2011 Status Report

Fort Collins Climate Action Plan

~ 2011 Status Report

City of Fort Collins

August 2012

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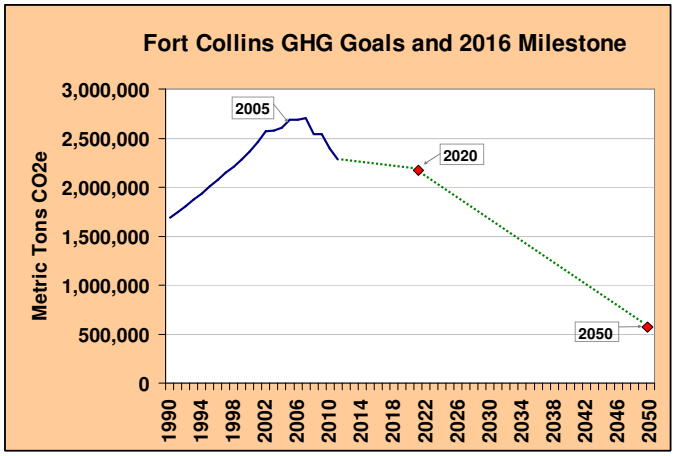
Executive Summary

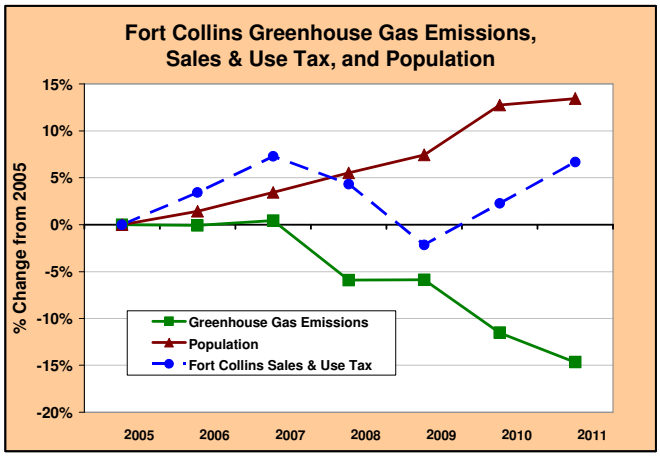
Climate change poses a real and serious threat to the world at large and to the quality of life that we value in Fort Collins. Climate change can affect us locally by contributing to more frequent and severe storms, increased drought and risk of forest fires and changes in the timing and amount of spring runoff. Painfully close to home in 2011, we have all witnessed or been directly impacted by the recent wildfires raging in our county and state. Climate change adds to wildfire risk through the proliferation of pine beetle-killed trees and vulnerability to extreme weather events such as heat waves and drought.

Fort Collins Climate Stewardship

In 2008, City Council adopted carbon reduction goals for the Fort Collins Community.

- Reduce communitywide emissions 20% below 2005 levels by 2020
- Reduce communitywide emissions 80% below 2005 levels by 2050





Through community engagement in energy efficiency and renewable energy programs, and waste and transportation reduction efforts, Fort Collins' greenhouse gas emissions are now 14.7% lower than they were in 2005, despite a population growth of 13.5%. And, during 2011, Fort Collins was ranked 5th Best Place for Businesses and Careers (*Forbes*, June 2011) and Top Colorado City for Job Growth, Fort Collins-Loveland (*newgeography.com* - May 2011), confirming that carbon reductions and high quality of life can, and do, go hand in hand.

Good News by the Numbers

Between 2005 and 2011:

- Total community greenhouse gas (GHG) emissions dropped by 14.7%.
- Core community emissions (electricity, natural gas and vehicle travel) dropped by 9%.
- Per capita GHG emissions dropped by 25%.
- Per capita electricity use dropped by 8%.
- 6.5% of our electricity investments provide clean, renewable energy.
- Tons of waste sent to the landfill dropped by 45%.
- The Non-Industrial Community Waste Diversion Rate has increased to 47%.
- ClimateWise partners avoided over 149,000 metric tons of CO_2e while saving more than $13M in 2011.
- The number of VanGo vans increased by 49% from 2005.
- Transfort saw more than 2.1 million riders in 2011, a 46% increase from 2005.

The Fort Collins community collectively avoided more than 365,000 metric tons of CO_2e in 2010 alone. These reductions are comparable to avoiding:

- Annual GHG emissions of more than 71,000 passenger cars
- Emissions from the energy used in 31,000 homes for one year
- GHG emissions avoided by recycling more than 127,000 tons of material each year

Air Pollution Benefits

2011 climate mitigation actions also reduced air pollution in Fort Collins:

• 199 tons nitrogen oxides avoided

• 178 tons sulfur oxides avoided

• 59 tons of carbon monoxide avoided

Action Highlights

Energy Policy Programs

- The Home Energy Report Program provided periodic reports to over 25,000 homeowners, with educational information about their electricity use compared to similar homes in Fort Collins. Recipients of the report achieved electric savings of over 5,000 MWh.
- The Home Efficiency Program completed 518 comprehensive home efficiency audits, leading to 248 energy retrofit projects.
- Staff from Utilities and Neighborhood Services collaborated to provide training for building professionals related to the adopted amendments designed to "green" the City's building codes.
- Load management and demand response programs for both residential air conditioning and hot water heaters, and for commercial/industrial customers maintained a capacity of over 10 megawatts (MW) of summer peak demand.
- Renewable energy comprised 6.5% of total electrical energy purchases in 2011. Renewable energy purchases were 97,600 MWh.
- Photovoltaic (PV) capacity additions totaled 350 kW (130 kW residential and 220 kW commercial).
- Light and Power staff increased goals for reliability metrics as follows:
    - Average System Availability Index (ASAI) greater than 99.9956%
        - Customer Average Interruption Index (CAIDI) less than 45 minutes
        - System Average Interruption Frequency Index (SAIFI) less than 0.66

ClimateWise

- Partner volunteers and student interns supported the program by logging more than 606 hours valued at $12,944 ~~in~~ areas such as website redevelopment assistance, research and related reporting, and more.
- ClimateWise partners contributed more than $17,550 to the program through sponsorship, service and in-kind donations.
- The newest innovation designed to save money as well as staff and partner time was the redevelopment of the *myClimateWise* database, funded by grant monies.
- More than 230 businesses attended the annual conference, *The Business Innovation Fair*, to learn about topics such as environmentally preferred purchasing, Advanced Meter Fort Collins, Mason Transportation Corridor and advanced recycling.
- More than 450 ClimateWise partners, guests and community members celebrated business achievements at the annual *EnvirOvation – A ClimateWise Showcase*, in April. Partner sponsorships and in-kind contributions reduced the event venue costs by 90%.
- Natural Capitalism Solutions named ClimateWise as a national best practice program, along with six outreach programs spanning from Boston to Seattle.
- Agencies that explored the ClimateWise model include:
    - State of New Mexico, Pollution Prevention Department (Green Zia Environmental Leadership Program)
    - University of Chicago (through a student project)
    - Town of Durango's Four Core Program

Solid Waste/Recycling

- Citizens' opinions about waste and recycling were captured in a community-wide survey. The responses showed a strong support for recycling and many comments indicated citizens' increasing interest in food and yard waste compost collection options.
- Collection for residential yard waste and commercial food and yard waste continued to be offered by some private haulers, although fuel prices and long driving distances to permitted compost facilities resulted in price increases in 2011. (The nearest permitted compost facility able to accept food waste is in Commerce City.)
- Construction and demolition (C&D) activities (and therefore C&D wastes) did not change significantly during 2011.
- Two reports regarding Fort Collins' waste stream were commissioned in 2011. They can be viewed at fcgov.com/recycling/reports.php.
    - The Integrated Recycling Facility Study examined the feasibility of creating a facility to accept many of the recyclables still currently being landfilled, especially from small-scale C&D projects.
    - A Waste Stream Study analyzed the composition of materials currently being landfilled and looked at waste conversion technologies (waste-to-energy) and their feasibility.
- Green building codes were established, which went into effect in January 2012. Staff will be watching closely to determine whether the new on-site recycling requirements help divert more C&D material from landfills.

Transportation

- Transfort helped avoid over 8.4 million miles of vehicular travel in Fort Collins in 2011.
- Transfort purchased six new Compressed Natural Gas (CNG) buses and seven more are planned to be purchased in 2012.
- The final design of the Mason MAX BRT system was completed and conversion of Mason Street to two-way operation commenced in 2011.
- Almost ten percent (9.9%) of Fort Collins' work force cycled to their jobs each day.
- Bike Box installed at Plum and Shields (first in Colorado).
- Bicycle Safety Education Plan adopted in March 2011.
- The North Front Range Metropolitan Planning Organization had a total of 85 VanGo vans in daily operation that saved a total of about 12,000,000 miles of vehicle travel.
- Several street improvements were made in 2011 to Fort Collins' streets that helped to reduce congestion or increase bicycling, thereby reducing associated GHG emissions.

Fort Collins Climate Action Plan
2011 Status Report

I. INTRODUCTION

Climate Change Information Update

One of the greatest humanitarian threats to the world is a changing climate, and the data on climate change continues to document the urgency of the situation.

Link to Wildfires

Painfully close to home, we have all witnessed or been directly impacted by the recent wildfires raging in our county and state. Climate change adds to wildfire risk through the proliferation of pine beetle-killed trees, and vulnerability to extreme weather events such as heat waves and drought. A recent note in the *Proceedings for the National Academy of Science* finds that, since the late 1800s, human activities and the ecological effects of recent high fire activity caused a large, abrupt decline in burning. Consequently, there is now a forest "fire deficit" in the western United States attributable to the combined effects of human activities, ecological, and climate changes. This year's fire season may just begin to start paying off this "deficit". [1]

Global Emission Trends

Regarding carbon emission trends, the Energy Information Administration (EIA) reported that global CO_2 emissions from fossil-fuel combustion reached a record high of 31.6 gigatonnes (Gt) in 2011, representing a 3.2% increase over 2010 levels. Coal accounted for 45% of total energy-related CO_2 emissions in 2011, followed by oil (35%) and natural gas (20%).[2] This rise is led by increased emissions from China, offsetting falls in the United States and Europe. According to the EIA, CO_2 emissions in the U.S. in 2011 fell by 92 Mt, or 1.7%, primarily due to ongoing switching from coal to natural gas in power generation and an exceptionally mild winter, which reduced the demand for space heating. US emissions have now fallen by 430 Mt (7.7%) since 2006, the largest reduction of all countries or regions. This development has arisen from lower oil use in the transport sector (linked to efficiency improvements, higher oil prices and the economic downturn which has cut vehicle miles travelled) and a substantial shift from coal to gas in the power sector. However, the U.S. is still the second largest emitter global of CO_2 emissions.

Temperature Trends

[1] Retrieved from http://www.pnas.org/content/early/2012/02/09/1112839109 on 7/10/12

[2] Retrieved from http://www.iea.org/newsroomandevents/news/2012/may/name,27216,en.html on 7/10/12

More than 40,000 daily heat records have been broken nationwide, compared to 25,000 daily records broken in June of 2011. According to NASA's Goddard Institute for Space Studies, an entity that tracks global surface temperatures, nine out of the last 10 summers have been the hottest years on record. Extensive scientific research reviews were conducted by the U.S. National Academy of Sciences in 2011. The *America's Climate Choices* report concluded that pollution from smokestacks and tailpipes is causing destabilization of our climate. [3]

According to the report, "Climate change is occurring, is very likely caused primarily by the emission of greenhouse gases from human activities, and poses significant risks for a range of human and natural systems. Emissions continue to increase, which will result in further change and greater risks. In the judgment of this report's authoring committee, the environmental, economic, and humanitarian risks posed by climate change indicate a pressing need for substantial action to limit the magnitude of climate change and to prepare for adapting to its impacts."

Connection Between Climate Change and Extreme Weather Events

One of the predicted impacts of climate disruption is an increase in the frequency and severity of weather events. Until recently, it has been difficult to draw a direct link between climate change and specific weather events, other than to say they follow the predictions. However, for the first time recently, scientific studies have been able to make strong statistical links between climate change and certain extreme weather events. For example, The UK's *Guardian* reported on July 10, 2012, that last year's record warm November in the UK – the second hottest since records began in 1659 – was at least 60 times more likely to happen because of climate change than owing to natural variations in the earth's weather systems, according to the peer-reviewed studies by the National Oceanic and Atmospheric Administration in the U.S., and the Met Office in the UK. The devastating heat wave that blighted farmers in Texas in the U.S. last year, destroying crop yields in another record "extreme weather event," was about 20 times more likely to have happened owing to climate change than to natural variation.[4]

A recent study published in *Nature* by Seung-Ki Min and colleagues shows that rising concentrations of greenhouse gases in the atmosphere have caused an intensification of heavy rainfall events over some two-thirds of the weather stations on land in the northern hemisphere. The climate models appear to have underestimated the contribution of global warming on extreme rainfall: it's worse than they thought it would be.[5]

A special report released by the Intergovernmental Panel on Climate Change (IPCC) in November 2011 predicted that global warming will cause more dangerous and "unprecedented extreme weather" in the

[3] Retrieved from http://www.nap.edu/catalog.php?record_id=12781 on 8/8/12

[4] Retrieved from http://www.guardian.co.uk/environment/2012/jul/10/extreme-weather-manmade-climate-change on 7/10/12

[5] Retrieved from http://www.nature.com/nature/journal/v470/n7334/full/nature09763.html on 7/10/12

future. The report finds that an increase in heat waves is almost certain, while heavier rainfall, more floods, stronger cyclones, landslides and more intense droughts are likely across the globe this century as the Earth's climate warms. [6]

The same November 2011 IPCC report that predicts increased certainty of extreme weather events also calls on countries to come up with disaster management plans to adapt to the growing risk of extreme weather events linked to human-induced climate change. The full report was released in March 2012. "The main message from the report is that we know enough to make good decisions about managing the risks of climate-related disasters. Sometimes we take advantage of this knowledge, but many times we do not," said Chris Field, Co-Chair of IPCC's Working Group II, which together with Working Group I produced the report. "The challenge for the future has one dimension focused on improving the knowledge base and one on empowering good decisions, even for those situations where there is lots of uncertainty," he said.

