



strategies ideas achievements a progress report

The City of Boulder Greenhouse Gas Emissions Management Plan



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Overview

In May 2002, the Boulder City Council passed a resolution committing the city to a seven percent reduction in greenhouse gas (GHG) emissions from 1990 levels by 2012. This resolution, also known as the Kyoto Protocol or GHG goal (Goal), builds on environmental policies and goals found in the Boulder Valley Comprehensive Plan (BVCP) and the City Council's Environmental Goal. Specifically, the BVCP has policies relating to energy conservation, alternative energy, city leadership in resource conservation, energy-efficient land use and energy-efficient building design and construction. The Kyoto goal was also an outgrowth of concerns about the potential negative impacts of climate change on the Rocky Mountain region and beyond.

The Office of Environmental Affairs (OEA) is responsible for implementing many of the city's environmental policies and programs. The OEA works in the following program areas: waste reduction, green building, integrated pest management, pollution prevention, energy and GHG emissions reduction. Energy and GHG became a focus area with dedicated budget from the City Manager's Contingency Fund in the spring of 2004. These funds were used to complete a community-wide GHG inventory, commercial and residential analyses, and hire a full-time employee dedicated to GHG programs. In 2005, there was one full-time fixed-term employee dedicated to commercial planning and programs, renewable energy, and general research, one half-time employee dedicated to residential planning and programs, and one full-time employee spending 75% of time on general oversight, policy development, and community relations. The half-time position was filled for approximately six months. In 2006, the position will be rehired as a full-time fixed-term OEA outreach position with an emphasis on residential energy and waste reduction outreach.

As part of the 2005 Budget process, City Council approved a two-year increase to the Trash Tax, allocating \$258,000 a year for 2005 and 2006 for GHG and energy programs. For 2005-2006, Council directed staff to concentrate on developing long-term funding sourc-



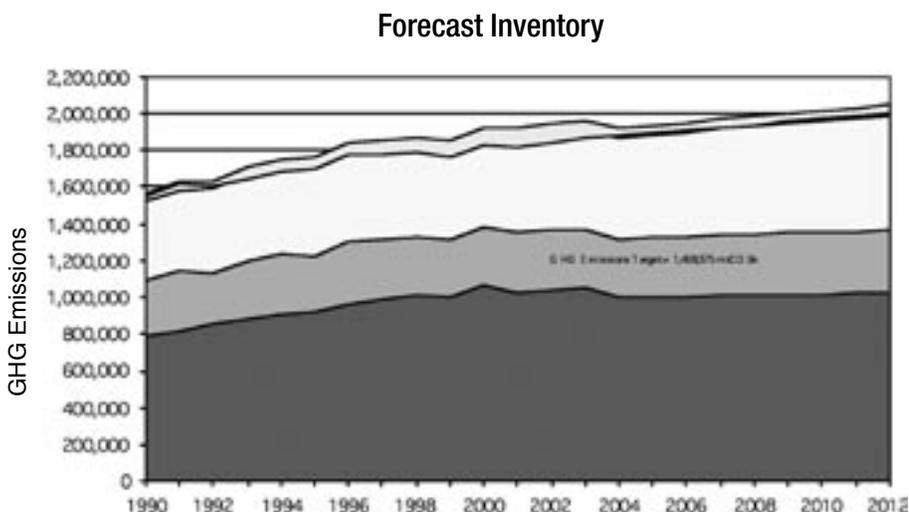
es and implementing limited commercial and residential programs that raise public awareness about energy issues and the Goal. Details of these programs and initiatives are included in the Program and Outreach section below, but some of the highlights include:

- Completed Xcel Energy lighting rebate program (\$187,000 in Xcel rebates for 37 businesses with annual energy cost savings in excess of \$160,000)
- Launched commercial energy and water efficiency audit and assistance program; "Building Performance with ENERGY STAR"
- Expanded residential weatherization services
- Distributed over 650 energy-efficient light bulbs and educational material
- Initiated the Boulder Wind Challenge 500 with Western Resource Advocates, resulting in 1,150 new wind power subscribers
- Joined Chicago Climate Exchange (CCX)
- Coordinated inter-departmental team to investigate the city's solar power opportunities
- Convened a Strategy Group of local stakeholders to discuss overarching strategies for the Climate Action Plan
- Initiated work with a local firm to develop a logo, brand and messages for the Goal
- Presented to City Council a consultant report on potential long-term funding sources for GHG emissions management.

