative incentive programs, Smart T. Bucks and DriveLess Challenge. The City injected new life into its DriveLess Challenge incentive.
program, making it more attractive with an incentive partnership with Downtown merchants. The SmartTrips™ team also captured honorable mention in the Outstanding Service Award (Public Sector category) for its Freewheels Bicycle Library. With a full year of our focus on education and safety in the Bike program, the Freewheels Business Loaner Bike program was so successful that the City needed to expand the fleet.

Partnerships were a big focus for the year. TDM had tremendous success during Bike Month with partnerships ranging from cycling clubs and bicycle shops to the realtors. The Transfort bus schedule was redesigned to make it more customer friendly. A telework program was developed with input from Human Resources, City Attorney’s office and Risk Management to provide a manual for teleworking for City departments. Partnering with the Natural Resources Department (NRD) helped boost TDM inroads with local businesses. TDM and NRD participated together in the community-wide Earth Day celebration. A plan was launched to build an informational kiosk in downtown Fort Collins which offers information on alternative transportation.

**Future Actions** Fort Collins TDM has recently refocused its energies with an eye toward targeting the employees of local businesses. Materials touting the benefits of using alternative modes during the working day - whether commuting to and from work, going to meetings or to lunch - will be used in the upcoming years to reach this market. Redefined staff duties will allow one member to concentrate fully on this outreach effort. The Telework guide, DriveLess Challenge incentive program, and the Freewheels Business Loaner Bicycles will be used to further encourage use of alternative modes during the work day. Transit and carpooling will also be encouraged at these sites since data show they may be the two modes with the biggest “bang for the buck”. Data collection methods have been refined through collaboration with Regional SmartTrips™ and surveys will be conducted.

♦ **Consider Accelerated TDM Program; Disincentives for Driving**

**Status** When consultants evaluated the SmartTrips™ program in 2000, their report, SmartTrips™ Strategic Operations and Deployment Plan for 2000-2006, recommended four additions to the existing TDM program. These include teleworking and site design, variable work hours and legislative updates, parking management, and developing a regional transportation management organization. A specific recommendation was made to step up the pricing strategies, such as parking management, to 2002-2003 rather than waiting until 2006. Parking management strategies include preferential parking, travel allowances, and commuter choice tax incentives.

♦ **Promote Telecommuting**

**Status** The telework manual for City employees was completed in 2000, providing all City departments with a uniform, formalized procedure to implement teleworking. City employee teleworking in 2000 is estimated to have reduced 3 tons of CO₂e.

**Future Actions** The City telework policy will be officially introduced in 2001. A survey of City employees’ transportation habits will also be conducted in 2001 to establish a baseline against which to measure success of the teleworking program.

♦ **Alternative Fueled City Fleet Vehicles**

**Status** In 2000, the City’s alternative fueled vehicles consumed 107,629 gallons of gas equivalent (GGE) of propane and 1,106 GGE of compressed natural gas (CNG). This emitted 382 fewer tons of CO₂ than if
the same number of gallons of gasoline was combusted. The Fleets Department’s alternative fueled vehicle program was featured in the Rocky Mountain Bullhorn in the Fall of 2000.

Future Actions The City Fleets Department was awarded Congestion Mitigation and Air Quality funding in 2001 to construct a CNG fueling station with 2 time-fill CNG fuel makers. Plans are underway to add fueling capacity for ethanol as well.

♦ Fuel Consumption by City Departments

Status In 1999, a total of 980,900 gallons were consumed by the City’s 1,561 fleet vehicles, averaging 628 gallons/vehicle. In 2000, the City fleet increased to 1,632 vehicles, but fuel consumption dropped to 914,981 gallons, or 560 gallons/vehicle. If the vehicles in 2000 consumed fuel at the 1999 rate, CO₂ emissions would have increased by 47 tons in 2000.

Future Actions Plans are underway to develop a Municipal Fuel Use Reduction Program that considers vehicle idling, cold-starts and clean vehicle purchases. This action was included in the City Council-approved update to the City’s Air Quality Action Plan.

♦ ULEV/ZEV Vehicles for City Fleet

Status The City has adopted a goal that by 2008, 75% of all City light-duty vehicles will meet 1998 Ultra Low Emission Vehicle (ULEV) standards. In 1999, the City had two ULEV vehicles out of a total of 1,561 vehicles. By 2000, the City had 11 ULEV (or better) vehicles, including two of Toyota’s hybrid electric vehicle, the Prius.

♦ Clean Cities Program

Status The Weld/Larimer/Rocky Mountain National Park alternative fueled vehicle and electric bike rebate program was actively promoted in Fort Collins at Earth Day and throughout Bike Month in June. In all, 12 autos, two electric scooters, and 42 electric bikes were purchased in the region using rebate funds from the Department of Energy. In addition, an Alternative Fuel Vehicle Show was held at the Foothills Fashion Mall in April, 2000. City staff also visited all Fort Collins’ current or potential alternative fuel vehicle dealerships in mid-March 2000 to explain alternative fuel vehicles, infrastructure, availability and rebates.

♦ Fort Collins-Denver Commuter Rail

The North Front Range Transportation Alternatives Feasibility Study was a Major Investment Study (MIS) sponsored by four public agencies. In April 2000, a Vision Plan was released, identifying a strong need for transportation improvements. By 2020, area population is predicted to increase 43% and employment 36%. Violations of federal carbon monoxide and PM10 standards are predicted to occur in several communities. One of the five key recommendations of the vision plan is a rail alignment focused in the I-25 right-of-way. This is envisioned as a single-track alignment with passing tracks where needed, using self-propelled Diesel Multiple Unit “regional rail” commuter rail technology, having branches to Greeley and Fort Collins. Total cost is estimated at $652 million. The passenger rail alignment and potential station stops have been incorporated in several regional planning efforts that are underway along the north front range.
♦ Parks Satellite Shops

Status  The City Parks Division is still refining its long-range plan, one segment of which will address satellite maintenance shops, which have the potential to substantially reduce both personnel hours and vehicle miles in driving to park sites. Community parks have been identified as locations for future satellite shops. The first building and storage yard will be at Fossil Creek Park, scheduled for development in 2003, which will give Parks a location in the southeast part of the city. The second proposed satellite shop will be located at Southwest Park, to be developed about 2006. Further projections include a community park development in the northern part of the city somewhere around 2012. City Council recently approved an increase in the parkland fee, a portion of which will go toward funding these future maintenance buildings.