Human Health Implications of Climate Change

A changing climate also has impacts on human health though the increased potential of infectious disease spread, increased mortality risks associated with hotter temperatures leading to extreme heart waves, worsening air quality associated with hotter temperatures, as well as health impacts associated with other extreme weather events such as floods, hurricanes, etc.

In May 2012, the Natural Resources Defense Council issued a brief entitled, *Killer Summer Heat: Projected Death Toll from Rising Temperatures in America Due to Climate Change*. This report analyzes the results of independent peer-reviewed scientific papers and presents the findings of increasing heat-related mortality due to global warming for the 40 largest U.S. cities. The findings indicate that rising temperatures driven by unabated climate change will increase the number of life-threatening excessive heat events, resulting in thousands of additional heat-related premature deaths each year, with a cumulative toll of approximately 33,000 additional heat-related deaths by mid-century in these cities, and more than 150,000 additional heat-related deaths by the century's end.[7]

The findings for Denver, CO are as follows:

Avg. Number of Excessive Heat Event (EHE) Days per Summer (Historical Average 1975-1995)	9
By Mid Century-Climate Change Will Increase Per-Summer EHE Days by…	79
…Making the New Total Number of EHE Days by Mid-Century Increase to….	88

(Note: The analysis shows the change to the number of EHE days projected to be caused by climate change and total projected average EHE days during 2045-2055, based on a climate model assuming the A1FI emissions scenario, which portrays a ""business-as-usual"" trend with continued significant reliance on fossil-fuels and no significant policy interventions.)

[6] Retrieved from http://www.ipcc.ch/news_and_events/docs/srex/srex_press_release.pdf on 7/10/12

[7] Retrieved from http://www.nrdc.org/globalwarming/killer-heat/files/killer-summer-heat-report.pdf on 7/11/12

In 2009, the U.S. Environmental Protection Agency (EPA) asserted that greenhouse gases (GHGs) threaten the public health and welfare of the American people, following a thorough examination of scientific evidence and careful consideration of public comments.[8] Although this "endangerment" finding was challenged by certain industry groups and states, a federal appeals court in Washington upheld this finding and further ruled that the U.S. EPA was "unambiguously correct" that the Clean Air Act requires the federal government to impose limits once it has determined that emissions are causing harm.

Economic Costs of Climate Change

The future health costs associated with predicted climate change–related events such as hurricanes, heat waves, and floods are projected to be enormous. A study published in 2011 in the journal *Health Affairs* estimates the health costs associated with six climate change–related events that struck the United States between 2000 and 2009. The six case studies represented categories of climate change–related events projected to worsen with continued global warming—ozone pollution, heat waves, hurricanes, infectious disease outbreaks, river flooding, and wildfires. The study estimates that the health costs exceeded $14 billion, with 95 percent due to the value of lives lost prematurely. Actual health care costs were an estimated $740 million.[9]

Consequently, the insurance industry has been speaking out about climate change-related costs. According to Swiss Re, the average weather-related insurance industry loss in the U.S. was about $3 billion a year in the 1980s compared to approximately $20 billion annually by the end of the past decade. So great are their concerns that in March of 2012, stakeholders from the insurance industry met with members of the U.S. Senate to acknowledge the role global warming plays in extreme weather-related losses, and to issue a call for action. The insurance industry concedes that costs associated with natural disasters and extreme weather events will eventually translate into higher insurance costs for us all.[10]

[8] Retrieved from http://yosemite.epa.gov/opa/admpress.nsf/7ebdf4d0b217978b852573590040443a/08d11a451131bca585257685005bf252!OpenDocument on 7/10/11

[9] Retrieved from http://content.healthaffairs.org/content/30/11/2167.abstract on 7/11/12

[10] Retrieved from http://www.insurancenetworking.com/news/insurance-climate-change-risk-ceres-30007-1.html on 7/10/12

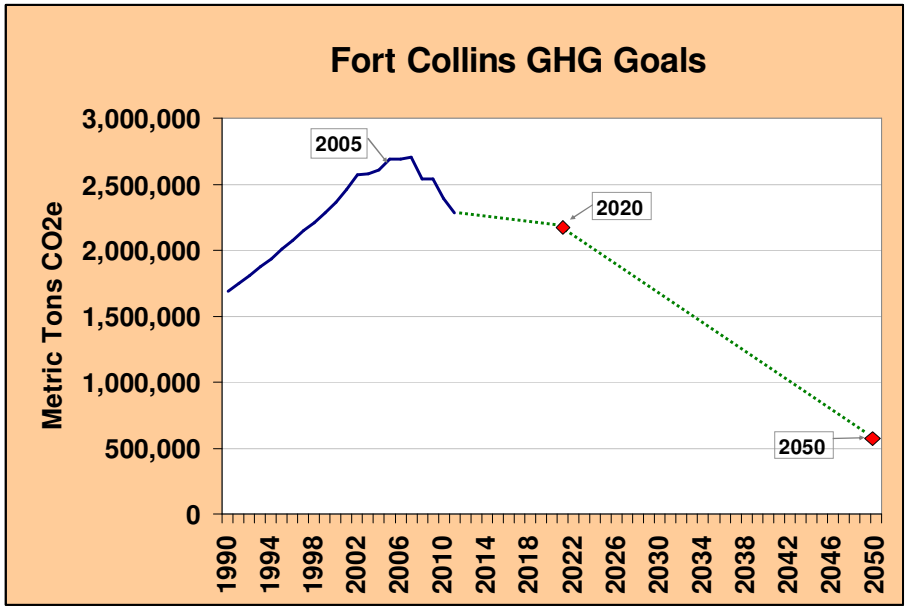
Fort Collins Climate Protection Commitments

Over a decade ago Fort Collins was among the first wave of communities in the nation to commit to reducing local greenhouse gas (GHG) emissions. The Climate Action Plan (CAP), available at *fcgov.com/climateprotection*, details the updated carbon reduction goals for the Fort Collins community adopted by the City Council in December 2008:

- Reduce communitywide emissions 20% below 2005 levels by 2020
- Reduce communitywide emissions 80% below 2005 levels by 2050
- Intent to reduce emissions to a level comparable to 3% below 2005 by 2012

The 2020 and 2050 goals depicted in Figure 1 also align with goals established for the state of Colorado.

Figure 1. Fort Collins Community Greenhouse Gas Reduction Goals



Fort Collins has long been committed to reducing the community's carbon footprint. In 1997 the City joined the ICLEI- Local Governments for Sustainability's Cities for Climate Protection Campaign, followed by adoption of the 1999 and 2008 Climate Action Plans, and adoption of its 2003 and 2009 *Energy Policy*. In January 2012 the City created a new Sustainability Services Area dedicated to balancing economic health, social well-being, and environmental stewardship. The City is currently developing a Sustainability Strategic Plan to guide its future sustainability efforts.

II. COMMUNITY GHG EMISSIONS

The main purposes of the community GHG inventory are to track progress on community carbon reduction goals, raise awareness about emissions sources and reduction opportunities, and inform policy and budgeting decisions. The community inventory does not represent asset ownership of emissions or reductions, but is intended to illustrate local emission trends. Several entities within Fort Collins (including Colorado State University, Fort Collins Utilities, New Belgium Brewing and Platte River Power Authority) are reporting their emissions via formal reporting registries that have clear guidelines for establishing ownership boundaries for emissions.

2011 Community Inventory (by Source and Sector)

The 2011 community GHG inventory was calculated using the same approach as the 2005 baseline, with updated methodologies applied retroactively back to the baseline year. Table 1 presents a short summary of GHG emissions, Appendix A contains the detailed line item report of the 2011 community GHG inventory, and Appendix B contains a summary of the 2005 GHG Inventory Baseline.

Table 1. Fort Collins 2011 Greenhouse Gas Emissions (Metric Tons CO_2e)[11]

Source	MT CO2e*	Type
Electricity	1,028,471	Indirect (Scope 2)
Natural Gas	423,249	Direct (Scope 1)
Ground Travel	505,171	Direct (Scope 1)
Air Travel	89,386	Indirect (Scope 2)
Landfill Gas**	33,029	Indirect (Scope 2)
Recyclable Materials Energy***	204,569	Indirect (Scope 2)
Total	**2,283,875**	
Benefit of Renewable Energy Certificates	-38,397	
Benefit of Known Offsets	-21	
Revised Total	**2,245,457**	

*Carbon dioxide equivalents calculated for landfill gas and natural gas only.

** Landfill gas emissions incorporate the benefit of the landfill gas capture system.

*** Recyclable materials energy refers to the GHG emissions associated with having to manufacture new products when recyclables are thrown in the landfill.

Scope 1 emissions are direct emissions emitted inside the City boundary (fuel combustion and natural gas combustion). Scope 2 emissions are those generating power (electricity) used in the community. Scope 3 emissions are from other activities where the emissions are generated outside the City boundary as a result of citizen and business activity (e.g., trash from Fort Collins thrown in the landfill, air travel emissions).

[11] MTCO2e = Metric tons carbon dioxide equivalent: Each greenhouse gas has a "global warming potential" which refers to its heat-trapping ability relative to carbon dioxide. Methane is 21 times more potent that CO2, and nitrous oxide is 310 times more potent. CO2e refers to the summed impact of gases quantified, in terms of carbon dioxide.

Figure 2. 2011 Emissions by Source (2,283,875 Metric Tons CO_2e)

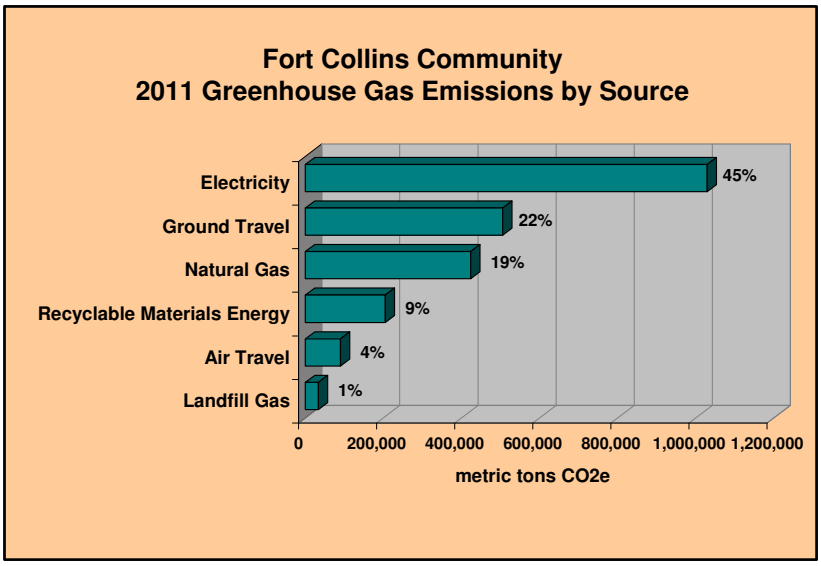
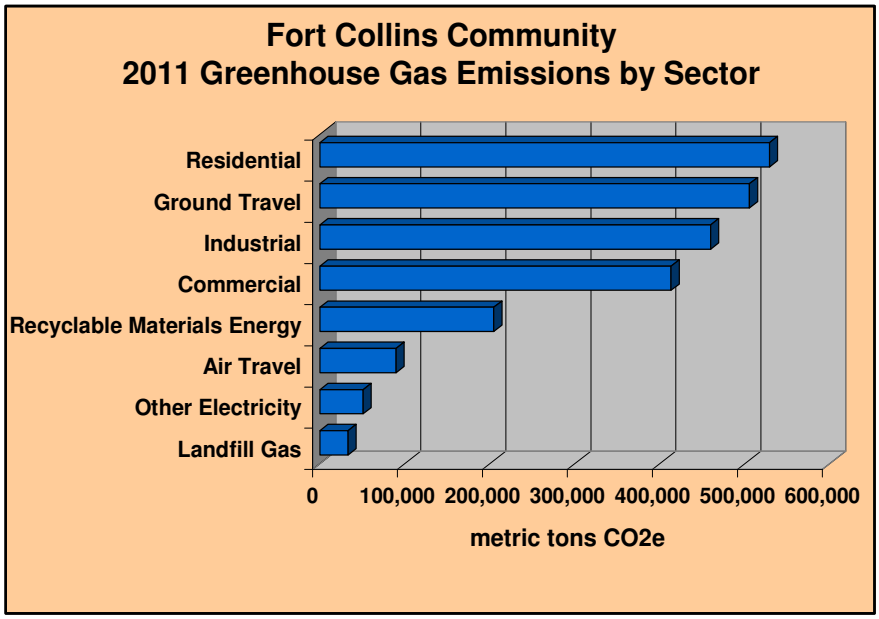


Figure 3. 2011 Emissions by Sector (2,283,875 Metric Tons CO_2e)



"Other electricity" in Figure 3 refers to traffic signals, streetlights, and electricity transmission/distribution losses.