Emissions reductions from city activities dramatically increased in 2005 as compared to 2004 activities. While this represents steady progress toward the Goal, the community must radically reduce emissions from 2005 levels to meet the Goal.

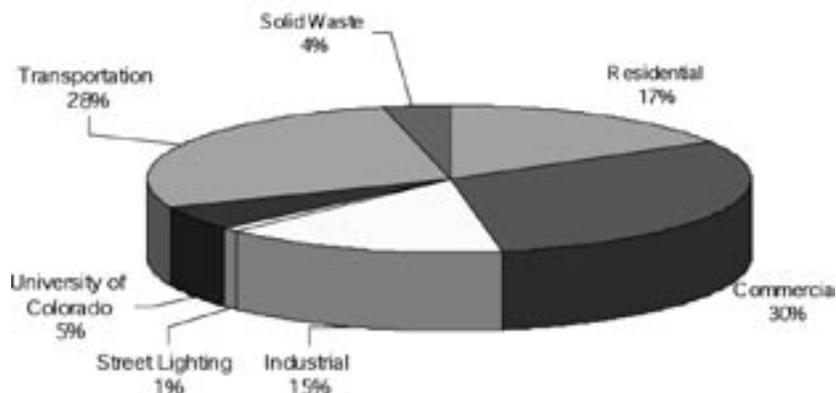
The Inventory

The greenhouse gas emissions inventory was updated to reflect 2004 data using the Inventory Maintenance System created by Eenergy. The primary data sources are community electricity and natural gas consumption from Xcel Energy, University of Colorado operations and generation, annual vehicle miles traveled from the Transportation Division, tons of garbage sent to the landfill, and offsets from renewable energy, such as wind power and biodiesel. The inventory translates these inputs into GHG emissions by sector and by fuel source. The 2004 inventory shows a very slight (<1% decline) in emissions from 2003 levels. The community must reduce GHG emissions by 350,000 metric tons from 2004 levels by 2012 in order to meet the Goal. This represents a 24% decrease from 2004 levels. In 2004, the commercial sector became the largest source of emissions at 30% of the total. Emissions from the Transportation and University of Colorado sectors slightly declined. The chart below shows the 2004 emissions breakdown by sector and energy source and the forecasted GHG inventory.

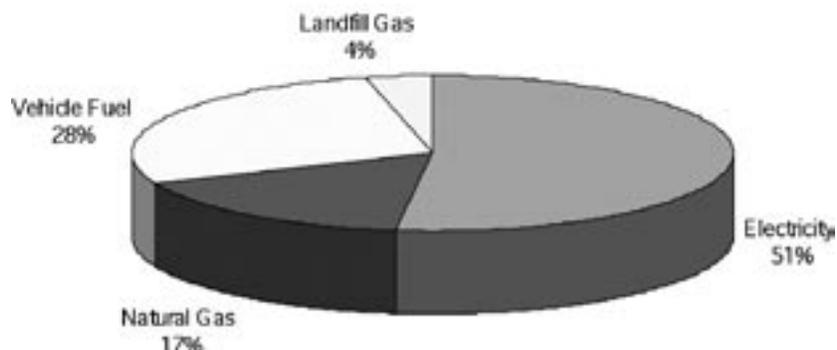




GHG Inventory Breakdown by Sector



GHG Inventory Breakdown by Energy Source



Budget

The GHG program had a budget of \$258,000 for 2005. The same amount is allocated for 2006. The 2005 budget was supplemented by revenue generated through the Xcel Energy rebate program and two grants. Major expenditures—defined as over \$10,000—included the commercial and residential programs, long-term funding source analysis, branding and logo development, consultant services for public process and solar project development, advertising and personnel expenditures.

At the December 13 Study Session, staff and a consultant team presented Council with a report titled, "Long-Term Funding Sources for Greenhouse Gas Emissions Management." The report contains thirteen potential revenue sources that meet the following scope of work criteria:

- Be capable of generating \$1.0 to \$3.0 million general fund dollars annually to implement the Plan
- Be capable of implementation by January 1, 2007
- Generate funding for at least six years
- Be within the city's legal ability to implement
- Have a clear nexus to the work funded
- Not involve a sales tax increase.

City staff identified the five options listed below as having the greatest potential for successful implementation. Many of the options can be used together to generate the required funds. Council members were supportive of conducting additional research on all of the five options.