♦ Push for Tighter National Fuel Efficiency (CAFÉ) Standards

Status In 2000, the City of Fort Collins sent a letter to Senator Ben Nighthorse Campbell and to Representative Tom Tancredo, asking for support for legislation that would allow the U.S. Department of Transportation to strengthen the Corporate Average Fuel Economy standards.

♦ Hydrogen Task Force

Status In September 2000, the “Forum for Converting to a Hydrogen Economy” was held in Fort Collins. This workshop featured presentations by international technical and policy experts on hydrogen-based energy. Following the forum, the City’s Electric Advisory Board requested that a task force be established to evaluate the City’s potential role in promoting the use of hydrogen energy. In early 2001, the City Manager convened a Hydrogen Task Force with representatives from relevant City advisory boards and staff departments. The task force intends to make its recommendations to the City Manager by mid-2001.

ENERGY

♦ Fort Collins Electricity Distribution System Improvements

Status  Fort Collins has made substantial investments to keep its 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. The methodology used here compares Fort Collins’ distribution system losses against a national average of 5.0%, taking credit for “reductions” when losses are lower than the national average. In 2000, these activities saved 35,300 MWh of energy, with a corresponding CO₂ reduction of 14,639 tons. Since 1990, these activities have saved over 137,000 tons of CO₂.

♦ Colorado State University Programs ('90 – '97)

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 are counted as part of this report. In future climate protection status reports, CSU’s greenhouse gas reduction activities will be reported under Climate Wise program partner activities.
♦ **1996 City Energy Code**

**Status** During 2000, a comprehensive evaluation of the City’s 1996 residential energy code was conducted. The non-residential portion of the 1996 energy code has not been evaluated.

This study was intended to evaluate energy savings attributable to the 1995 code change and the degree to which the code was actually being implemented. A detailed study of 80 homes built between 1994 and 1998 revealed that homes built under the code realize, on average, a 16% reduction in natural gas consumption, compared with homes built prior to the code change. It also revealed that some gaps exist between the energy code requirements and implementation. The study is currently undergoing final review and is expected to be formally released by mid-2001.

♦ **Climate Wise for Businesses**

**Status** In 2000, the City of Fort Collins initiated a voluntary greenhouse gas reduction program targeting businesses in the industrial and commercial sectors. The program is a local adaptation of the Federal Climate Wise program and works directly with the Fort Collins business community to achieve a number of important environmental quality goals: air and water pollution prevention, solid waste reduction, energy conservation, and travel demand reduction. Supported by grant funding from the International Council for Local Environmental Initiatives, a Climate Wise team was assembled including staff from City Utilities, transportation, solid waste and air quality programs, and a local consulting firm, the Brendle Group. A recruitment strategy was developed and implemented, and in its first year, the program surpassed goals both in terms of number of businesses participating, and the potential for pollution prevention. Sixteen local businesses have joined the program (twice the initial goal of eight businesses) and have made commitments to write an Action Plan to reduce greenhouse gas emissions.

During 2000, the Climate Wise project team conducted assessments at several partner facilities. The team identified existing practices and made new recommendations in the areas of energy efficiency, transportation reduction, and pollution prevention.

The following table lists the 16 partners, as well as which partners received on-site assessments.

<table>
<thead>
<tr>
<th>Partner</th>
<th>On-Site Assessment?</th>
<th>Reason if no</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agilent</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Hewlett Packard</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Celestica</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Ben &amp; Jerry’s</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Lafarge</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>O’Dells</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>New Belgium</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Foothills Fashion Mall</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Holnam</td>
<td>No</td>
<td>Corporate Partner outside of city limits</td>
</tr>
<tr>
<td>Poudre School District</td>
<td>No</td>
<td>In-house expertise</td>
</tr>
<tr>
<td>Colorado State University</td>
<td>No</td>
<td>In-house expertise</td>
</tr>
<tr>
<td>Post Office</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Coloradoan</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Anheuser Busch</td>
<td>No</td>
<td>Corporate Partner</td>
</tr>
<tr>
<td>Excel Energy</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Platte River Power Authority</td>
<td>No</td>
<td>In-house expertise</td>
</tr>
</tbody>
</table>
In total, there were 23 existing practices observed to be in place and 77 new projects proposed as a result of the assessments. So far, 17 of the existing practices have been quantified (74%) and are estimated to have reduced greenhouse gas emissions by 7,552.7 tons/year of CO₂e. In addition, the existing practices which have been quantified are saving partners:

- $561,549/yr,
- 3,377,019 kWh/yr in electric energy
- 11,550.5 MMBtu/yr in natural gas usage
- 1,474.5 tons/yr in solid waste disposal

The GHG reductions identified in this report represent the sum of reductions from only three of the 16 Climate Wise partners, since not all of the partners have completed their assessment of existing actions. Next year, the project will quantify savings from all partner businesses.

**Future Actions** In 2001, a Web-based monitoring and reporting system will be implemented, enabling partner businesses to easily prepare and submit their Actions Plans and annual progress reports. A grant from the Colorado Pollution Prevention Advisory Board will enable the City to continue working with existing partners on implementation and reporting of greenhouse gas reduction efforts as well as recruit new businesses. In 2001, the program goal is to recruit five additional businesses, which would increase the program participation by roughly 30%.

Of the 77 new projects already identified for existing Climate Wise partners, 13 have been quantified (16.8%) and would collectively reduce greenhouse gas emissions by 4,214.2 tons/year of CO₂e. In addition, the new practices, if implemented, would collectively save partners:

- $185,615/yr,
- 1,576,672 kWh/yr in electric energy
- 3,280 kW/yr in electric demand
- 13,588 MMBtu/yr in natural gas usage
- 234.5 tons/yr in solid waste disposal
- 6,000,000 gallons/yr in water conservation

♦ **CSU’s Industrial Assessment Center**

Status Since inception, the IAC has performed assessments at 25 Fort Collins businesses. It is estimated that the approximately 145 projects implemented in Fort Collins between 1990 and 2000 have reduced 4,206 tons of CO₂ in 2000.