The City of Fort Collins has moved to calculating all of its GHG emissions inventories using the Greenhouse Gas Emissions Management System (GEMS) database system. This change has allowed greater efficiency in conducting the annual GHG inventory and implementation of more quality assurance and quality control measures. Quality Management Plans (QMP) for both the community and municipal emission inventories provide detailed descriptions of methods, emission factors, and data sources, and are available at: http://www.fcgov.com/airquality/.

III. COMMUNITY PROGRESS

Greenhouse Gas Trends

Progress on community GHG goals is measured by changes in the total emissions level. Fort Collins' reduction goals are not a "per capita" measurement. Progress must be made in lowering total emissions, regardless of population growth rates.

In 2011, community GHG emissions dropped by 14.7% from 2005 levels (Figure 4), while population grew by 13.5% (Figure 5) during this period. Also shown in Figure 5, Fort Collins' sales and use tax has been going up since 2009. In 2011, Fort Collins was ranked 5th Best Place for Business and Careers (*Forbes*, June 2011), the top Colorado City for Job Growth (Fort Collins-Loveland, newgeography.com, May 2011), and one of the top ten places to retire in the nation (Charles Schwab's on Investing, April 2011) confirming that carbon reductions and high quality of life can, and do, go hand in hand.

Additional findings of the 2011 GHG inventory showed that there was a 9.3% decrease in Scope 1 and 2 'core' emissions (those from electricity, natural gas, and cars and trucks) compared to 2005 levels. Scope 3 emissions (waste and recyclables sent to the landfill and air travel by Fort Collins citizens and businesses) decreased by 37% in 2011 relative to the 2005 baseline. Several things impact GHG emissions, including the emissions factor used to convert electricity into tons of GHGs. This factor is updated annually to reflect the actual mix of sources that comprises Platte River Power Authority's electricity portfolio. The electricity emissions factor went down in 2011 compared to 2010 because the amount of hydropower generation in Fort Collins' electricity portfolio increased and the amount of fossil fuel-generated electricity declined.

Figure 4. Fort Collins GHG Emissions Trend

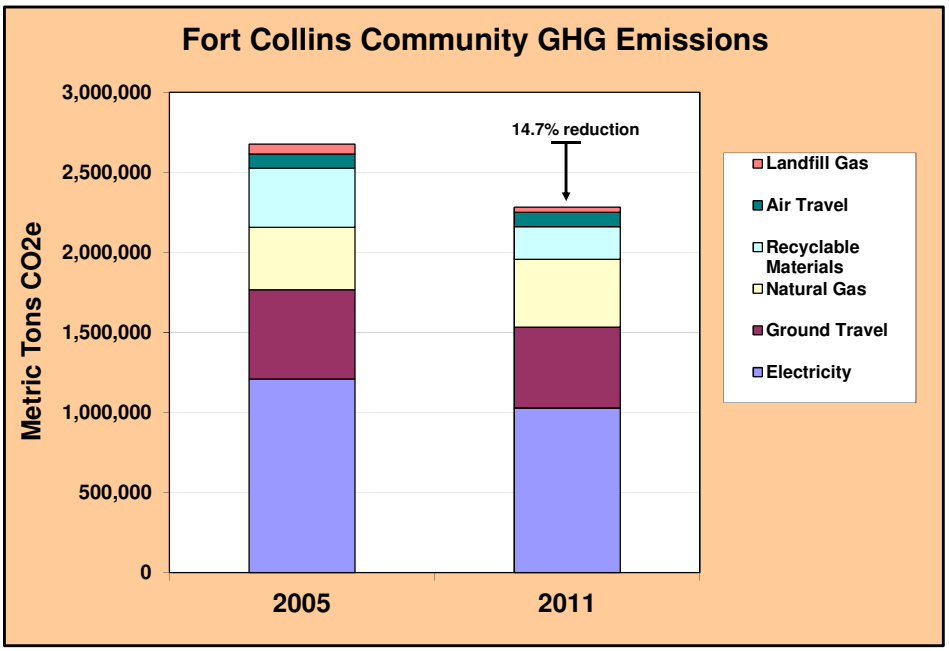
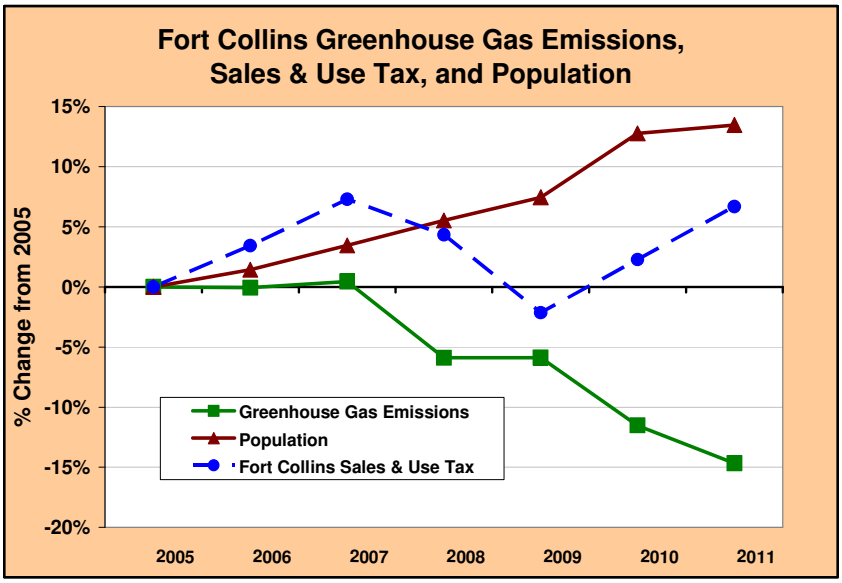


Figure 5. Fort Collins GHG Emissions and Population, and Sales and Use Tax



The reduction in total community emissions from the baseline year reflects, in part, reduction in per capita electricity use and increased acquisition of renewable energy. It also reflects significant reductions in solid waste-related emissions. Total community emissions include landfill gas from trash thrown in the landfill during the inventory year 2011, and upstream emissions associated with recyclable materials that were instead thrown away (embodied energy in recyclable materials). Following the economic downturn, communities around the country saw decreases in solid waste, as people bought fewer products and construction activity declined. In addition, Fort Collins' pay-as-you-throw program continued to encourage increased waste reduction and diversion.

Greenhouse Gas Reduction Summary

Over 365,000 $MTCO_2e$ was estimated to have been avoided in 2011 through the communitywide projects listed below. Although numerous other projects may have occurred during 2011, they were not evaluated for their potential carbon reduction benefits in this report because of the difficulty of collecting the data. Progress on the community GHG reduction goal is tracked through changes in total emission levels, not by estimated annual GHG reductions.

Table 2. 2011 Estimated Community GHG Reductions

Community Reductions Project name	2011 Metric tons CO2e/yr
CLIMATEWISE PROGRAM	
Electric Energy Efficiency projects	76,808
Renewable Energy Projects**	14,372
Natural Gas Projects	17,906
Recycling/Waste Diversion	38,442
Transportation	818
Water	1,507
ClimateWise Total	**149,853**
ENERGY	
Electric Efficiency Program Savings (2002 - 2011)	
Electricity Savings	70,532
Natural Gas Savings	279
RFR Program CFC-11 Destruction	9,199
Metered Renewable Energy	28,829
On-site Renewable Energy	1,133
Renewable Energy Certificates**	36,322
Energy Total	**146,295**
WASTE REDUCTION	
Communitywide Recycling	140,485
Concrete and Asphalt	5,639
Waste Reduction Total	**146,124**
TRANSPORTATION	
Transfort Bus Ridership	3,973
Van Go vanpool	260
Community Bike to Work	2
Transportation Total	**4,235**
TOTAL QUANTIFIED REDUCTIONS*	**365,881**

* Total is corrected for double-counting across programs.

** These GHG reductions are calculated according to Green-E protocols for reporting carbon equivalents.

These estimated reductions are comparable to avoiding:

- Annual GHG emissions of over 71,000 passenger cars
- Emissions from the energy used in 31,000 homes for one year
- GHG emissions avoided by recycling over 127,000 tons of material each year

Key Community Indicators

Table 3. Changes in Key Community Indicators Between the 2005 Baseline and 2011

14.7% ↓	Total community GHG emissions
9.3% ↓	Core community GHG emissions (electricity, natural gas, and vehicle travel)
37% ↓	Scope 3 GHG emissions (waste and recyclables to the landfill and community air travel)
25% ↓	Per capita GHG emissions
8% ↓	Per capita electricity use
6.5% ↑	Percent of electricity generated by clean, renewable energy
45% ↓	Tons of waste sent to the landfill
14.3% ↑	Non-Industrial Waste Diversion rate now at 47%, up from 33% in 2008 (no 2005 baseline)
44.5% ↓	Community air travel
49% ↑	Number of VanGo vans
44.5% ↑	Number of Transfort bus riders

IV. 2011 COMMUNITY ACTION HIGHLIGHTS

Over 365,000 $MTCO_2e$ were estimated to have been avoided in 2011 through communitywide projects. Although numerous other projects certainly occurred during 2011, they were not evaluated for their potential carbon reduction benefits in this report because of the difficulty in identifying and collecting the data. Only major program benefits are reported below. Progress on the community GHG reduction goal is tracked through changes in total emission levels, not by estimated annual GHG reductions. The action highlights discussed below are organized according to the categories of action identified in the 2008 Climate Action Plan.

Community Leadership

ClimateWise

In 2011, the ClimateWise program grew by over 54 organizations to include more than 300 local business partners. Partners in the program employ nearly 34,660 employees ranging from small one-employee businesses to Colorado State University, the largest employer in Northern Colorado. With 67 % of partners reporting, the number of GHG reductions projects implemented by ClimateWise partners grew to almost 1,200 in 2011. This resulted in ClimateWise partners avoiding over 149,000 $MTCO_2e$. The projects saved the partners $13 million in 2011 alone, and over $59 million since the program began in 2000. Along with the valuable ongoing assistance to help partners reduce GHG emissions and meet program levels, ClimateWise also provides recognition of partners in various publications, radio spots, local cable channel, and community presentations.

Figure 6 shows the growth in ClimateWise partners and projects since 2000, and Figure 7 shows the distribution of projects by type. In order to achieve Gold or Platinum status, ClimateWise partners in the community must create and share a GHG reduction goal, and indicate strategies and measures planned to achieve their goal. By April 2011, there were 53 Gold and Platinum partners working toward a GHG reduction goal. For more information, see the 2010 ClimateWise Annual report at: http://www.fcgov.com/climatewise/reports.php.