- Establish an Energy Efficiency and Renewable Energy (EERE) enterprise and fee
- Create an annual Vehicle Sticker Fee
- Extend the Trash Tax
- Create a Renewable Energy Mitigation Program/Renewable Energy Mitigation Fund
- Increase the Development Excise Tax.

The options are explained in greater detail in the Report and are presented in a matrix format that shows legal and administrative considerations, precedent in other locations, revenue potential, nexus to GHG emissions, and whether voter approval is required. All options require further research and evaluation before implementation. As options are thoroughly researched, they will be evaluated using more specific criteria, such as revenue potential, economic impacts on all sectors, social equity concerns, and relation to Transportation Master Plan and the Boulder Valley Comprehensive Plan.

Climate Action Plan

To achieve the Goal, Council directed Office of Environmental Affairs staff in April 2004 to develop an action plan that would serve as a planning tool and roadmap to Boulder's Goal. In 2005, staff began work on a Climate Action Plan. The Plan will provide a framework to compare and analyze alternative policies and strategies to facilitate Council's review and decision-making process. Energy efficiency and renewable energy strategies are presented for the commercial, industrial, municipal, residential and transportation sectors. Waste reduction, water conservation, and urban forestry strategies are also discussed. The Plan is continuously evolving in response to new information, legislation, and opportunities. Staff expects to provide a draft Plan to Council in the first or second quarter of 2006 for Council direction on Plan options. Staff will seek public comment and internal review during the Plan development process.

Programs and Outreach

Discussions with the Strategy Group and tactical groups suggested that the city should act as a facilitator to connect residents and businesses with existing resources, develop and implement policies and programs that fill important gaps, and provide information to help the community make smart energy choices. Wherever possible, the city promoted existing external resources, such as Xcel Energy's rebates and state weatherization funds. This approach is in contrast to providing direct financing or directly implementing efficiency measures, for example.

The 2005 activities built on the foundation laid by the 2004 efforts. The allocation of additional budget and staff time devoted to GHG activities dramatically increased the amount of progress made in raising awareness of energy issues, increasing participation in programs, and reducing emissions. Through community outreach, the city is developing itself as a resource for energy-related information and assistance.

Commercial Energy Efficiency Rebates

The city participated in Xcel Energy's Custom Efficiency program. The Custom Efficiency Program is a demand-side management (DSM) program that awarded rebates for the installation of energy efficient measures, such as efficient lighting and HVAC upgrades, in order to reduce summer peak electric demand. Through business outreach and contractor education, over thirty-five businesses received rebates totaling \$187,000 for energy efficiency projects from October 2003 to June 1, 2005. The businesses are expected to save over \$160,000 a year for the life of the equipment. This level of participation among Boulder businesses had not been seen prior to the city's involvement.

A retail flood light campaign targeting downtown businesses sought to promote compact fluorescent alternatives to high wattage retail bulbs. Staff distributed over thirty free bulb samples to local retailers. Flood light retrofits were completed at eight businesses located primarily on the Pearl Street Mall. The rebate structure and high savings potential of the compact fluorescent bulbs resulted in projects with no upfront cost and immediate energy savings.





Involving local contractors was an important contribution to the program's success. Five local contractors and three Boulder-area contractors participated in the program after attending an informational meeting coordinated by staff. Because the contractors were actively soliciting projects and promoting the rebates, awareness of the program increased and additional projects were completed. Staff wrote a report titled, "Maximizing Utility DSM Resources," which documented staff's participation in the Xcel program. The report will be included in the American Council for an Energy Efficient Economy's (ACEEE) 2006 Summer Study Proceedings.

Building Performance with ENERGY STAR (BPwES)

BPwES is a commercial energy and water efficiency pilot program offering free ENERGY STAR building benchmarking, energy and water audits, and customized technical assistance. The program's primary goals are to increase efficiency in Boulder's commercial buildings, raise awareness of ENERGY STAR tools and utility rebates, and better understand the energy- and water-related assistance needs of the commercial sector. A Boulder-based engineering firm, Nexant, was contracted to offer the services. OEA partnered with the Water Conservation Office to fund and launch the program. Grant funds of \$13,000 were received from the StEPP Foundation for the project.

Since the program's launch in August, the program has received interest from key property and business owners and was fully subscribed by the end of 2005. As of December 31, 2005, the program had benchmarked fourteen buildings and conducted energy and water audits on six buildings. Along with identifying savings opportunities and cost estimates, the audit reports included information on receiving utility rebates, other business resources, and staff contact information. The audits identified significant savings opportunities at the buildings with paybacks of less than five years. Staff will continue to provide outreach to the participating businesses after the report is presented.