♦ **Wind Phase II - 1999**

Status Fort Collins Utilities was the first utility in Colorado, and among the first in the nation to provide clean, 100% renewable wind power to its customers. Moving beyond the Wind Power Pilot Program, in 1999 the City made a commitment to generate wind energy from two and a half new 660 kW turbines. As of March, 2001, wind energy from all of Fort Collins’ turbines is fully subscribed to by 718 residential subscribers and 23 commercial subscribers. As of February 2001, all the turbines dedicated to Fort Collins had produced more than 14,745 million kilowatt-hours of wind energy.

In 2000, Fort Collins Utilities and Platte River Power Authority (PRPA) won the Utility Leadership Award from the American Wind Energy Association, the national trade association of the U.S. wind energy industry, for leading the electric utility industry toward increased reliance upon wind energy technology.

"This award illustrates the very important role that local utilities can play in offering wind energy to their customers," said AWEA Deputy Executive Director Tom Gray. "The Colorado utilities..."
are proof that you don't have to wait for restructuring of your state electricity market to tap customer demand for clean power."

◆ **Wind Power for City Facilities**

**Status** The City of Fort Collins has demonstrated willingness to lead by example by making the commitment to purchase wind energy from one 660 kW turbine to cover a portion of its own municipal electricity needs. The City facility turbine was installed at PRPA’s wind site in 2000. Fort Collins Utilities handles the billing for the City turbine. The cost is prorated between the General Fund and the Utilities’ funds, based on the energy used by electric accounts in each fund. City departments experience an increase of approximately 3.97% in electric costs. Because of its use, the Utilities’ Drake Water Reclamation Facility pays the most for wind energy.

◆ **Zero Interest Loans for Conservation Help (ZILCH)**

**Status** In 1999, six residential energy efficiency projects were completed using Utilities’ ZILCH loans, and in 2000, five more homes made efficiency improvements under the loan program. This brings the total annual CO2 reductions resulting from ZILCH projects to 431 tons CO2 each year.

◆ **Replace Incandescent Traffic Signals with LEDs**

**Status** Retrofitting traffic signals to light-emitting diodes (LEDs) was rated as the City’s highest priority greenhouse gas reduction measure, receiving the #1 rating from both the Staff Technical Team and the Citizen Advisory Committee who developed the City’s Local Action Plan (LAP) to reduce GHGs. By December 2000, 31 intersections had been retrofit with LEDs, reducing 405 tons of CO2 emissions. In November, 2000, the City Council adopted Ordinance 160, approving a lease purchase agreement to purchase the remaining LED bulbs.

**Future Actions** Retrofit of more than 160 traffic signal intersections will be completed by May 2001. This project will cost the City $370,000 but is expected to save $110,000 per year in reduced energy and maintenance costs, reduce over 3,000 tons of CO2, as well as improve intersection safety. In 2001, Traffic Operations plans to meter each intersection to provide accurate data on energy savings.

◆ **Lighting Upgrades in City Buildings (’93 – ’98)**

**Status** 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, or 237 tons of CO2. 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 CO2 benefits.

◆ **City Government Converting to Variable Frequency Drives (‘90 – ’98)**

**Status** 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 to Promote Energy Efficiency in Commercial Sector

New Source Review Project
A voluntary City of Fort Collins New Source Review Project has been designed to offer new businesses in Fort Collins assistance with multi-media pollution prevention and sustainable building design. The process, which is now being finalized, will identify and work with businesses through the City’s development review process.

Utilities Design Assistance

Design Assistance - Fort Collins Utilities has assisted several clients who want to construct buildings that are better places for people to work and visit while costing much less to operate and maintain and reducing environmental impact.

Through the Design Assistance program, Utilities helps to fund incremental increases in design costs related to energy analysis, daylighting, and commissioning. Completed projects include Value Plastics and harmony Library. Input at the conceptual design stage was provided for the Larimer County Justice Center. Recent projects include the new City administration building to be completed in 2001, the Community Horticultural Center (to be completed in 2002), and a new prototype elementary school for Poudre School District. The first PSD building will be completed in 2002, with two additional elementary schools to be built from the same basic plans in subsequent years. In addition to funding assistance for these projects, Energy Services staff typically play advocacy and education roles, provide technical support, and review plans at several stages.

The Poudre School District (PSD) project is particularly noteworthy. City staff participated in the research and planning phase with the PSD "Green Team." An important outcome was PSD's "Sustainable Design Guidelines" that served as an integral part of the design team hiring process. City staff also assisted in the design team selection process and participated in the design process. The school district has set a very positive example for a successful, integrated, design process that will have important spin-offs in the future.

In support of these design assistance projects, the Utilities sponsored three workshops in 2000 for the key players in an integrated design process.

1) "Sustainable Design: An Integrated Approach," was held in March and featured instructors who discussed site/building integration, water conservation, watershed issues, energy efficiency, daylighting, environmental building materials, and the integrated design process.

2) "Daylighting Goes Mainstream: How to Daylight Every School," a two-day event in April, featured nationally recognized daylighting consultants and a tour of daylit buildings in Fort Collins.

3) A two-day training was held in October on using Energy-10, a computer modeling tool, in support of whole-building design processes.

All three workshops were well attended by a mix of architects, engineers, building owners, maintenance staff, and others involved with the design and operation of buildings. The workshops have had a significant impact on several current projects in Fort Collins.

Lighting Demonstration - Utilities also provided technical assistance for a lighting retrofit project at the Old Town Parking Garage. A lighting design was achieved that substantially increases the amount, quality, and distribution of light in the garage, with no significant energy penalty. Without the new induction lights, power consumption for a comparable lighting upgrade would double the existing load by adding 140,000 kWh/year, or 160 tons CO2. The new induction lights have a rated life of 100,000 hours (vs. 16,000 for conventional lighting) which will greatly reduce maintenance requirements.
It is significant to note that this will be the first large-scale installation of this technology in Colorado.

Other successful lighting demonstration projects have included retail, office, and public buildings (i.e., Discovery Center, Bullfrog Liquors, Advanced Energy, and Municipal Court offices).

Load profiles - Hourly electric demand profiles are provided upon request to customers in the GS-50 and GS-750 rate classes. The Utilities’ goals for these key accounts are to provide customer service, customer education, identification of costly energy use patterns and control problems, and identification of energy-saving and peak-demand-limiting opportunities. This is done monthly for some customers and on request for others, and is typically done prior to most energy assessments.