Figure 6. ClimateWise Program Growth, in Numbers of Partners and Projects

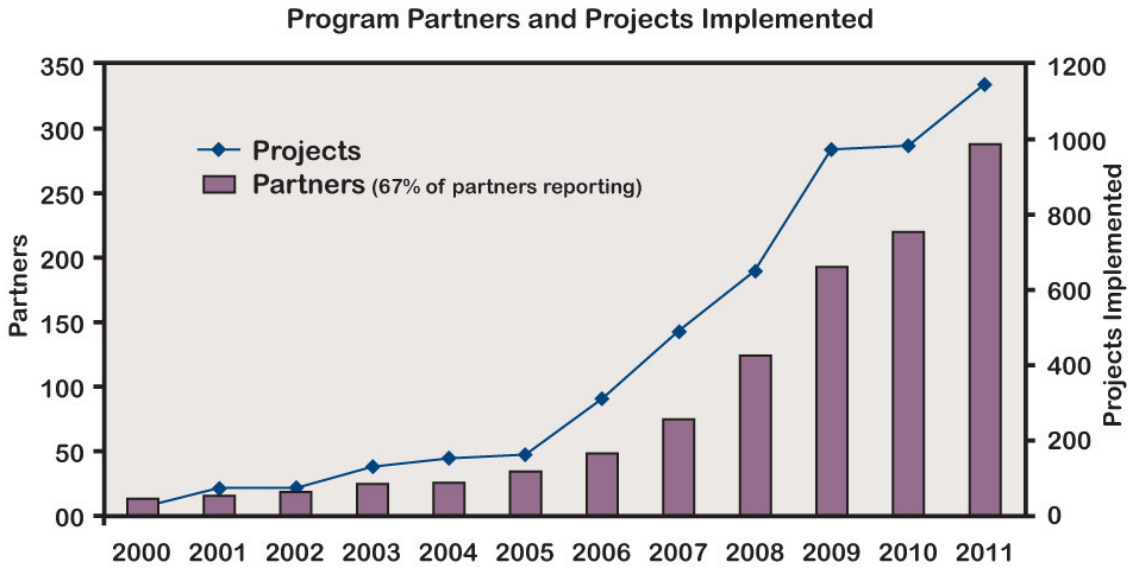
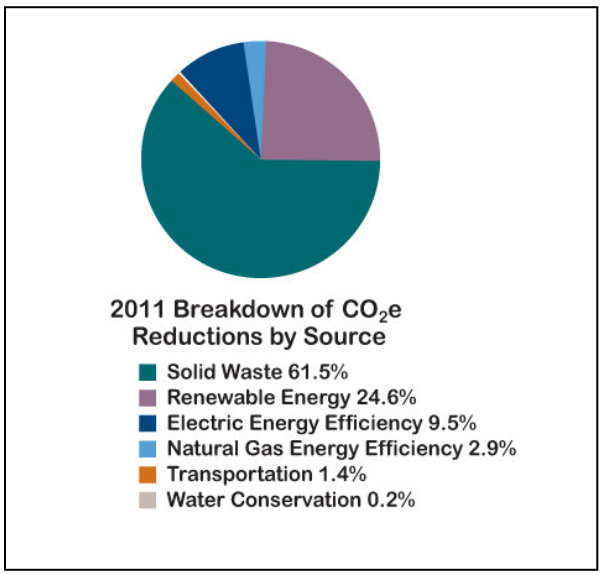


Figure 7. ClimateWise Partners' 2011 Project GHG Reductions by % Tons CO_2e Avoided (not cumulative)



2011 Highlights

- ClimateWise program grew by 54 organizations to include 304 business partners.
- These 304 businesses reduced greenhouse gas emissions by 149,000 $MTCO_2e$, exceeding the 2012 goal of 140,000 $MTCO_2e$. The program's emissions reduction goal has been exceeded three times in the last four years.
- Cost savings for businesses exceeded $13 million in 2011.

- Partner volunteers and student interns supported the program by logging more than 606 hours valued at $12,944 ~~in~~ in areas such as website redevelopment assistance, research and related reporting, and more.
- ClimateWise partners contributed more than $17,550 to the program through sponsorship, service and in-kind donations.
- The newest innovation designed to save money as well as staff and partner time was the redevelopment of the *myClimateWise* database, funded by grant monies.
- More than 230 businesses attended the annual conference, *The Business Innovation Fair*, to learn about topics such as environmentally preferred purchasing, Advanced Meter Fort Collins, Mason Transportation Corridor and advanced recycling.
- More than 450 ClimateWise partners, guests and community members celebrated business achievements at the annual *EnvirOvation – A ClimateWise Showcase*, in April. Partner sponsorships and in-kind contributions reduced the event venue costs by 90%.
- Natural Capitalism Solutions named ClimateWise as a national best practice program, along with six outreach programs spanning from Boston to Seattle.
- Agencies that explored the ClimateWise model include:
    - State of New Mexico, Pollution Prevention Department (Green Zia Environmental Leadership Program)
    - University of Chicago (through a student project)
    - CSU graduate students (presented at a national conference in New Orleans)
    - Town of Durango's Four Core Program
    - Rocky Mountain Climate organization's *Save Our Snow* program is based on ClimateWise, and includes City of Aspen, Town of Vail and Park City

Measures that Matter: Cumulative savings since 2000

Water Conservation: Cumulative water savings since the year 2000: 9 billion gallons
Approximately equivalent to:

- the water use of 13,000 homes (over same period)
- filling City Park pool 42,000 times

Electric Energy: Cumulative savings since the year 2000: 586,000,000 kWh

- Approximately equivalent to the energy use of 6,300 homes (over the same period)

Natural Gas Energy: Cumulative savings since the year 2000: 14,600,000 therms

- Approximately equivalent to the natural gas use of 1,900 homes (over the same period)

Material Diverted from Landfill: Cumulative savings since the year 2000: 254,000 tons

- Approximately equivalent in weight to 18,000 Transfort city buses

Local Government Organizations Establish GHG Goals and Make Progress

Colorado State University

In 2008, Colorado State University (CSU) signed the American College & University Presidents Climate Commitment (ACUPCC), whereby CSU agreed to set climate neutrality as a long-term climate goal. In 2010, CSU developed a Climate Action Plan. This Plan, along with annual GHG inventories and other reports, are available at: http://www.fm.colostate.edu/sustain/index.cfm?page=about/reports. The *2011 CSU Environmental Report* highlights the following achievements:

- 83% of waste generated in the construction of the new Behavioral Sciences LEED Gold building was diverted from the landfill
- The Research Innovation Center became the 10th LEED Gold building on campus
- A closed loop composting system was installed that can process 2,000 pounds of food waste and bulking material per day
- CSU recycled over 50% of its total waste stream in 2011
- Earned a Silver ranking from the League of American Bicyclists in the Bicycle Friendly University program

Poudre School District

Poudre School District's (PSD) 2006 Sustainability Management System set a goal to reduce energy and water GHG emissions by 1.5% per year until 2016, for a total reduction of 15% in 10 years. PSD's 2011 Annual Sustainability Report reported the following examples of progress:

- During 2011, 30 schools and 2 office buildings received Energy Star awards, with 16 schools earning a score of 90 or above
- 6,649 tons of aggregate, asphalt, concrete, metal, and cardboard generated by 2010 Bond construction projects were recycled
- Poudre High School distributed newsletters electronically to students and parents, saving 22,000 sheets of paper, as well as ink, postage, and staff time
- Fixture lighting upgrades resulted in a savings of over 47,800 watts of electricity and $3,000
- High efficiency Bradford White water heaters that use up to 50% less energy than standard models were installed at four schools
- Webasto heating units were installed on 30 school buses to provide interior supplemental heat to the bus engine which decreased idling time by 33 hours per week, thereby reducing fuel consumption by 340 gallons every 90 days.

City of Fort Collins

The City of Fort Collins has tracked its own organizational GHG emissions and produced biennial reports through 2009, then switched to annual reports through 2011, documenting efforts to reduce emissions

since a Municipal Climate Protection Plan was adopted in 2001. The City joined its own ClimateWise program in April 2007 and set a GHG goal for City operations in 2009 to:

> ***Reduce GHG emissions from municipal operations at least 2% per year starting in 2009 in order to achieve a reduction of 20% below 2005 levels by 2020; ultimately to achieve carbon neutrality for the municipal organization.***

The City organization's municipal goal aligns with community and state goals to reduce emissions 20% below 2005 levels by 2020. Including its GHG reduction goal, the City of Fort Collins has adopted 10 internal sustainability goals for municipal operations. These range from reducing building energy use, to increasing recycling and waste diversion, to increasing alternative fuel use in City fleets. The annual Municipal Sustainability Report lists the following examples of progress for City operations:

Changes since the baseline year of 2005:

- Total carbon emissions down 7.4%
- Carbon emissions from electricity are down 22%
- Carbon emission from building energy use (electricity and natural gas) are down 14%
- Conventional fuel use down 2%
- 48% drop in electricity used for traffic lights
- Electricity use for water and wastewater production is down 7.2%
- Carbon emissions from streetlights down 14.3% even though the number of streetlights in the City has increased by 9.8%
- City of Fort Collins achieved a Platinum level ClimateWise award

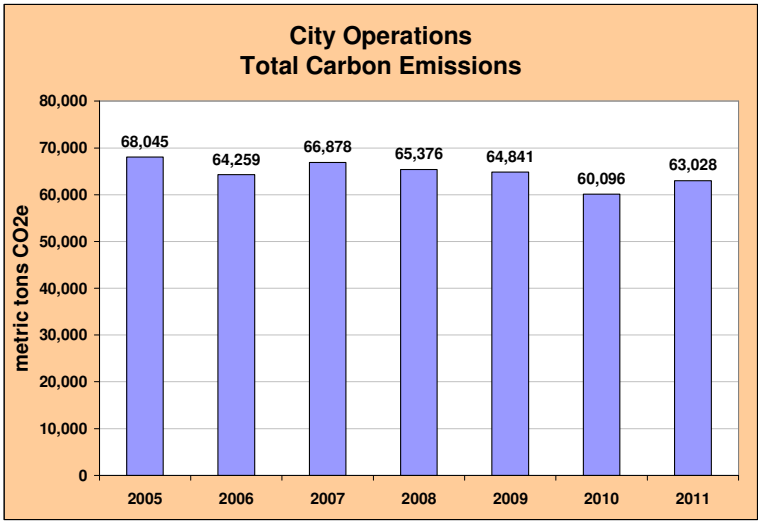
Changes since 2010:

- Facility water use is down 3.8%

Building on early efforts and progress, in 2011 the City moved from calculating its annual GHG emissions using the ClimateWise "Greenhouse Gas Baseline Tool" to using the Greenhouse Gas Emissions Management System (GEMS) database system developed for the City of Fort Collins for annual GHG inventories. GEMS provides the City with a greater level of detail in GHG reporting. The *Municipal Operations Quality Management Plan* (QMP) provides a detailed description of methods, emission factors, and data sources, and is available at: http://www.fcgov.com/airquality/.

Figure 8 provides a snapshot of municipal emissions over time. Complete results are detailed in the 2011 Municipal Operations Sustainability report available at: http://www.fcgov.com/sustainability/.

Figure 8. Municipal GHG Emission Trend since Baseline



From the baseline year of 2005 to 2011, total GHG emissions for City operations decreased by 7.4%. The majority of GHG emissions during 2011 were from electricity (48%) and solid waste (32%). A change in methodology for solid waste, recycling, and diversion activities during 2011 showed that the City is a large producer and recycler of industrial materials (e.g., both waste and recycled materials from street construction and maintenance).

Waste Reduction and Diversion Programs

The Fort Collins community's landfill and recycling weights in 2011 did not change significantly from 2010. The most notable change is that 18,798 tons of branches and tree debris were collected by citizens and by City crews following intense storms in late 2011. The woody material was then ground up for use in making compost and garden mulch, and given away for free to citizens.

Highlights in Recycling and Waste Diversion for 2011

- Citizens' opinions about waste and recycling were captured in a community-wide survey. The responses showed a strong support for recycling and many comments indicated citizens' increasing interest in food and yard waste compost collection options.
- Collection for residential yard waste and commercial food and yard waste continued to be offered by some private haulers, although fuel prices and long driving distances to permitted compost facilities resulted in price increases in 2011. (The nearest permitted compost facility able to accept food waste is in Commerce City.)
- Construction and demolition (C&D) activities (and therefore C&D wastes) did not change significantly during 2011.

- Two reports regarding Fort Collins' waste stream were commissioned in 2011. They can be viewed at fcgov.com/recycling/reports.php.
    - The Integrated Recycling Facility Study examined the feasibility of creating a facility to accept many of the recyclables still currently being landfilled, especially from small-scale C&D projects.
    - A Waste Stream Study analyzed the composition of materials currently being landfilled.
- Green building codes were established, which went into effect in January 2012. Staff will be watching closely to determine whether the new on-site recycling requirements help divert more C&D material from landfills.

Diversion Rates and Methodology

For the past 15 years, the City has determined which data to collect and include in its diversion rate by using the EPA classification for Municipal Solid Waste (MSW), which excludes industrial wastes. Recently, the Colorado Department of Public Health and the Environment and others have started to collect data for, and report, two separate diversion rates. The City opted to join this trend to allow for comparative analyses with data from not only the state, but other communities throughout the country.

An additional benefit of tracking both diversion rates is that it allows us to monitor trends in the community as a whole, and also to identify changes in the residential and commercial sectors. Since industrial materials are so heavy, small changes in their generation can yield significant changes in the Community Diversion Rate, potentially masking trends occurring in the residential or commercial sector. However, if we tracked only a Non-Industrial Diversion Rate, we would be missing a significant and important amount of material being generated in Fort Collins.

All data reported by the City are collected from weights reported by licensed trash haulers and recycling companies in Fort Collins.

Community Diversion Rate

It was possible to re-categorize data from 2010 and 2011 into this grouping, showing that the Community Diversion Rate increased slightly from 56% to 57%, largely due to the increased organics recycled from the storm in 2011. Landfill weights increased by 1.6%, while recyclables decreased by 6.3% and organics increased by 34%.

The Community Diversion Rate includes all waste from the community, whether from industrial, residential, or commercial generators. It is a new calculation for the City of Fort Collins. The state of Colorado reports refer to this as the "diversion rate."

> Materials included in the Community Diversion Rate: all items included in the Non-Industrial Rate as well as concrete and asphalt, aggregates and wood waste from C&D projects, organics from breweries, biosolids, and industrial landfill waste from City operations.

Non-Industrial Diversion Rate

This diversion rate more closely reflects diversion rates reported in the past. Again, the increase in organics from 2011 storms helped contribute to an increase in this diversion rate from 43% in 2010 to 47% in 2011. Non-industrial landfill weights decreased by 8%, recycling decreased by 13%, and organics increased by 30% from 2010 to 2011.