Brendle Group Energy and Water audits

The city's Water Conservation Office and the Partners for A Clean Environment (PACE) Program hired the Brendle Group—an engineering firm based in Fort Collins—to offer benchmarking and energy and water audits to six businesses. In 2004, the program targeted large water users, such as printers and hotels, for water audits. In 2005, the program was expanded to include energy audits. Energy audits were conducted on the three businesses that received water audits in the 2004 program. Ultimately, nine businesses were visited in 2005. The businesses that received benchmarking and energy and water audits in 2005 included hotels, senior living facilities, a grocery store, an athletic club, and a printer. The audit reports include savings opportunities and recommendations, implementation cost estimates, and additional resources. The consultants found annual energy cost savings opportunities of over \$100,000 for the nine businesses—preventing approximately 650 mtCO₂e a year—that could be implemented for approximately \$300,000. Again, staff will continue to provide outreach to the participating businesses after the report is presented.



Home Performance with ENERGY STAR (HPwES)

HPwES is a nationally-recognized program developed and supported by the ENERGY STAR program to build a market for whole-house retrofits. The aim of the program is to increase the energy efficiency, comfort, and durability of homes using a holistic approach that addresses the building envelope, heating and cooling systems, and appliances. The city of Boulder partnered with the Fort Collins Utilities, E-Star Colorado, and ENERGY STAR to offer technical training on home energy analysis and systems-approach retrofits to three area contractors. Each contractor was required to analyze five homes with diagnostic tools to determine how the home is consuming energy. The home evaluations were checked by the contractor's mentor during a Quality Assurance process. Two out of the three contractors have completed the training and mentoring process and are ready to market their services to the public.

Weatherization Program

The Office of Environmental Affairs partnered with Housing and Human Services and Longs Peak Energy Conservation to offer free weatherization services to owner occupied households that met specific income guidelines. To qualify for the program, a household could not qualify for services under the existing county-wide weatherization program and must have an income not exceeding 50% of the city of Boulder's area median income (AMI).

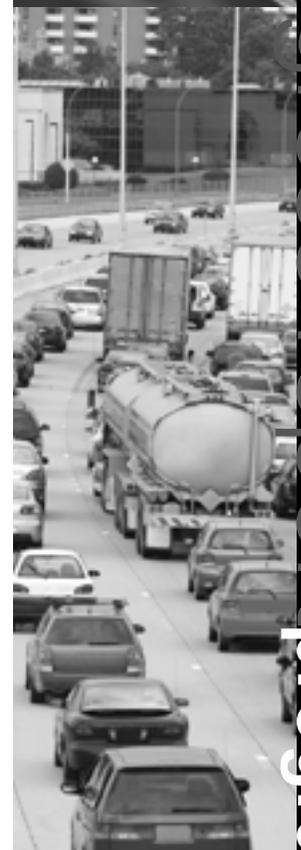
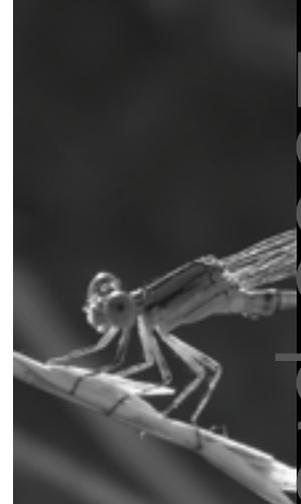
Under this program in 2005, nine homes were retrofitted with a variety of energy efficiency measures. Sample measures include installation of compact fluorescent light bulbs, additional insulation, programmable thermostats, duct sealing, and furnace repair and replacement.

October Energy Awareness Month

As part of Energy Awareness Month, ENERGY STAR's sixth annual "Change a Light, Change the World" campaign, and the Center for Resource Conservation's Solar Green Home tour, staff set up tables at various locations around Boulder and handed out energy efficiency starter kits containing a compact fluorescent light bulb (CFL) and energy-related information, such as ENERGY STAR brochures and a bicycle route map. A total of 660 bulbs were given away. A survey was available at the event sites to collect feedback on the public's knowledge of and attitude towards climate change and energy issues.