Non-residential building energy assessments - Utilities staff periodically do building assessments to identify energy problems and opportunities. Some assessments are performed in conjunction with other programs; others are related to customer requests. This assessment activity varies widely from year to year. Examples of customer-driven audits over the past couple of years include the DMA Plaza (senior housing), United Way building, and a large office and manufacturing building leased by Hewlett Packard. In 2000, assessments were completed at Liberty Commons and St. Luke’s church.

♦ Reduce City Building Energy Use 15% below 1990 levels (per s.f.)

Status Several actions were identified in the City’s Local Action Plan to Reduce Greenhouse Gas Emissions (LAP) that would help achieve this goal. Status of these actions is discussed below.

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

In approving Resolution 99-137 in November, 1999, the City Council directed the City Manager to form an Energy Management Team. In June, 2000, the City Manager did form a municipal Energy Management Team, which is led by Utilities and staffed with representatives from nine City departments. The team’s role is to establish an implementation schedule for the climate protection measures contained in the LAP, develop budget recommendations for measures contained in the LAP, and oversee preparation of the biennial report to City Council on greenhouse gas reduction. The Team has met approximately quarterly since it was formed.

Conduct energy audits of City government buildings
The Utilities has done an energy audit at the Parks Shop and is working on the recommendation for installation of T-8 lamps. The Facility Services Department has completed a power quality study of major municipal buildings and the report will be available soon.

Ensure that City buildings constructed by Facility Services use the City’s Green Building Criteria
The new City Administration Building incorporates many of the energy efficient design features in the Green Building Criteria, including:

- Use of daylighting,
- Energy saving technology, including an extensive energy management system to optimize the HVAC system and lighting, energy efficient transformers, T8 lights, a clean power energy generator, a real-time energy recording device (to track use), under-floor cabling, and universal space planning,
- Use of building commissioning to insure that the specified efficiency levels are really achieved by the contractors,
Use of natural materials that are locally obtained,
Natural cleaning of site water runoff, and
Alternative transportation modes (by close proximity to the transit center).

Remodeling at another new City building, the Depot, will also include an energy management system and will use energy efficient T8 lights.

It has been decided to drop the idea of billing each department for their energy use in the new administration building because the building is already so efficient that there is little that employees can do, individually, to reduce consumption. Because there are no separate meters, it would be nearly impossible to implement separate billing.

Consider joining “Energy Star Buildings”
The City’s Operations Services is currently not planning to join the Energy Star program. However, Operations Services staff met with representatives from the ReBuild Colorado program and heard a presentation on performance contracting by Peter Ottmann, with Econergy International Corporation from Boulder. The City is considering working with this company to complete energy audits on the five major City buildings: Mulberry Pool, City Hall, Lincoln Center, EPIC, and the library.

Fund new position for an HVAC Control Technician
Facility Services created a new staff position, HVAC Control Technician, which was filled in July 2000.

Other Actions
- An old 96kW chiller at City Hall was replaced with a new, energy efficient 48kW chiller. If runtimes are the same, the new chiller will result in a 50 % reduction of energy use.
- A carpet that was removed from the library last year was "reconditioned and retextured" and installed at EPIC. This saved about 6,500 s.f. of material from being sent to the land fill.

Future Actions
The City will consider performance contracting to complete audits of major City facilities. The chiller at the library will be replaced with one that is more energy efficient.

♦ Green Building Program

Status In March, 2001, the City Council approved an update to the City’s Air Quality Action Plan that adds an action to “Explore adoption of a Green Building Program during the regular review of the Municipal Building Code.” The Building and Zoning Department has indicated that a good place to start is to evaluate green building program models used in other communities to determine which hold the most promise for Fort Collins. This evaluation is likely to be carried out during 2001.

♦ Increase Energy Efficiency Training for Builders

Status In addition to completing an energy code assessment report, the Building and Zoning Department has hired a new building inspector in 2000, allowing for an increased focus on energy code inspections and trainings. Staff held numerous job site trainings for builders and insulation companies to educate them about energy code installation standards.

Future Actions The Building and Zoning Department has let the building industry know that there will be a significantly increased focus on local energy code inspections starting in 2001. Staff expects to receive assistance from the Energy Rated Homes of Colorado program to bring in a well-known building science
technology consultant to help with technical training. The City may also choose to compete for a grant that is available from the ICLEI for Cities for Climate Protection member communities, to provide assistance with builder training on energy efficiency.

♦ Lobby for Mandatory Renewable Energy in Utility Deregulation

**Status** In November 1999, the Colorado Electricity Advisory Panel issued its Final Report. A majority (17 of 29 members) voted against restructuring the industry as it would not be in the best interest of the State and its consumers. The Legislature requires a 2/3 majority vote for a formal recommendation, which was not met. A minority report supporting restructuring was also issued, as well as a "middle ground" report. The major reasons for opposing restructuring in the Final Report are: 1) Colorado has low rates now; 2) a consultant study modeling the effects of restructuring found that rates were likely to rise; and 3) rate impacts would be disproportionately shared among classes of consumers, with low-income, fixed-income, rural, residential, and small consumers seeing the greatest rate increases. Since deregulation is not imminent in Colorado, no efforts were undertaken by the City to promote mandatory renewables.

### SOLID WASTE

♦ 50% Waste Reduction Goal

**Status** In November, 1999 the City Council adopted a resolution that increased the policy goal for diverting solid waste from 20% to a new goal of 35% by the year 2004, and 50% by the year 2010. (A seminal survey that was conducted in February, 1999 of the community’s success at recycling, composting, and other waste reduction activities established that 24% of the waste stream was being diverted from local landfills.)

Fort Collins Solid Waste Reduction Program was featured in International City/County Management Association’s recently published handbook, *Local Solutions to Global Climate Change*.

**Future Actions** A community-wide survey is underway now to update the City’s data on how much waste diversion is being accomplished through the efforts of residents and industries in Fort Collins. The results of the survey will be available by June, 2001.

♦ Business Recycling

**Status** GHG reductions from recycling activities carried out by independent businesses is estimated at 39,542 tons of CO₂e for the year 2000. This estimate is derived by applying 1998 per capita business recycling rates to 2000 population. (In 1999, the Natural Resources Department conducted a detailed analysis of recycling conducted by private enterprise, separate from the residential curbside recycling program.)

**Future Actions** Another detailed evaluation of business recycling quantities will be conducted again in 2001 for the year 2000, as mentioned above.