The Non-Industrial Diversion Rate includes materials generated by residential and commercial sectors in Fort Collins. The state of Colorado reports refer to this as the "MSW recycling rate," but the City is choosing to use the term "Non-Industrial" so as to differentiate this material from that generated by the Fort Collins municipal organization. In the past, this calculation was reported as the diversion rate for the community, but also included organics from breweries and materials from C&D projects.

> Materials included in the Non-Industrial Diversion Rate: Residential and commercial landfilled waste, recycling and organics. It includes materials collected by private haulers as well as materials delivered to recycling drop-off centers and materials self-hauled to the landfill.

Fort Collins Energy Policy Programs

The primary goals of the 2009 *Energy Policy* are to sustain high system reliability and to contribute to the community's climate protection goals and economic health. The purpose of the policy is to provide strategic planning guidance for Fort Collins Utilities (Utilities). The *Energy Policy* 2050 vision is to ensure highly reliable, competitive, carbon neutral electricity supplies, managed in a sustainable, innovative, responsible and efficient manner for the Fort Collins community.

The Fort Collins 2008 Climate Action Plan references the *Energy Policy* for goals and objectives related to energy efficiency, conservation and renewable energy.

Key outcomes from implementation of the *Energy Policy* in 2011 include:

- Customers continued to receive highly reliable electric service.
- Utilities began implementation of the Advanced Meter Fort Collins project to modernize the distribution system.
- Community carbon emissions from electricity use were 17% lower in 2011 compared to the baseline year of 2005. The reduction in emissions was due both to factors related to the *Energy Policy* (increased use of renewable energy, efficiency programs' impact on electricity use, improved fossil fuel power plant efficiency) and factors unrelated to the Energy Policy (increased availability of hydropower from Western Area Power Administration, changes to monitoring systems at Rawhide).
- Electricity use per capita decreased by 8% from 2005 to 2011.
- Electricity savings from 2002 through 2011 efficiency programs will avoid over 100,000 MWh of electricity use in 2012.

- Customer electricity savings efficiency programs totaled over 20,434 megawatt-hours (MWh) in annual electricity use, or 1.4% of the community's electric use. This is equivalent to the annual electric use of over 2,250 typical Fort Collins homes.
- Efficiency programs saved electricity with a lifecycle cost-of-conserved energy of 3.8 cents per kilowatt-hour (kWh), compared to an average wholesale electricity cost of 4.8 cents per kWh.
- Renewable energy comprised 6.5% of total electrical energy purchases in 2011.
- Efficiency programs generated over $15 million in local economic benefits through reduced utility bills, incentives, leveraged investment and indirect activity.
- Avoided annual emissions of over 146,000 $MTCO_2e$ from *Energy Policy* related programs.

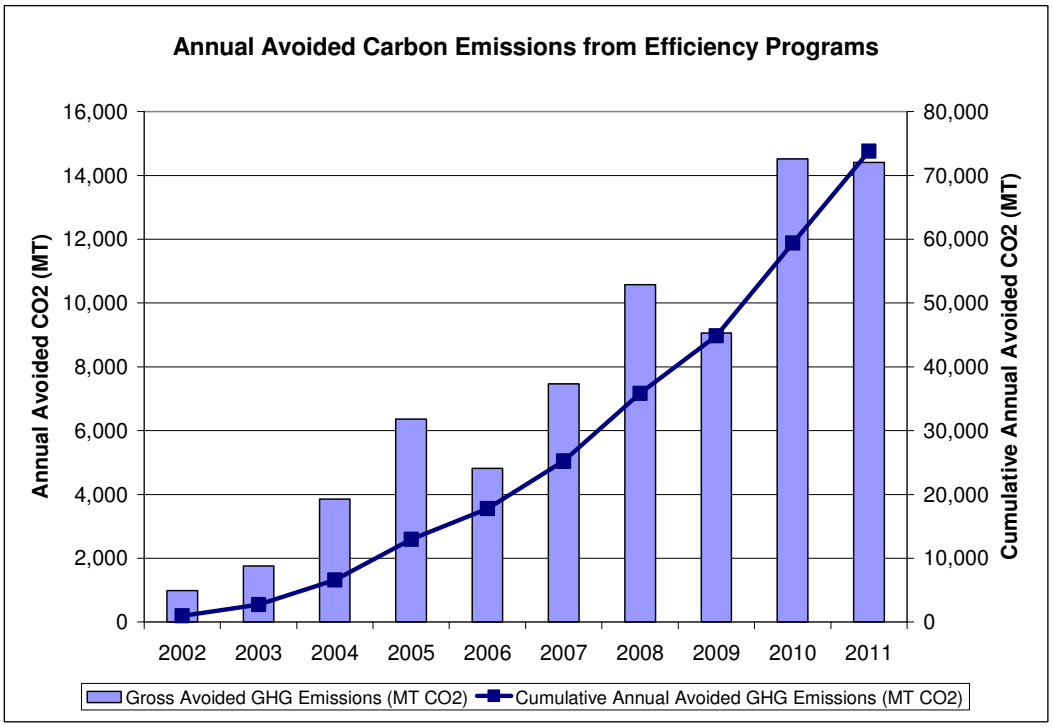
Major 2011 activities and highlights:

- The Home Energy Report Program provided periodic reports to over 25,000 homeowners, with educational information about their electricity use compared to similar homes in Fort Collins. Recipients of the report achieved electric savings over 5,000 MWh.
- The Home Efficiency Program completed 518 comprehensive home efficiency audits, leading to 248 energy retrofit projects.
- Staff from Utilities and Neighborhood Services collaborated to provide training for building professionals related to the adopted amendments designed to "green" the City's building codes.
- Load management and demand response programs for both residential air conditioning and hot water heaters, and for commercial/industrial customers maintained a capacity of over 10 megawatts (MW) of summer peak demand.
- Renewable energy comprised 6.5% of total electrical energy purchases in 2011. Renewable energy purchases were 97,600 MWh. Of the renewable energy purchases from Platte River, 44% were from combined energy and renewable energy certificates (bundled), 54% were from unbundled renewable energy certificates, and 2% were from local solar generation.
- Photovoltaic (PV) capacity additions totaled 350 kW (130 kW residential and 220 kW commercial).
- Light and Power staff increased goals for reliability metrics as follows:
    - Average System Availability Index (ASAI) greater than 99.9956%
    - Customer Average Interruption Index (CAIDI) less than 45 minutes
    - System Average Interruption Frequency Index (SAIFI) less than 0.66

Energy Efficiency Programs

Fort Collins Utilities has provided programs and services to help customers manage their energy use for over 25 years. Energy efficiency and load management are also called "demand side management" (DSM). Efficiency programs are a reliable energy resource for Utilities and Platte River Power Authority. Many of the programs are a collaborative effort, both in funding and implementation, between the two organizations. Information about energy efficiency programs for residential, commercial and industrial customers is available at fcgov.com/conserve.

Figure 9. Avoided Carbon Emissions from Energy Efficiency Programs, 2002–2011



Renewable Energy Programs

Fort Collins Utilities' renewable energy strategy is designed to meet policy initiatives to increase use of renewable energy. The initiatives support customers who voluntarily subscribe for additional renewable energy or who want to install on-site renewable energy systems.

The Energy Policy sets a goal of meeting the State of Colorado Renewable Energy Standard (RES), which requires Fort Collins to have a minimum of 1% renewable energy through 2009, 3% in 2011, 6% in 2015 and 10% in 2020. In addition, renewable energy is the backstop measure for reaching the Energy Policy carbon reduction goals, which places the priority on efficiency and conservation.

Fort Collins Utilities has offered renewable energy to customers since 1998. The Green Energy Program is a voluntary, premium-priced rate option for customers who wish to have all or a portion of their electricity generated from renewable energy sources.

Fort Collins Utilities purchases renewable energy for the RES and Green Energy Program from Platte River Power Authority (PRPA) under their Tariff 7. In 2011, the City's renewable program was supplied from two types of sources. Wind turbines at PRPA's Medicine Bow Wind Project and the Silver Sage Wind Project (Wyoming) provide both energy and Renewable Energy Credits or RECs (bundled). In addition, RECs with no associated energy are purchased by PRPA from multiple renewable sources in the region. Renewable energy sold by Fort Collins' Green Energy Program is "Green-E" certified. Figure 10 shows

Green Energy purchases made for voluntary Green Energy Program subscribers as well as "rate-based" renewables purchased on behalf of all rate-payers.

Fort Collins also offers rebates for on-site renewable projects, which have generally been comprised of photovoltaic (PV) systems on residential and commercial customer buildings. Fort Collins' net metering offers residential and small commercial electric customers full retail buy-back provisions for electricity generated by solar PV systems that are connected to the electric grid. Figure 11 shows the annual PV capacity additions and reflects a significant increase in budget allocation for renewable rebates in those years.

Figure 10. Renewable Energy Purchases, 1998-2011

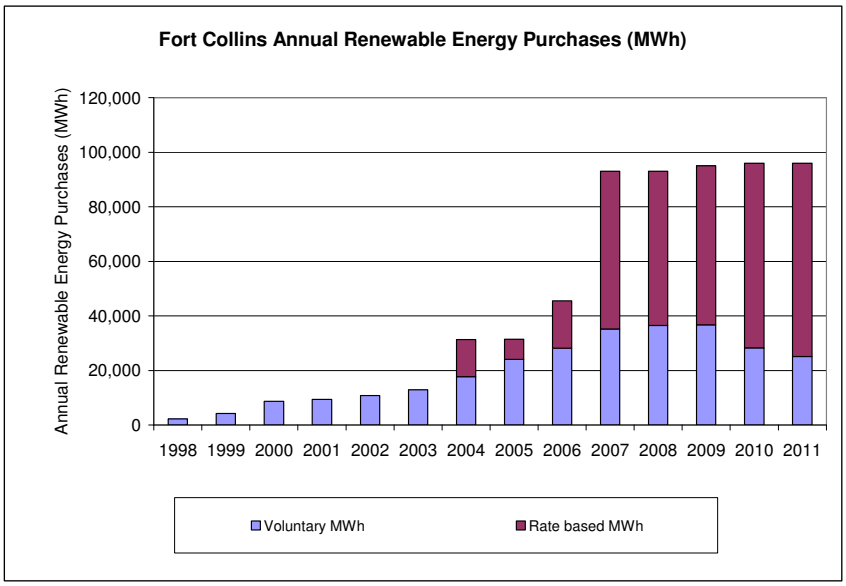
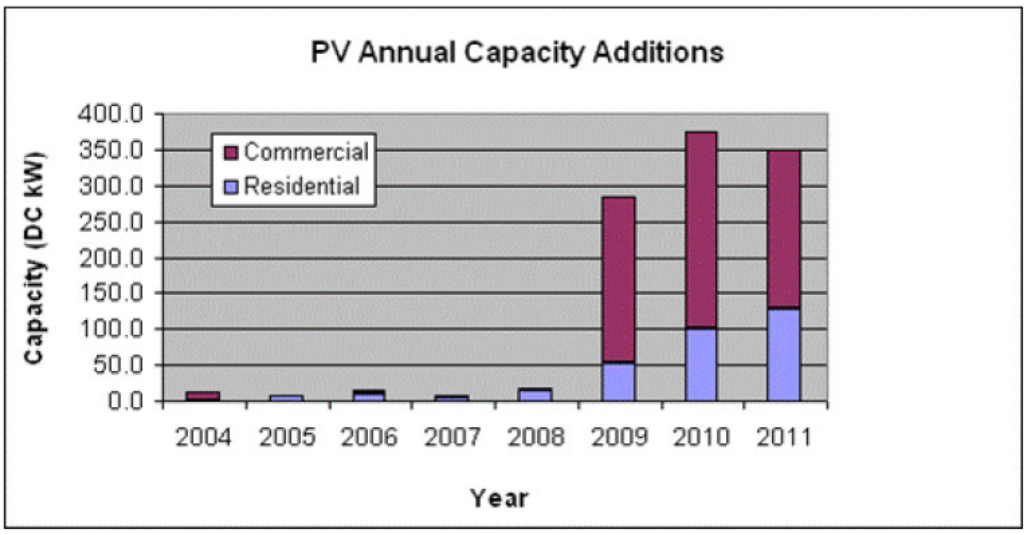


Figure 11. Installed Solar PV Capacity 2004 – 2011



FortZED

FortZED is a community initiative with a mission to transform the downtown area and the main campus of CSU into a net zero energy district through conservation, efficiency, renewable sources, and smart technologies. In 2008, FortZED received a $6.3 million grant from the Department of Energy (DOE) and $5.1 million in local matching funds for a three year Renewable Distributed Systems Integration (RDSI) Project. This grant completed and achieved its overall objectives in 2011 to demonstrate the integrated use of renewable and distributed energy sources (generation resources and controllable loads) to reduce demonstration area peak load by at least 15 percent. Many important lessons have been learned through this project that will benefit the ongoing evolution of smart grid and distributed energy technologies, load management applications, and the navigation of complex partnerships.

The FortZED Community Energy Challenge, launched in September 2010 by The Atmosphere Conservancy and UniverCity Connections, is a grassroots outreach initiative to engage and empower the residential sector to contribute to the net zero energy district. The Community Energy Challenge continued its objectives of engaging the Fort Collins community by hosting ZEDFest parties that promoted practical energy reduction and efficiency strategies. The Energy Challenge also increased citizen participation in 2011 by attaining over 2,100 household pledges to implement energy saving practices within the FortZED area and throughout Fort Collins.