Boulder Wind Challenge

The city of Boulder, in partnership with Western Resource Advocates (WRA) and local renewable energy suppliers, launched the Wind Challenge in late August. The challenge set the goal of signing up 500 new wind power customers from the commercial and residential sectors by October 31. The Challenge succeeded in signing up 1,150 new subscribers for approximately 16 million kWh a year, offsetting 12,431 metric tons of CO2. This is equivalent to taking 2,441 cars off the road for a year, saving 92 acres of trees from deforestation, or saving 26,000 barrels of oil. This brings the total amount of wind power subscribers to almost 7,000, representing 16% of total electric customers in the community.



Solar Boulder

The city of Boulder has selected PowerLight as the primary contractor for the proposed 1.5 MW solar photovoltaic (PV) system on city facilities. In collaboration with city staff, PowerLight will conduct the site and financial analyses and develop the bid for Xcel Energy's upcoming RFP process under Amendment 37. Staff is pursuing a third party ownership model, which enables the city to have solar systems with no up-front cost and relatively little financial risk. In this arrangement, a special purpose entity that is eligible for significant tax benefits owns the system and is typically responsible for operation, maintenance, and insurance. The city is required to purchase the electricity produced by the systems at a fixed rate, slightly lower than current rates, for the contract term, which is typically 15-20 years.

The city also investigated the possibility of a small PV system for the Reynolds Library to be financed and installed by a local investor team. The system would provide about 30% of the library's electricity, which the city would be obligated to buy. The most recent analysis indicated that the investment did not meet the city's financial objectives. The investor's team will be returning to staff with revised numbers for consideration.

The city also contributed \$5,500 to the Center for Resource Conservation to install solar hot water systems on affordable housing units in the Holiday neighborhood. At the end of 2005, there were eleven systems installed.

Chicago Climate Exchange

In May, City Council decided to join the Chicago Climate Exchange (CCX). CCX is a voluntary, legally binding cap and trade pilot program designed to reduce greenhouse gas emissions, help businesses and organizations manage emissions and recognize the value of reductions, and implement market-based strategies for emissions reduction. Participants commit to a one percent annual reduction in GHG emissions from the established baseline for years 2003 to 2006, for a four percent reduction in total. For municipal participants, only organization-wide emissions from electricity, natural gas, and fleet fuel are included; community-wide emissions are excluded.

The city's baseline data was audited by the National Association of Securities Dealers (NASD). Submissions of 2003 and 2004 energy consumption will be audited in early 2006. According to the 2004 data, the city organization reduced its emissions from vehicle fuel and natural gas by 15.9% relative to our baseline. Emissions from electricity increased 1.5%. Because this reduction is in excess of our commitment, it is anticipated that we will be in a seller's position through 2006. The city has not yet made a decision on whether to trade credits or to retire them.

City Operations

The city organization annually uses over 28 million kilowatt hours and 560,000 therms of natural gas, emitting over 20,000 mtCO₂. The city's fleet annually emits almost 3,000 mtCO₂. The sharp rise in electricity and fuel prices continues to strain already limited city budgets. The Facilities and Asset Management (FAM) Division is continuously evaluating strategies, such as conservation, energy efficiency, and alternative energy, to meet the energy needs of the city organization at the lowest cost. It is FAM's general policy to com-



plete energy-saving projects that have a five year or less payback and to purchase hybrid and higher efficiency vehicles where possible. In 2005, FAM completed maintenance and optimization projects, including installation of variable speed drives on an HVAC system, and set back the thermostats on all city facilities during the fall and winter season to conserve natural gas. FAM also purchased utility bill tracking software to better monitor energy consumption and expenditures. The city also made additional wind power purchases, bringing renewable energy to 3% of the city's total electrical load.

Transportation

Emissions from vehicles continue to be a large source of GHG emissions in Boulder. Council did not approve budget to hire staff to work on transportation-related GHG issues for 2005-2006. As a result, progress in this sector has been limited. Staff has initiated discussions with the Transportation Division to collaborate and form synergies between the departments and programs.

Waste Reduction

Emissions from the solid waste sector, in the form of landfill gas or methane, represent 4% of total emissions. The City Council, as part of the 2000 budget process, established a 50 percent waste diversion goal, to be achieved by 2005. Although Boulder will not get to 50 percent waste diversion by the end of 2005, research conducted as part of the master planning process indicates that the current funding levels and expansion of pilot programs in place today should bring the city's diversion rate to 60 percent by the end of 2007.