♦ Curbside Recycling

**Status** In 2000, Fort Collins’ curbside recycling system collected 15,106 tons of materials to be recycled, including more than 7,500 tons of newspaper and more than 4,000 tons of cardboard, according to
information reported to the City by trash haulers. This volume of recyclables equates to 36,671 tons of CO₂-e reduced in the year 2000.

♦ **Methane Flaring and Heat Recovery at the Wastewater Treatment Plant**

**Status** The City’s main wastewater treatment plant currently uses a significant amount of the methane (CH₄) produced from water treatment processes to power boilers located at the facility. The remaining gas is flared off, emitting carbon dioxide but eliminating potent methane emissions. This process of using the heat energy generated by methane combustion for power generation and flaring off the remaining gas is estimated to reduce nearly 30,00 tons of CO₂-e in 2000.

**Future Actions** During the years 2000 / 2001, a fourth the anaerobic digester was built at the Drake Water Reclamation facility and will be going on line in May 2001. As part of this project, a third boiler was added to the system. The total system will include four digesters with gas storage lids and three boilers. Gas production is not expected to increase much, although there may be a slight increase due to longer detention times in the digesters. Methane gas usage, however, will likely be similar to the previous usage of 85 to 90 % due to the increased efficiency of the new boiler.

♦ **Larimer County Wood Waste Diversion**

**Status** In 2000, Larimer County implemented a pilot Wood Waste Diversion Project. During this project, the County segregated wood waste loads brought to the landfill. Sources included wood from forest thinning, downed branches from the urban forest caused by early season snowstorms, and some construction and demolition debris. In 2000, 1,340,000 pounds of wood waste were segregated from the landfill, ground up, and recycled. This reduced an estimated 2,490 tons of CO₂-e emissions from the landfill in 2000.

♦ **Construction Debris Recycling Pilot Project**

**Status** Between July and November 2000, eight construction companies participated in a City-sponsored pilot program to separate and recycle wood debris from 13 construction sites (11 residential and 2 commercial). Wood was collected by a City-contracted hauler and taken to the Larimer County Landfill, where it was staged for processing into a landscaping mulch product. The objectives of the pilot program were 1) to quantify the volume of wood debris generated from new construction sites in Fort Collins and 2) to identify potential barriers and opportunities for further wood recycling efforts. A total of 325 cubic yards (75,000 pounds) of wood was diverted from landfill disposal during the pilot project, translating into 20 tons of CO₂-e emissions reduced.

**Future Actions** A second phase of the pilot project will occur in 2001. Beginning mid-year, the City will solicit participation from 15 - 20 construction companies, and will provide them with a subsidy of 50% for all clean and segregated loads of construction wood debris. The objectives for this second phase are to establish end markets for wood debris products, and to evaluate the effectiveness of a 50% subsidy on site participation and diversion levels. In addition, data will continue to be collected and monitored for trends in wood debris generated during new home construction.

♦ **Second Centralized Recycling Drop-off Site**

**Status** In the 2000-2001 budget, the City Council approved $110,000 to help build a new, expanded recycling drop-off facility. A location has been identified, and a three-to-five year lease is being negotiated with the owner of the property. The site could become operational by summer, 2001.
Future Actions Staff will work to design and develop this project in a cooperative planning process with the property owner to use the site on a three-to-five year basis. The City needs to further refine its financial plan (up-front and ongoing costs, revenue from sales of recyclable materials), establish the terms of partnerships, and complete the installation of the recycling drop-off facility. There will be approximately three months of construction activity including development review, some paving, purchase and installation of 30-yard roll-off bins, landscaping and fencing, and signage.

♦ **Expand Larimer County Landfill Recycling Center**

**Status** In setting the budget for 2000-2001, the City Council agreed to contribute $100,000 to the Larimer County recycling plant expansion project. To date, although a proposal made to the Board of Commissioners on January 13, 2000 met with general support, the County has not initiated work on the project. Final approval to expand the plant will be sought from the County Commissioners on May 3, 2001.

**Future Actions** Once the expansion is authorized, it will take 12-18 months to complete the construction. Larimer County staff will propose to bring in a consultant to help ensure design of a facility that will meet the community’s future recycling needs, which could add several months to the process but provide tremendous benefits.

♦ **Landfill Gas to Energy**

**Status** Emissions from the Larimer County landfill are not expected to exceed the EPA’s threshold level 50 MG (megagrams) of non-methane organic compounds (NMOC) until 2006. When that occurs, a gas collection system will have to be installed.

**Future Actions** Platte River Power Authority has initiated discussions with Larimer County about working cooperatively to install a gas collection system at the landfill. There may be a good opportunity to consider a gas-to-energy system that would use the collected gas for existing power needs at the landfill, such as at the recycling center.

---

### VEGETATION

♦ **Increase Tree Planting Citywide**

**Status**

**Tree Plantings** In 2000, an estimated 19,500 trees were planted citywide. Tree plantings in 2000 are estimated to have removed 482 tons of CO₂ from the air.

**Outreach** The City Forestry Department worked closely with a non-profit group, *Trees, Water, People*, to conduct tree planting at a park called Dragon Fly’s Lair. Arbor Day activities also helped to encourage citizens to plant trees. As part of Arbor Day, 2000 tree seedlings were donated by the City to Poudre School District fifth-graders to plant.

**Science** A “Front Range Ecosystem Analysis” project was initiated cooperatively by the City Forestry Department, Colorado State Forest Service, and American Forests. Data were collected on percent cover from five sites in Fort Collins, including City Hall and the CSU Oval. Based on assessment of these and other regional sites using the “City Green” model, a percent cover for Fort Collins was estimated, as well
as the economic value of tree-planting. This was presented at a biennial conference for foresters in Washington DC in September, 2000.

**Future Actions** In addition to continuing to promote citizen involvement in urban tree planting, City Forestry staff is interested in compiling and distributing technical information to the public on the environmental aspects of tree planting, including optimal placement, environmental benefits, etc.

♦ **Natural Areas Shrub and Tree Planting**

**Status** In 2000, volunteers and staff in the City’s Natural Areas program planted 104 cottonwood trees and 6,580 native shrubs. However, the carbon sequestration benefit associated with these plantings was probably offset by the removal of a large number of Russian Olives in an effort to restore natural vegetation conditions in the City’s natural areas. Therefore, no CO₂ benefit was reported for the year 2000.