Green Building

In March, City Council adopted a "green amendment" package to the City's building codes, to be effective 1/1/2012. The changes address construction waste management, resource efficiency, energy efficiency, water efficiency, indoor and outdoor environmental quality, and building operation and maintenance and commissioning. During the remainder of 2011, Building Code Services and Utilities closely worked together to set the stage for implementing the new amendments. This work included development of specific processes, protocols and support materials, along with extensive industry training on the amendments that represented the biggest changes.

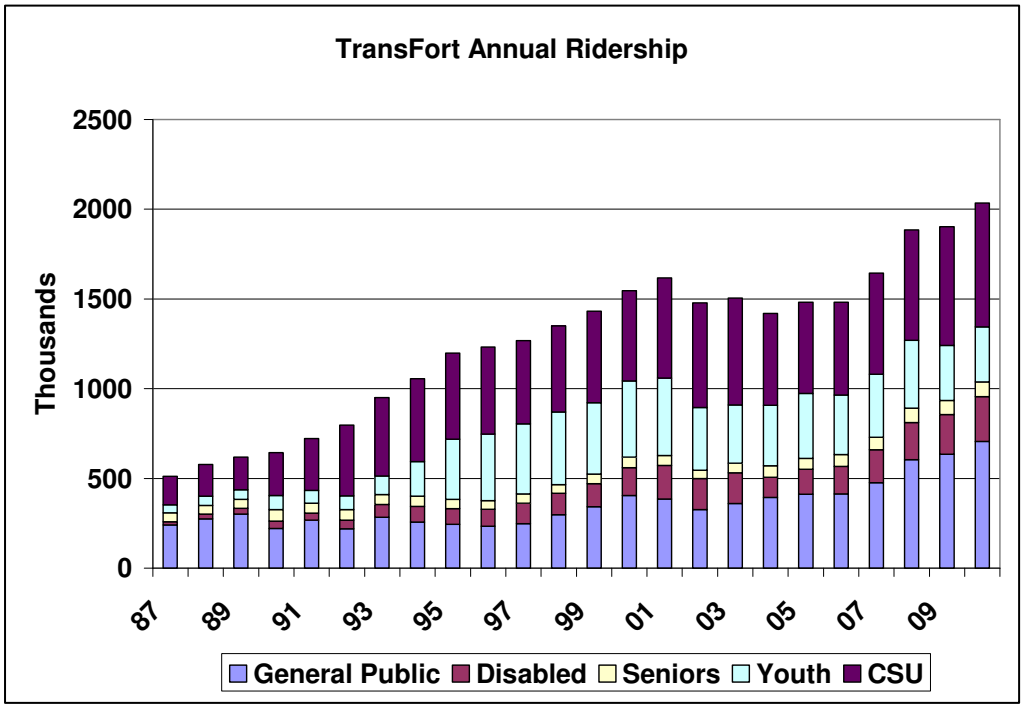
Transportation Programs

Transfort Bus Program

Transfort is a municipal agency that provides bus service in Fort Collins along 19 different routes; 18 local and one regional. Ridership levels in 2011 reached over 2.15 million trips, a 46% increase from 2005. At 3.9 miles per bus trip on average, Transfort helped avoid over 8.4 million miles of vehicular travel in Fort Collins in 2011. Regional ridership has grown by 52% between 2009 and 2011 with the expanded regional route, FLEX, between Fort Collins and Longmont coming on board in 2010. This connects Fort Collins and other North Front Range community residents to the RTD transit network so for the first time people can ride public transit from Fort Collins to downtown Denver and beyond.

In 2011, thanks to Federal funding, Transfort purchased six new compressed natural gas (CNG) buses and seven more are planned to be purchased in 2012. In the next two years, Transfort's fleet is expected to be 100% CNG. According to Federal Transit Administration calculations, heavy duty CNG vehicles are expected to reduce CO_2 emissions by over 50% per vehicle. That equates to Transfort decreasing 719 tons of CO_2 emissions per year and 8,640 tons of CO_2 emissions over the life of the fleet, and supporting progress towards both the municipal and community carbon reduction goals.

Figure 12. Transfort Ridership Trends



A major element of the City's transit system in the development of the Mason Corridor, a five mile north-south byway within the City of Fort Collins which extends from Cherry Street on the north to south of Harmony Road. The corridor is centered along the Burlington Northern Santa Fe Railway property, located a few hundred feet west of College Avenue (U.S. 287). The Mason Corridor project was initially approved by voters in 1997. By pursuing many different funding sources for the Mason Corridor, Fort Collins has been able to leverage limited local dollars with state and federal grants for the Mason Corridor project.

The Mason Corridor includes a new bicycle and pedestrian trail as well as a planned Bus Rapid Transit (BRT) system in a fixed guideway for the majority of the corridor. Six BRT vehicles will be purchased from the North American Bus Industries. These 60-foot long vehicles are articulated and will use compressed natural gas. They will also include low floor entry to accommodate wheelchairs and bicycles.

The BRT service will operate nearly twice as fast as auto travel along College Avenue, as well as provide high frequency service every 10 minutes. Stations will incorporate new high-quality amenities that are similar to light rail, with low floor boarding platforms, sleek new busses, next bus arrival information, and

pre-pay fare machines. In 2011, final design of the BRT system was completed and conversion of Mason Street to two-way operation commenced in 2011. BRT service is anticipated to begin in 2014.

Bicycling

Almost ten percent (9.9%) of Fort Collins' work force cycles to their jobs each day, making it the third highest bike commuter city in the nation according to the U.S. Census Bureau's 2009 American Community Survey. Bicycling is promoted locally through a strong network of 280+ miles of bike lanes, 32+ miles of multi-use trails, 18 local bicycle retailers, and 14 local bicycle manufacturers. In addition, the Fort Collins Bike Co-op collects and refurbishes bicycles locally, and the FC Bike Library offers free bike check-outs for residents and visitors. To date, over 4,000 residents, students, and visitors have become members of the FC Bike Library.

Bicycling Program Highlights

- Bike Box installed at Plum and Shields (first in Colorado!)
- 24 Shared Lane Markings installed on Mountain Avenue from Howes St. to Riverside Ave.; at least 36 more will be installed in 2012
- Bicycle Safety Education Plan adopted in March 2011
- Added a poster to the CO-Exist campaign – to discourage drinking and biking
- Share the Road task force designed, printed, and created a plan to display Share the Road banners
- Celebrated 24th annual summer Bike to Work Day and 5th annual winter Bike to Work Day
- Hired a Safe Routes to School Coordinator
- Summer BIKE Camps taught safe cycling to 76 students
- Trained 80 City police officers in safe cycling curriculum
- U.S. Gran Prix of Cyclocross was hosted here in October 2011
- Launched BikeWise, a regional extension of FC Bikes created to encourage and expedite regional connections, share best practices, and provide consistent bicycle safety education and encouragement throughout northern Colorado communities
- March 2011, CSU was designated as a Silver Level Bicycle Friendly Community by the League of American Bicyclists
- Performed counts on bicycle parking facilities in downtown to assess need

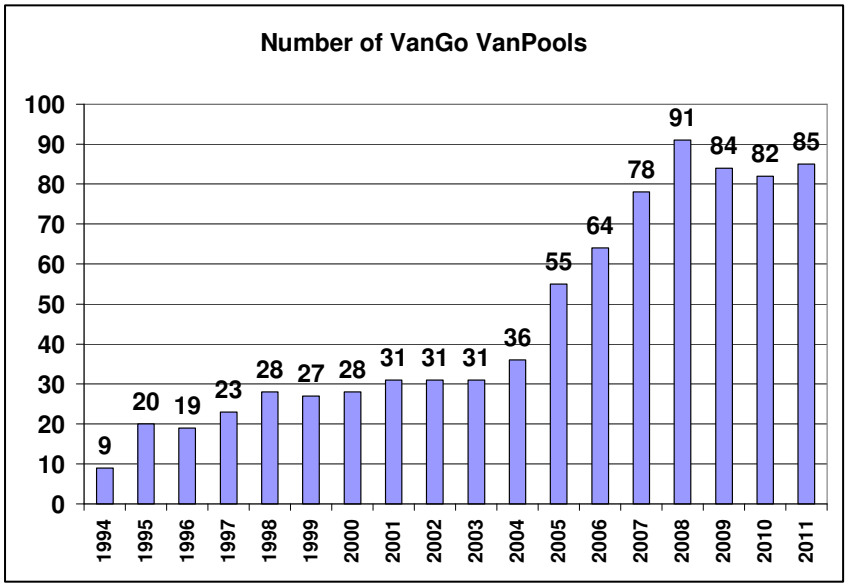
Safe Routes to School Program

The Safe Routes to School program activities during 2011 included Safe Routes to School training, Strap-n-Snap helmet safety programs for K-8 schools, and mode-of-transportation parent pre-training and post-training surveys. Set-up and management of subcontractor service agreements for Bicycle Colorado, Fort Collins Bike Co-op, Bike Fort Collins, Healthier Communities Coalition, Safe Kids Larimer County, and Poudre Valley Healthcare System Emergency Management Technicians (EMT) Reserves were also completed.

VanGo Vanpool Program

In 2011, the North Front Range Metropolitan Planning Organization had a total of 85 VanGo vans in daily operation that avoided a total of about 12,000,000 vehicle miles. Of those, 46 vans originated from, or traveled into, Fort Collins city limits, avoiding approximately 552,000 vehicle miles traveled (VMT) in the community. VanGo ridership remained the same as the previous year in 2011 and remained generally strong in the region.

Figure 13. Growth in VanGo Ridership



Street Improvements

Several street improvements were made in 2011 to Fort Collins' streets that helped to reduce congestion or increase bicycling, thereby reducing associated GHG emissions.

- Improved the street infrastructure on the section of Linden Street from Jefferson to the Poudre River. Improvements included curb and gutter, on-street parking, bike lanes, sidewalks, intersection improvements, and streetscaping.
- Drake Road and Lemay Avenue turn lane project. The goal of this project is to relieve traffic congestion and vehicle wait time by constructing a right turn lane from westbound Drake to northbound Lemay.
- Harmony and Lemay intersection turn lane project. The goal of this project is to relieve traffic congestion and vehicle wait time by constructing a second left turn lane from westbound Harmony to southbound Lemay.
- The City reshaped Laporte Avenue from Wood Street to Howes Street utilizing a road-diet to improve the neighborhood's livability and address traffic concerns. Laporte Avenue was changed from a four-lane to a two-lane street with a center turn lane, bicycle lanes, and on-street parking.

The project addressed a number of issues including; existing and projected traffic volumes that did not warrant a four-lane arterial street through residential neighborhoods, the need to make bicyclists feel safe using Laporte Avenue as a key bicycling commuter route, and the neighbors' concern of speeding.

Air Pollution Co-Benefits

The carbon reductions quantified in this report are estimated to have avoided over 217,000 MWh of electricity and 5,100 decatherms of natural gas. In addition to reducing greenhouse gas emissions, these improvements helped prevent emissions of other, more traditionally recognized air pollutants that are harmful to human health and the environment. Nitrogen oxides, volatile organic compounds (VOCs), and carbon monoxide all contribute to ground level ozone.

Table 4. Air Pollution Benefits from 2011 GHG Reduction Actions

Pollutant	Avoided in 2011 from GHG Reduction Actions in Fort Collins
Nitrogen Oxides*	199 tons
Sulfur Oxides*	178 tons
Carbon Monoxide**	59 tons
Particulates **	7.6 tons

*Calculated using regional marginal emission factors estimated factors
**Calculated using regional average emission factors

Climate Adaptation Planning

The City Council adopted a new City policy on climate adaptation when City Plan was updated in 2011.

Principle ENV 12:*"The City will plan and integrate strategies to adapt to a changing climate into City operations, and will promote climate adaptation actions in the community."*

In 2008, the City of Fort Collins began work on assessing the potential impacts of climate change on its operations. Fort Collins Utilities was initially part of the ICLEI "Climate Resilient Communities" pilot program. This effort received guidance from a water and climate change advisor from NOAA/Western Water Assessment and also used additional advisors from Colorado State University and other City departments. Vulnerability and risk factors were identified based on anticipated impacts of climate change to the Fort Collins area.

In 2011, Fort Collins Utilities worked with the consultant firm MWH to reassess the previous climate adaptation work and determine the next best steps for considering the impacts of future climate scenarios. A key objective was to develop strategies to assist Utilities to evaluate possible impacts of climate change and help maintain the continuity of business services. The scope of work included assisting Utilities in

synthesizing existing research and data on climate change to better inform water supply planning, asset management, and master plans. The planning process helped staff better understand the best available climate data and modeling to assess the planning of future capital projects and will incorporate these considerations into future asset management criteria and considerations. Utilities staff will re-evaluate climate change scenarios and updated modeling based on the most credible sources including the IPCC and regional studies by the Water Research Foundation and the Joint Front Range Climate Change Vulnerability Study research. This will allow Utilities to include further considerations as the granularity of regional science evolves and refines what and how the likely possible climate impacts might affect the Front Range and Fort Collins Utilities operations in the future.