**PURCHASING**

♦ **Distribute Bids and Proposals Electronically**

**Status** In the year 2000, approximately 100 bids and RFPs (average length = 50 pages) were posted to the City’s Web site. Making these documents available electronically prevented consumption of 500 reams of paper, which resulted in the reduction of five tons of CO₂e emissions in 2000.

**Future Actions** In 2001, City departments are being encouraged to use a City purchasing card, rather than using the paper-intensive “Mini Order” system. This action is expected to reduce nearly 40 reams of office paper, or nearly one-half ton of CO₂e emissions.

♦ **Pilot Environmentally Preferable Products**

**Status** In the year 2000, the City Fleets Department piloted the use of vegetable oil as a substitute for motor oil and the use of non-volatile sprays for cleaning brakes. The Streets Department piloted the use of “Excalibur”, a mixture of magnesium chloride and corn by-products, to facilitate snow and ice melting on City streets.

**Future Actions** The Purchasing Department plans to include information in the next City budget manual on purchasing options for duplexing printers, as not all departments currently have them.

**CLIMATE CHANGE EDUCATION AND OUTREACH**

**Status**

**New Position Approved** In 2000, City Council approved a one–year position for a half-time Environmental Planner to conduct business outreach and promote pollution prevention. This position is jointly funded by the Utilities and the Natural Resources Department. The new planner will continue outreach to local businesses through the Climate Wise program, which aims to reduce emissions of greenhouse gases through the use of energy conservation, waste reduction, pollution prevention, and alternative transportation measures. The planner will work directly with partner businesses on the completion, implementation, monitoring and reporting associated with their greenhouse gas reduction Action Plans. The new planner will also provide assistance to the City’s Energy Management Team by
performing education and public involvement tasks, and will help with implementation of the greenhouse gas reduction plan for City operations.

**Public Outreach Efforts**

**Recognition of Climate Wise business partners** – In November 2000, the Mayor and City Council recognized the City’s local Climate Wise partners with a certificate of appreciation. In December 2000, the City also paid for advertising in the *Coloradoan* to recognize and thank the sixteen participating businesses.

A profile of the Climate Wise program was featured in the City’s 2000 Annual Report and video.


Web pages on climate protection were installed early in 2000 on the City’s Web site. A significant expansion of the Climate Protection Web pages was completed in March 2001. The new pages include:

- a news section,
- Energy Tip of the Month,
- background on City policy and involvement in climate protection activities,
- updates on key climate change scientific and policy news, and
- complete information and reporting capabilities for Climate Wise business partners.

**ICMA Article** – In August 2000, Fort Collins was featured in ICMA’s *Public Management* publication with an article entitled, “Climate Protection: Fort Collins Likes the Idea.”

**Future Actions**

As Climate Wise partners achieve continued success with greenhouse gas reductions, the City will write press releases and encourage publication of positive program results in local newspapers. The first Annual Recognition Event will be held in the April, 2001 to recognize the partners’ accomplishments to date. The Natural Resources Department will work with Information Technology Department and the Energy Management Team to produce a 5-minute video on climate protection, featuring Climate Wise partner activities. Another idea under consideration is a climate protection newspaper “pull-out” insert.

The 2001 Triple I public information series includes a presentation by City Utilities, “Cool It! Guide to Smart Air Conditioning Choices”. This presentation will inform citizens about how to make cost-effective choices for cooling their homes. Residential air conditioning is a rapidly growing electrical energy end-use in Fort Collins.

**IV. RECOMMENDATIONS**

The Energy Management Team recommends implementation of the following actions to reduce greenhouse gas emissions in accordance with the City’s *Local Action Plan to Reduce Greenhouse Gas Emissions* (LAP) and with existing City policies and priorities. When developing these recommendations, the Energy Management Team qualitatively considered the following factors:

- progress to date on implementation of measures identified in the LAP,
- greenhouse gas reduction potential of remaining measures in the LAP,
- staff and citizen rankings of the remaining measures in the LAP (lower number equates to higher rank, with #1 being top),
- current understanding of department, service area, and City objectives and priorities.

Table 2 on the next page lists measures recommended by the Energy Management Team for priority implementation in 2002-2003 or sooner.
Table 2. Climate Protection Measures recommended for priority implementation in 2002-2003.

<table>
<thead>
<tr>
<th>Measure Name</th>
<th>Projected tons CO2 reduced in 2010</th>
<th>Staff Ranking in LAP</th>
<th>Citizen Committee Ranking in LAP</th>
<th>Current Status</th>
<th>Recommended Future Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRANSPORTATION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25 VMT Goal</td>
<td>337,676</td>
<td>Not ranked</td>
<td>On-going</td>
<td>Continue LUTRAQ programs; Fund TDM</td>
<td></td>
</tr>
<tr>
<td>48 Fuel Consumption by City Departments</td>
<td>?</td>
<td>6</td>
<td>10</td>
<td>Not started</td>
<td>Implement Municipal Fuel Use Reduction Education Program</td>
</tr>
<tr>
<td><strong>NEW</strong> Hydrogen Task Force</td>
<td>??</td>
<td>Not ranked</td>
<td></td>
<td></td>
<td>Implement Task Force recommendations</td>
</tr>
<tr>
<td><strong>ENERGY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 Climate Wise for businesses</td>
<td>39,732</td>
<td>Not ranked</td>
<td>On-going</td>
<td>Continue support and outreach</td>
<td></td>
</tr>
<tr>
<td>31 Wind Program</td>
<td>9,141</td>
<td>Not ranked</td>
<td>On-going</td>
<td>Continue expansion</td>
<td></td>
</tr>
<tr>
<td>62 Optimization of Waste Water Treatment Pumps and Motors</td>
<td>961</td>
<td>4</td>
<td>4</td>
<td>Not started</td>
<td></td>
</tr>
<tr>
<td>64 Reduce City Government Building Energy Use 15%/s.f.</td>
<td>3,129</td>
<td>7</td>
<td>3</td>
<td>On-going</td>
<td>Encourage/require Green Design Guidelines for all new buildings</td>
</tr>
<tr>
<td>75 Energy Code Training for builders</td>
<td>20,840</td>
<td>4</td>
<td>9</td>
<td>Started</td>
<td>Seek funding, increase training, increase inspections</td>
</tr>
<tr>
<td>76 Green-Building Program for residences</td>
<td>1,665</td>
<td>8</td>
<td>5</td>
<td>Not Started</td>
<td>Start by evaluating models appropriate for Fort Collins</td>
</tr>
<tr>
<td><strong>SOLID WASTE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>79 35% Waste Diversion Goal by 2004</td>
<td>112,787</td>
<td>2</td>
<td>1</td>
<td>On-going</td>
<td>Continue recycling and waste reduction efforts</td>
</tr>
<tr>
<td>83 Landfill Gas to Energy</td>
<td>84,307</td>
<td>7</td>
<td>4</td>
<td>No City action</td>
<td>Work with LC, PRPA to encourage early installation of collection System</td>
</tr>
<tr>
<td><strong>VEGETATION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>86 Increase Tree Planting Citywide</td>
<td>125</td>
<td>9</td>
<td>9</td>
<td>On-going</td>
<td>Provide in-kind match to strengthen tree-planting grant applications from local non-profits; provide info on environmental benefits of tree planting</td>
</tr>
<tr>
<td><strong>PURCHASING</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40 Pilot Environmentally Preferable Products</td>
<td>Not ranked</td>
<td></td>
<td></td>
<td>On-going</td>
<td>Encourage use of duplexing printers</td>
</tr>
<tr>
<td><strong>EDUCATION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>93 Climate Change Education and Outreach</td>
<td>40,533</td>
<td>2</td>
<td>5</td>
<td>Started</td>
<td></td>
</tr>
</tbody>
</table>