V. 2020 FORECAST AND MILESTONES

The City of Fort Collins updates its community GHG inventory biennially, in preparation for the biennial budget process. The 2020 forecast was revised in 2012 using the most recent projections for utility usage and population growth. The 2012 revised forecast results in very minor changes to community GHG projections. It is important to note that the forecast by the Fort Collins Utilities and Xcel Energy have begun to incorporate some of the planned benefits of policy and mandated reductions. Modifications to the 2020 GHG forecast are discussed in more detail in the Quality Management Plans at http://www.fcgov.com/climateprotection/ . Figure 14 below identifies the growth of emissions by source category, incorporating the new assumptions.

Figure 14. Community GHG Emissions and Projections

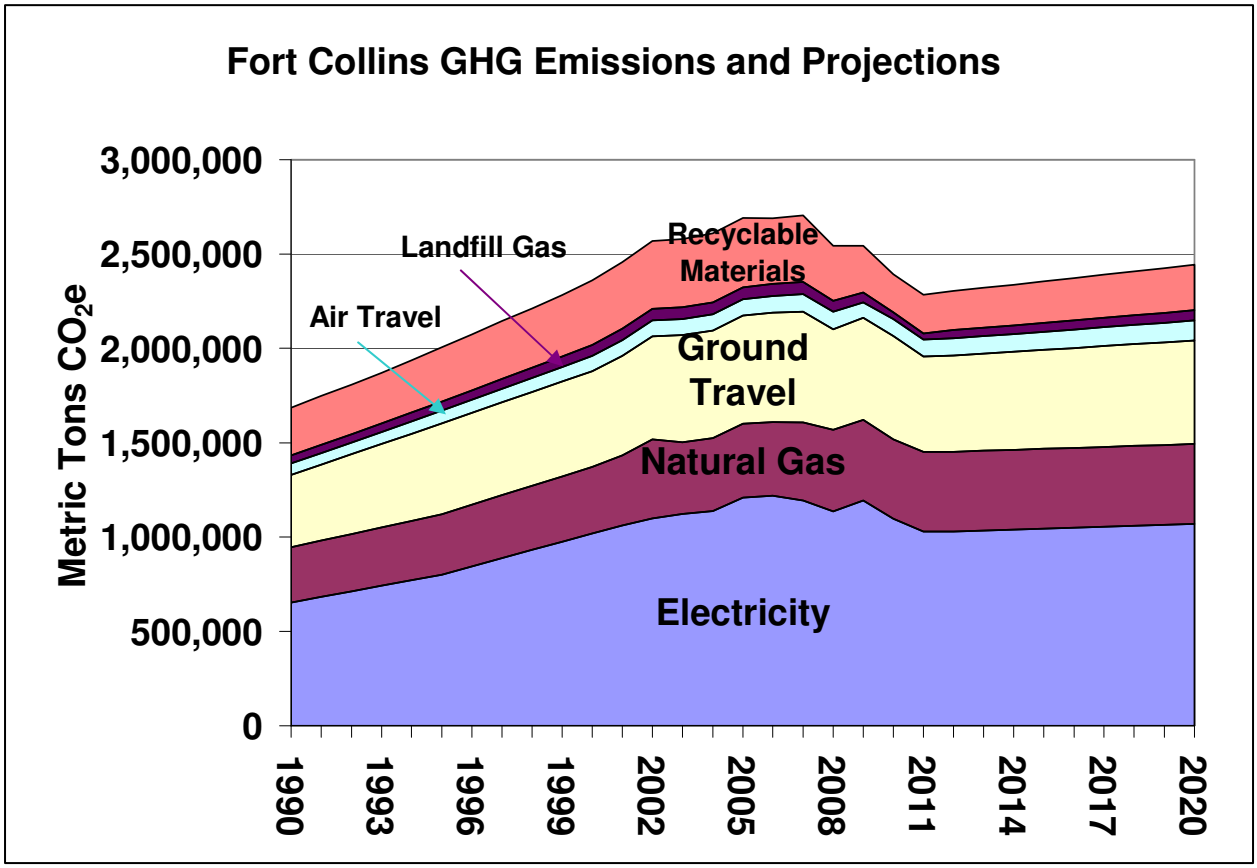
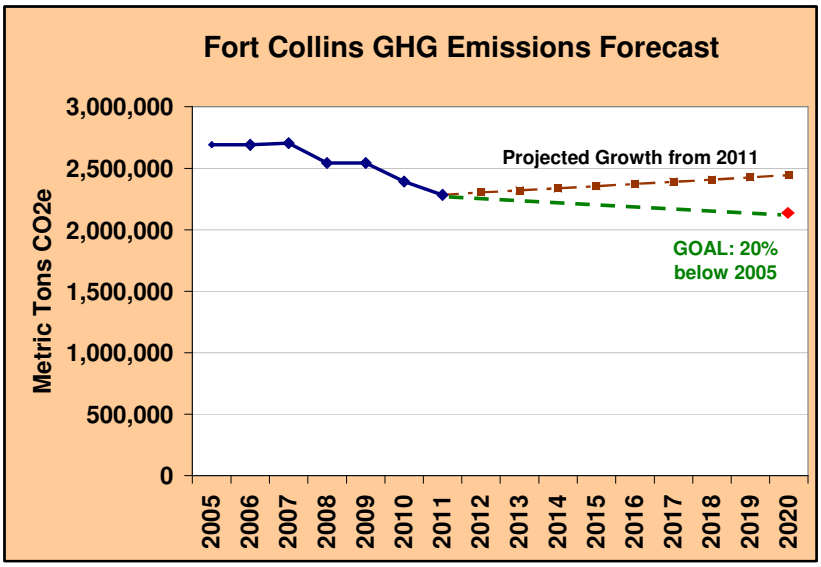


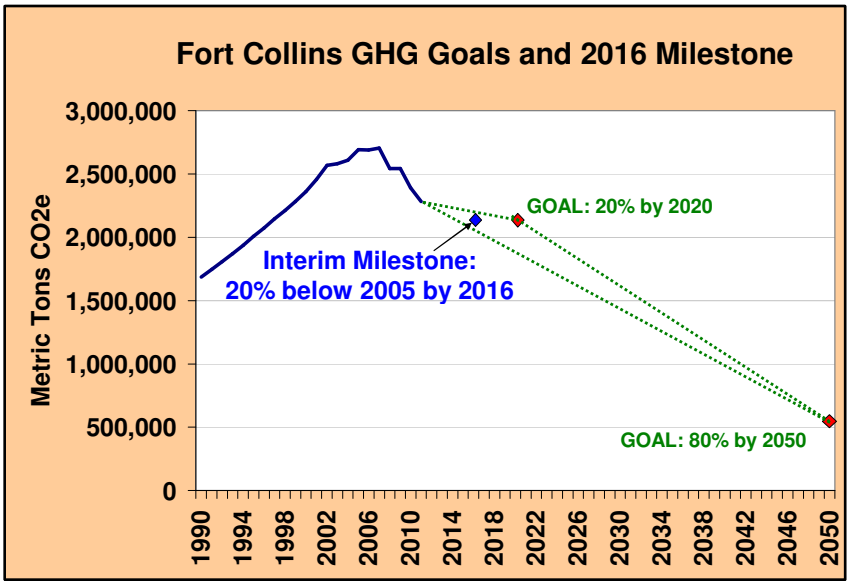
Figure 15 on the next page illustrates the revised forecast that incorporates these new assumptions relative to reduction goals.

Figure 15. Revised Forecast for Fort Collins Greenhouse Gas Emissions



The 2008 Climate Action Plan calls for developing interim milestones towards the 2020 and 2050 goals. The 2012 interim milestone (intent to reduce GHG emissions 3% below 2005 levels by 2012) has been met, because the 2011 emissions are 14.7% below 2005. The City's Energy Management Team discussed alternatives for an interim milestone for the year 2016. The Team recommends a working interim milestone of 20% below 2005 by 2016, illustrated in Figure 16. This places the 2016 milestone midway between the trajectory towards the 2020 goal and the 2050 goal. This milestone is considered a "stretch" target, but is conceivably achievable. Rapidly mounting evidence about the impacts of climate change identified at the beginning of this report compel the need for timely action to deter the "large-scale, unprecedented adverse health, social, economic and ecological effects from a changing climate system that are acknowledged in Council Resolution 2008-51. Progress is needed now to reach the 80% reduction called for by 2050 that scientists say is needed to avert the worst impacts of climate change. In addition, the actions needed to reach these objectives can support additional jobs and economic health in Fort Collins.

Figure 16. 2016 Interim Milestone



VI. RECOMMENDED FUTURE ACTIONS

In order to meet the proposed 2016 interim milestone, additional GHG reduction actions are needed that will help avoid over 130,000 $MTCO_2e$ emissions by 2016, in addition to those already incorporated in the Business As Usual forecast. While 20% below 2005 by 2016 is a stretch "interim milestone," several major projects will be coming on-line in Fort Collins that will assist in progress towards the recommended 2016 milestone including Advance Meter Fort Collins and Mason MAX.

Table 5. GHG Reductions Needed to Meet Fort Collins' Goals Using New Forecast

Year	Projected Levels of GHG Emissions (Metric Tons CO2e)	Goal Level (Metric Tons CO2e)	Amount of Additional Reductions Needed Above Current (Metric Tons CO2e)
2011	2,283,875		
2016	2,372,154	2,153,471	130,404
2020	2,444,568	2,153,471	254,641
2050	Not Projected	538,368	Not Estimated

The Energy Management Team has identified a number of 2013/2014 budget requests that can play an important role in advancing carbon reductions in Fort Collins. While this list is by no means inclusive of all budget requests that could directly or indirectly reduce carbon emission, the Team feels that these offers would contribute to reductions in a meaningful way. Carbon benefits, estimated for some of these offers, exceeds 269,000 $MTCO_2e$/year avoided, combining current and enhancement offers. (See Appendix C for the list.)

Expansion of existing programs such as energy efficiency and renewable energy programs, the Climate Wise program, waste reduction and recycling programs, and transportation demand management programs including Transfort are all called for in the 2008 Climate Action Plan. In addition to expansion of existing initiatives, new initiatives will be needed in order to meet the community's 2020 goal.

Expansion of Existing Initiatives

Additional Benefits from the Adopted 2009 Energy Policy

The 2009 *Energy Policy*, adopted by City Council in January 2009, includes a primary goal to *"Support the community's carbon emissions goal of reducing the City's carbon footprint 20% below 2005 levels by 2020 and 80% by 2050"*. Two objectives contained in the 2009 Energy Policy to meet this goal are to:

- Achieve annual energy efficiency and conservation program savings of at least 1.5% of annual energy use (based on 3 year historic average).

- Increase the contribution of renewable energy to achieve a 20% carbon reduction goal by 2020, after accounting for the contributions of resource mix, energy efficiency, conservation, minimum renewable energy requirements, and voluntary renewable energy programs.

Based on progress by 2011 and the current 2020 forecast, an additional 240,000 tons of CO_2e reductions, above 2011 levels, will be needed in order to meet the objective to reduce community electricity consumption 20% below 2005 levels. Advance Meter Fort Collins and FortZED will contribute to this needed progress. However, in order to reach the Climate Action Plan objectives for the 2009 *Energy Policy* by 2020, additional resources and participation is needed.

Expansion of ClimateWise

The 2008 Climate Action Plan calls for the ClimateWise program to grow enough to achieve total emissions reduction of 240,000 $MTCO_2e$ by 2020. Current projections for the ClimateWise program in 2020 are conservatively estimated at 165,000 $MTCO_2e$, assuming a growth of 10 average partners per year and a 67% reporting rate. In order to reach the Climate Action Plan objectives for the ClimateWise program in 2020, additional resources and participation are needed. The two Climate Wise 2013/2014 budget enhancement requests are estimated to avoid an additional 22,000 $MTCO_2e$ per year.

Transportation Strategies

The 2008 Climate Action Plan calls for transportation strategies that reduce driving through walking and bicycling improvements, employee-based transportation demand management programs, school-based transportation demand management programs, and transit service innovations and improvements. The Plan calls for transportation strategies to avoid 16,000 MTCO2e by 2020. Estimated benefits of transportation efforts that have been quantified to date achieved over 4,000 MTCO2 avoided. Attempts should be made in future Status Reports to estimate the benefits of other major transportation initiatives. Bringing Mason MAX into service in 2014 will support carbon reductions in the transportation sector. However, in order to reach the Climate Action Plan objectives for transportation, additional resources and participation is needed.

New Initiatives

Waste Reduction Strategies

In 2011, City Council requested a waste stream study and preliminary research on waste-to-energy (WTE) opportunities for Fort Collins. (See http://www.fcgov.com/recycling/reports.php.) Based on the materials that are discarded in Fort Collins, community demographics, regional economics, market conditions, and processing capability, the report concludes that there are 75,000 "new" tons of the community's waste that may feasibly be managed by practices other than landfill disposal, including 27,500 tons for WTE conversion. Applying the yard waste emissions factor used by the ClimateWise program, this could avoid an estimated 5,500 $MTCO_2e$ from organics kept out of the landfill. This volume of material processing would likely take several years to accomplish and would likely occur following further feasibility studies and implementation of a small scale demonstration WTE site.