Transportation Emissions
- **LUTRAQ Activities** - Recognizing that greenhouse gas emissions from the transportation sector are predicted to rise more quickly than emissions in any other sector, and that VMT reduction is a high
priority for the City, the Energy Management Team strongly recommends that projects and programs proposed by the interdepartmental LUTRAQ Team be funded and implemented.

- **Transportation Demand Management (TDM) Activities** – Recognizing that on-the-ground efforts to promote use of alternative modes and reduce citizen and employee VMT play a critical role in achieving citywide VMT reduction, and recognizing that the TDM program has just undergone a thorough evaluation and revision, staff strongly recommends that City TDM activities receive needed funding in 2002-2003. In order to demonstrate the City’s commitment to VMT reduction efforts, staff recommends that the TDM program be funded from the City’s general fund, rather than relying on federal dollars (i.e., CMAQ) to sustain the program.

- **Capital Improvement Projects (CIP)** – Recognizing that the LUTRAQ Team has formed a CIP subcommittee to evaluate and recommend capital improvement projects that facilitate VMT reduction, staff recommends that the Committee’s prioritized list be given serious consideration for funding.

- **Municipal Fuel Use Reduction Program** – The City Council’s March 2001 update to the Air Quality Action plan calls for the City to develop a municipal fuel use reduction program that considers vehicle idling, cold-starts, and clean vehicle purchasing criteria. The Energy Management Team plans to form a subcommittee with representatives from Purchasing, Fleets, Utilities and Operations Services to work with the Equipment Review Board to develop the fuel use reduction program.

- **Hydrogen Task Force** – Staff recommends implementing the recommendations prepared by the “Hydrogen Task Force”, once they have been presented to the City Manager in mid 2001.

**Energy Emissions**

Recognizing that greenhouse gas emissions from electricity and natural gas use in the residential and commercial sectors collectively account for 64% of the city’s greenhouse gas emissions, energy conservation remains an on-going priority. The Energy Management Team recommends focusing on the following measures in 2002-2003:

- **Climate Wise for Businesses** – Continue outreach efforts to secure more Climate Wise business partners and maintain close relationships with existing partners to ensure implementation, monitoring, and reporting of actions identified in their Action Plans. Seek funding to sustain the program.

- **Wind Program** – Continue expansion of the voluntary wind subscription program.

- **Optimization of Wastewater Treatment Pumps and Motors** – Evaluate relevance of a 1994 audit of the wastewater treatment plant. Conduct a new audit if necessary. Implement recommendations as feasible.

- **Reduce City Government Building Energy use by 15% per square foot** – Encourage/require implementation of green design guidelines for construction of all new City buildings, including use of the “design/build” methodology and building commissioning. Continue efforts to conduct energy audits of major City facilities, and implement the recommendations as feasible.

- **Energy Code Training for Builders** – Seek funding to increase energy code training for builders and inspectors.

- **Green Building Program** – Evaluate green building program models that are employed in other communities and determine which model holds the most promise for Fort Collins. Develop an implementation plan and schedule for adopting a green building program in Fort Collins within the next two years.

**Solid Waste Reduction**

- **35% Waste Reduction Goal by 2004** – Continue efforts to increase community-wide recycling and waste reduction.
• **Landfill Gas-To-Energy** – Work with Larimer County and Platte River Power Authority to encourage installation of a gas-to-energy system sooner than 2006, when mandatory installation is anticipated.

**Vegetation**

• **Increase Tree Planting Citywide** – Provide in-kind match to strengthen tree planting grant applications made by local non-profit organizations. Compile and distribute public information on the environmental benefits of tree planting.

**Purchasing**

• **Pilot Environmentally Preferable Products** – Include information in the next City budget manual on purchasing options for duplexing printers in City offices. Participate in the development of clean vehicle purchasing guidelines for the Municipal Fuel Use Reduction Program. Explore other opportunities as they arise for purchasing environmentally sound goods and services.

**Education**

• **Climate Change Education and Outreach** – Continue, and expand, education and outreach efforts to include City government employees as well as citizens and businesses.
APPENDIX A

2000 GREENHOUSE GAS EMISSIONS ANALYSIS
DATA SOURCES
2000 EMISSION AUDIT

Total Tons CO2e Emissions in 2000

<table>
<thead>
<tr>
<th>Energy Source</th>
<th>Electricity</th>
<th>Transport</th>
<th>Natural Gas</th>
<th>Solid Waste</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tons CO2e</td>
<td>889,795</td>
<td>716,952</td>
<td>413,243</td>
<td>21,010</td>
<td>2,041,000</td>
</tr>
</tbody>
</table>

ELECTRICITY

Data Source: Fort Collins Utilities, Ellen Switzer, Fort Collins Utilities, (970) 221-6714
(These data are not weather normalized.)
Total kWh: 1,218,617,411
MMBtu 4,157,923
Tons CO2 889,795

When calculating tons CO2, the coefficient of 0.214 tons CO2/ MMBtu was used, as requested by Platte River Power Authority. This emission factor takes into account the mix of sources for local electricity (Rawhide, hydro, and a small amount of wind energy.)