A number of strategies previously have been identified that are especially effective at reducing greenhouse gas emissions. These strategies include a residential yard waste drop-off site, the option to recycle yard waste at the curbside, and ultimately to ban yard waste from the waste stream. Construction and demolition debris recycling and banning cardboard from curbside collection are also strategies recommended to reduce GHG emissions. More recently, a consulting team was hired by the City to analyze Fort Collins' waste stream and develop proposals for increasing recycling. Their report suggests that a new, integrated recycling facility, at a medium volume of operation would be capable of receiving up to 16,250 tons of materials per year. This could equate to an estimated avoidance of 25,000 $MTCO_2e$ of landfill gas and embodied energy emissions.

In addition to increased recycling opportunities, the City of Fort Collins Utilities (FCU) is seeking proposals for the development of a long-term purchase agreement for the energy and Renewable Energy Certificates (RECs) associated with a biomass fueled electric power generation plant to be constructed and operated within the City limits. Proposals for power plants ranging from 500kW to 5MW installed generation capacity will be considered. The biomass to be used must be generated within the City of Fort Collins, and consideration will be given to a variety of technologies and fuel types. The selected developer will be required to enter into a long-term agreement for purchase of the generated power and energy with PRPA. FCU presently has several distributed generation plants operating on its system and has established interconnection guidelines for small (less than 5MW) distributed generators. The goal is to help the City meet the Renewable Energy Standard (RES) goals of 6% of total energy sold by 2015 and 10% of total energy sold by 2020.

Streetlights

Manufacturers are starting to develop better streetlights with light-emitting diodes (LEDs) as the illumination source. While costs for LED lighting are still higher than that of current high pressure sodium lighting, as the demand for LED streetlights grows and the market shifts past recovering research and development expenses, the cost is likely to come down. In Fort Collins, the streetlight category with the largest consumption is 150W high pressure sodium lights, which are typically used on collector and arterial streets. If these streetlights were converted to LEDs, which are estimated to use approximately 50% of the power of the currently installed lights, carbon reduction would be achieved.

In addition to the lights themselves, it is recommended that the City convene an interdepartmental team to evaluate streetlighting levels. In 2011 a proposal was made to the Innovation Fund Team to reduce the number of illuminated streetlights in certain areas of town. Because reduction in streetlights could deliver dark sky benefits as well as energy benefits, the Innovation Team strongly recommends that this issue be fully investigated at the policy level by an interdepartmental team that includes staff from Utilities, Police, Planning Development and Transportation, and Sustainability Services.

Solar Array at Rawhide

The City of Fort Collins and Platter River Power Authority are currently discussing options for construction of a solar array of 5-10 megawatts to be located on the grounds of the Rawhide Power Plant.

This would assist the City in meeting its obligation under the Colorado Renewable Energy Standard of acheiving 6% renewable energy by 2015, while taking advantage of the "three-times" multiplier available to solar projets.

Vehicle Electrification

In 2008, total transportation in America was responsible for about 70% percent of oil consumption. The transportation sector as a whole is today 94% reliant on petroleum products for delivered energy—with no substitutes available at scale. And growing demand for petroleum, especially by developing countries, along with increased production costs, increase our exposure to petroleum price volatility. Locally, transportation is responsible for 22% of Fort Collins' carbon footprint, and 23% of the state carbon footprint. Therefore, promoting non-fossil fueled transportation strategies is an important way to reduce our dependence on fossil fuels, our carbon footprint, and our vulnerability to petroleum price shocks. The City now has three electric vehicle (EV) charging stations located at Operations Services and three more at Fort Collins Utilities, as well as a Web site dedicated to electric vehicles at http://www.fcgov.com/utilities/residential/conserve/EVs.

Per City Plan Policy 9.1 to "promote alternative and efficient transportation and vehicles," staff have been exploring options for vehicle electrification beyond the six electric vehicle charging stations already in place at the City. To date, City staff have had discussions with BYD and Proterra regarding electric busses. The City is also in dialogue with the "Electrification Coalition." (See http://www.electrificationcoalition.org/) This coalition is a nonpartisan, not-for-profit group of business leaders committed to promoting policies and actions that facilitate the deployment of electric vehicles on a mass scale. Their platform is based on the belief that oil dependence threatens the nation's economic, environmental, and national security and that the only long-term solution is electrification of transportation. Moving towards vehicle electrification will help reduce our carbon footprint, especially when the electricity is generated from renewable sources.

Process to Recommend Future Actions

Resolution 2008-051 calls for the City to biennially prepare a report evaluating progress on GHG reduction related to established milestones and to recommend future actions for consideration in the next budget cycle. In order to accomplish this responsibility effectively, it is recommended that the City of Fort Collins:

- Examine the scope and charter of its interdepartmental Energy Management Team in context of other interdepartmental teams to clarify mission and deliverables.
- Seek broader input on potential future strategies for consideration, possibly from select City Boards and Commissions.
- Evaluate the feasibility of developing high-level estimates of the carbon impacts of future budget offers that are submitted for the 2015/2016 budget process. If feasible, this would enable the carbon impact to be considered as one of the offer evaluation criteria.

Appendix A. 2011 Community GHG Inventory

2011 Community GHG Report

Scope 1 - Direct GHG Emission	Usage		Metric tons of CO2
Natural Gas, Residential:	3,603,033	Dth	195,090
Natural Gas, Commercial:	1,359,080	Dth	73,589
Natural Gas, Industrial and Transportation:	2,854,697	Dth	154,570
Gas Car (assumes 22.1 mpg):	25,893,869	gal.	227,348
Gas Light Truck (assumes 17.7 mpg):	28,943,314	gal.	254,122
Gas Heavy Truck (assumes 13.9 mpg):	636,681	gal.	5,590
Diesel Car (assumes 19.378 mpg):	45,670	gal.	466
Diesel Light Truck (assumes 16.859 mpg):	118,110	gal.	1,206
Diesel Heavy Truck (assumes 5.634 mpg):	1,610,066	gal.	16,439
Scope 1 Subtotal			**928,420**

Scope 2 - Energy Indirect GHG Emissions	Usage		Metric tons of CO2
Electricity, Residential:	493,810,336	kWh	333,747
Electricity, Commercial:	502,064,224	kWh	339,325
Electricity, Industrial:	451,082,970	kWh	304,869
Electricity, Street Lights:	8,532,694	kWh	5,767
Electricity, Traffic Signals:	576,847	kWh	390
Electricity, Distribution and Transmission Losses:	65,653,635	kWh	44,373
Scope 2 Subtotal			**1,028,471**

Scope 3 - Other Indirect GHG Emissions	Usage		Metric tons of CO2
Landfill	132,018	tons	33,029
Community Air Travel	9,340,211	gal.	89,386
Recyclable Waste Embodied Emissions	41,982	tons	204,569
Scope 3 Subtotal			**326,984**
Total Metric Tons of CO2e:			**2,283,875**
Benefit of RECs:			-38,397
Benefit of Known Offsets:			-21
Revised Total Metric Tons of CO2e:			**2,245,457**

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Appendix B. 2005 Community Baseline Inventory

The year 2005 serves as the community's "baseline" or benchmark against which progress will be measured. In 2005, a total of 2,676,000 metric tons (MT) of carbon dioxide equivalent[12], or CO_2e, were emitted by the Fort Collins community.[13]

Table 6. Fort Collins 2005 Baseline Greenhouse Gas Emissions (Metric Tons CO_2e*)

Source	MT CO2e*	Type
Electricity	1,209,371	Indirect (Scope 2)
Natural Gas	391,376	Direct (Scope 1)
Ground Travel	557,383	Direct (Scope 1)
Air Travel	86,933	Indirect (Scope 2)
Landfill Gas**	62,731	Indirect (Scope 2)
Recyclable Materials Energy***	368,401	Indirect (Scope 2)
Total	2,676,195	
Benefit of RECs	-13,934	
Benefit of Known Offsets	0	
Revised Total	2,662,261	

* Carbon dioxide equivalents calculated for landfill gas and natural gas only

** Landfill gas emissions incorporate the benefit of landfill gas capture system

*** Recyclable Materials Energy refers to the GHG emissions associated with having to manufacture new products when recyclable materials are thrown in the landfill.

RECs = Renewable Energy Certificates; Offsets = Certified carbon offsets purchased by Fort Collins residents or businesses

[12] Carbon dioxide equivalent or CO_2e: Each GHG has a "global warming potential" which refers to its heat-trapping ability relative to carbon dioxide. Methane in 21 times more potent than CO_2 and nitrous oxide is 310 times more potent. CO_2e refers to the summed impact of gases quantified, in terms of carbon dioxide.

[13] See the Quality Management Plans for community and municipal GHG inventories at http://www.fcgov.com/climateprotection/ or contact the City of Fort Collins Environmental Services Department (970-221-6600) for details on the methodology used to calculate the community GHG inventories.

2005 Community GHG Report

Scope 1 - Direct GHG Emission	Usage		Metric tons of CO2e
Natural Gas, Residential:	2,968,669	Dth	160,742
Natural Gas, Commercial:	1,207,770	Dth	65,396
Natural Gas, Industrial and Transportation:	3,051,712	Dth	165,238
Natural Gas Subtotal	*7,228,151*	*Dth*	*391,376*
Gas Car (assumes 22.1 mpg):	22,579,612	gal.	198,249
Gas Light Truck (assumes 17.7 mpg):	21,402,275	gal.	187,912
Gas Heavy Truck (assumes 13.9 mpg):	2,561,720	gal.	22,492
Diesel Car (assumes 19.378 mpg):	61,766	gal.	631
Diesel Light Truck (assumes 16.859 mpg):	94,660	gal.	966
Diesel Heavy Truck (assumes 5.634 mpg):	14,410,724	gal.	147,133
Scope 1 Subtotal			**948,759**

Scope 2 - Energy Indirect GHG Emissions	Usage		Metric tons of CO2e
Electricity, Residential:	454,070,392	kWh	376,298
Electricity, Commercial:	474,176,147	kWh	392,960
Electricity, Industrial:	464,277,920	kWh	384,757
Electricity, Street Lights:	8,123,199	kWh	6,732
Electricity, Traffic Signals:	907,818	kWh	752
Elec., Distribution and Transmission Losses:	57,766,373	kWh	47,872
Scope 2 Subtotal			**1,209,371**

Scope 3 - Other Indirect GHG Emissions	Usage		Metric tons of CO2e
Landfill	237,747	tons	62,731
Community Air Travel	9,083,951	gal.	86,933
Recyclable Waste Embodied Emissions	75,604	tons	368,401
Scope 3 Subtotal			**518,065**
Total Metric Tons of CO2e:			**2,676,195**
Benefit of RECs:			-13,934
Benefit of Known Offsets:			0
Revised Total Metric Tons of CO2e:			**2,662,261**

Appendix C.
2013/2014 Budget Proposals that Support Community Carbon Reduction

The City's interdepartmental Energy Management Team has identified a number of 2013/2014 budget requests that can play an important role in advancing carbon reductions in Fort Collins. While this list is by no means inclusive of all budget requests that could directly or indirectly reduce carbon emission, the Team feels that these offers would contribute to reductions in a meaningful way. Items in the list below are not prioritized. Carbon benefits were estimated for offers from the Climate Wise, Energy Services, Renewable Energy packages and the Integrated Recycling Facility offer that exceed 269,000 $MTCO_2e$/year avoided, before double-counting is removed. These offers include both current and new services.

Table 7. City's Energy Management Team List of 2013/2014 Budget Proposals that Support Community Carbon Reduction

Budget Offer #	Name
9.1	Environmental Services Staffing and Programs Core Offer
9. 4	ENHANCEMENT: Integrated Recycling Facility
9. 5	KFCG: Road to Zero Waste Package
104. 1	ClimateWise
104. 2	KFCG: ClimateWise Base Offer
104. 3	KFCG: ClimateWise
104. 4	KFCG: ClimateWise Enhancement-Commuter Choices
106.2	FC Bikes
106.4	FC Bikes to Platinum
106.5	FC Walks
108. 1	Energy Services
108. 2	Energy Services: On-Bill Financing
108. 3	Energy Services: Demand Response
108. 4	Green Building / Building Energy Performance
108. 5	ENHANCEMENT: Energy Services: Staffing
110. 1	Renewable Energy Purchased from PRPA
110. 2	Community Renewables / Small-scale Solar Incentives
110. 3	ENHANCEMENT: Community Renewables / Community Solar Garden
110. 4	ENHANCEMENT: Community Renewables / Fort Collins Solar Program
118.1	Transfort Fixed Routes
118.2	FLEX Regional Service
118.3	MAX Operations
128. 1	FortZED Special Projects
128. 2	FortZED Grant Development
128.3	ENHANCEMENT: FortZED Engagement and Administration
132.3	Building Services
155. 1	ENHANCEMENT: Utilities Capital Projects - Digester Gas Treatment System
158. 1	ENHANCEMENT: Utilities Capital Project- Commercial Foodwaste Receiving Facility
160. 1	ENHANCEMENT: Utilities Capital Project- DWRF Biogas Electric Gen Set

Report prepared by the City of Fort Collins Energy Management Team
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