NATURAL GAS

Data Source: Xcel Energy, Glen Monroe
(These data have been weather normalized and pressure adjusted.)
Total Therms: 70,041,22
Total tons CO2 413,243
The emissions coefficient for converting from MBTU of natural gas to tons of CO2 was 0.059.

TRANSPORTATION

Fuel consumption, by fuel type, was calculated by
1) Identifying total Vehicle Miles Traveled (VMT). Annual VMT for 2000 was calculated to be 1,062,735,845 miles. This was calculated using a 6.3% annual vehicle miles traveled (VMT) growth rate from 1998 VMT levels. This growth rate factor was derived by calculating the historic relationship (1990 to 1998) between VMT and other data such as population, vehicle registration, total fuel sales, and service station fuel sales.
2) Apportioning total VMT among the percentage of vehicle types in Fort Collins estimated by the Colorado Department of Public Health and Environment (CDPHE) for emissions modeling purposes.
3) Multiplying the annual number of miles driven (by fuel type) by an estimated MPG to yield gallons fuel consumed
4) Applying emissions coefficients to convert from gallons of fuel to BTU’s to CO2.

<table>
<thead>
<tr>
<th>Vehicle type</th>
<th>VMT percent</th>
<th>Avg MPG</th>
<th>Conversion factor</th>
<th>Conversion factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasoline car</td>
<td>59.8</td>
<td>19</td>
<td>0.125 MMBtu/gallon</td>
<td>0.079 tons Co2/MMBtu</td>
</tr>
<tr>
<td>Gasoline light truck</td>
<td>32.0</td>
<td>14</td>
<td>0.125 MMBtu/gallon</td>
<td>0.079 tons Co2/MMBtu</td>
</tr>
<tr>
<td>Gasoline heavy duty</td>
<td>2.5</td>
<td>8</td>
<td>0.125 MMBtu/gallon</td>
<td>0.079 tons Co2/MMBtu</td>
</tr>
<tr>
<td>Diesel car</td>
<td>0.2</td>
<td>30</td>
<td>0.139 MMBtu/gallon</td>
<td>0.081 tons Co2/MMBtu</td>
</tr>
<tr>
<td>Diesel light truck</td>
<td>0.1</td>
<td>17</td>
<td>0.139 MMBtu/gallon</td>
<td>0.081 tons Co2/MMBtu</td>
</tr>
<tr>
<td>Diesel heavy duty</td>
<td>5.4</td>
<td>5</td>
<td>0.139 MMBtu/gallon</td>
<td>0.081 tons Co2/MMBtu</td>
</tr>
</tbody>
</table>
SOLID WASTE

Data Source: Steve Harem, Larimer County Natural Resources (970) 498-5761

<table>
<thead>
<tr>
<th>Category</th>
<th>Amt</th>
<th>unit</th>
<th>Conversion</th>
<th>Total Lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Load</td>
<td>15,760</td>
<td>cy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Car Load</td>
<td>4,014</td>
<td>cy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small Pickup</td>
<td>74,038</td>
<td>cy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large Pickup</td>
<td>27,609</td>
<td>cy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yard waste</td>
<td>2,587</td>
<td>cy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C&amp;D Debris</td>
<td>248,047</td>
<td>cy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial Loose</td>
<td>309,888</td>
<td>cy</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total MSW</strong></td>
<td><strong>681,943</strong></td>
<td>cy</td>
<td>2000 lbs/cy</td>
<td><strong>136,388,600</strong></td>
</tr>
<tr>
<td>Compact MSW</td>
<td>317,867</td>
<td>cy</td>
<td>750 lbs/cy</td>
<td>238,400,250</td>
</tr>
<tr>
<td>Tree limbs</td>
<td>41,164</td>
<td>cy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tree limbs not landfilled</td>
<td>32,549</td>
<td>cy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tree limbs to landfill</td>
<td>8,615</td>
<td>cy</td>
<td>300 lbs/cy</td>
<td>2,584,500</td>
</tr>
<tr>
<td>Tires</td>
<td>8,884</td>
<td>ea</td>
<td>25#/ea</td>
<td>222,100</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>377,595,450</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The total tons received from Larimer County at the landfill in 2000 equals 188,789. This was reduced by 47.18% to 88,757 tons from Fort Collins, because Fort Collins population in 1990 was 47% of all Larimer County’s.

<table>
<thead>
<tr>
<th>Larimer County</th>
<th>Fort Collins</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000 pop- 251,494</td>
<td>118,652 (47.18%)</td>
</tr>
<tr>
<td>1995 pop- 215,686</td>
<td>99,726 (46.24%)</td>
</tr>
</tbody>
</table>

The conversion from tons MSW to tons CO2 was calculated by the Cities for Climate Protection software v3.54a, using the following characterization of landfill waste.

<table>
<thead>
<tr>
<th>Material</th>
<th>Percent of Waste</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper</td>
<td>23.6</td>
</tr>
<tr>
<td>Food Waste</td>
<td>7.1</td>
</tr>
<tr>
<td>Plant Debris</td>
<td>13.4</td>
</tr>
<tr>
<td>Wood/Textiles</td>
<td>22.6</td>
</tr>
<tr>
<td>All Other</td>
<td>33.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

** 1998 Larimer County Landfill Waste Characterization
Coefficients for Calculating GHG Reduction Benefits

**ELECTRICITY**

Measures that reduce electricity typically result in a reduction of the most costly source of electricity, or the marginal generating source. In this region, that is typically coal-generated electricity, not hydro or renewables. The conversion factor of 2,100 lbs. CO2/MWh (0.308 tons CO2, MMBTU) was used to calculate the GHG reduction benefit of electricity-reducing actions. This factor is considered by PRPA to be reasonable aggressive, yet defensible, and is used in PRPA’s 1605(b) reports to the Energy Information Administration. It would have been possible to select a more aggressive conversion factor of 2,400 lbs./MWH, but this more moderate conversion factor was chosen in to be compatible with 16095 (b) reporting.

**NATURAL GAS**

The conversion factor of 0.059 tons Co2/MMBtu was used.

**RECYCLING**

Calculation of the recycling benefits was determined using the CCP software version 3.54 a.

Please contact Lucinda Smith at the City of Fort Collins, Natural Resources Department (970)224-6085 with any comments or questions about information contained in this Appendix.