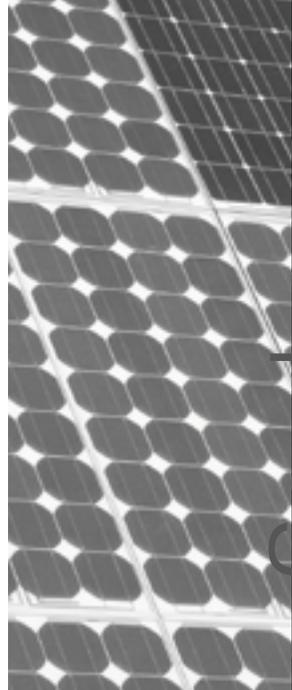
In 2005, the Waste Reduction Team launched a residential organics pilot called the "Can, Can, Can Program" designed to increase waste diversion from the residential sector. This program was an important first step to decreasing the amount of food waste and yard debris sent to the landfill and increasing compost. On average, pilot participants were able to recycle or compost 70% of their household waste. This is a 21% increase over typical households. The program will be

expanded to approximately 2,400 households in 2006 and is anticipated to be implemented city-wide in 2007.

The Team also supported a commercial composting program to collect food waste from restaurants and grocery stores. The city provides businesses with a rebate of \$2.50 per yard of organic waste collection subscription. The goal of the rebate is to increase organic waste collection in the commercial sector and to offset some of the additional costs to the business for organic waste collection. In 2005, ten businesses participated.

Urban Forestry

While the sequestration benefits of Boulder's urban forest are not included in the emissions inventory, staff recognizes the environmental benefits of trees and supports the Urban Forestry program. A section on Urban Forestry is included in the draft Climate Action Plan. It is estimated that Boulder's trees store an estimated 109,000 metric tons of carbon and sequester about 1,900 tons annually. In 2005, the program faced budget cuts, but planted 115 trees, of which 78 were planted through the city's Tree Planting Program. In 2004, staff planted 82 trees, of which 79 were through the Tree Planting Program. The Urban Forestry program receives donations to plant trees, which are not considered a part of the Tree Planting Program.



Awards and Recognition

The city earned a Climate Protection Award from the EPA. The award recognizes exceptional leadership, outstanding innovation, personal dedication, and technical achievements in protecting the climate.

The Environmental Protection Agency (EPA) also designated Boulder as a Green Power Community. EPA awards this designation to communities that receive at least 2% of total electricity from renewable energy and have local governments that are Green Power Partners and initiate the community challenge. Boulder currently receives 8% of its electricity from renewables, including the city's hydroelectric generation. When the renewable energy credits from hydropower are excluded, renewable energy makes up 4% of total electrical load. Boulder is the first community in Colorado to become a Green Power Community and is one of only a handful of such communities in the country. Boulder will receive recognition from the EPA, including press releases and an outdoor sign to be posted in the community.

Public Process

Staff hired a consultant to work with staff to coordinate the public process and facilitate public meetings. A Strategy Group was convened for four meetings during May and June with the stated purpose of drafting broad recommendations for the focus of the city's GHG program. Participants were selected based on an expressed interest in the program, previous involvement with the program, policy knowledge in the field, the time and ability to serve, or by recommendation from other invitees. The members represented a variety of viewpoints and levels of knowledge about climate change and mitigation strategies. Strategy Group members were invited to participate in the Climate Action Plan Committee, which will begin meeting in January 2006 to provide input on the Plan and the potential long-term funding sources.

Business tactical groups were also convened to discuss commercial mitigation strategies in greater detail. The groups consisted of local energy efficiency experts and a representative from a large commercial development company. Staff also discussed strategies and sought feedback from business and commercial property owners during one-on-one interviews.

Surveys were used to collect community input on energy and climate related issues. Several questions related to personal energy habits and attitudes towards energy and climate change were included in the community-wide waste reduction and energy survey. English and Spanish versions of the waste reduction survey were sent to 1,200 randomly-selected households and had a response rate of 41%. Electronic survey boxes were also placed at various locations around Boulder, including the light bulb giveaway sites, Boulder Main Library, East Boulder Recreation Center and People's Clinic. The surveys indicated that the majority of Boulder residents believe the city has a role in helping residents and businesses reduce emissions. Results of the surveys can be found at www.environmentalaffairs.com.

Staff also increased the number of public presentations during 2005. Staff gave presentations on the city's GHG program and energy savings strategies to groups such as the Sierra Club, Kiwanis Club, neighborhood groups, and University of Colorado classes. Staff



also coordinated a public event on climate change and reducing emissions, featuring Representative Alice Madden, Mayor Mark Ruzzin, Stephen Saunders, and comedian Bill LeBlanc. The event was held at Redfish Restaurant during the Solar and Green Home Tour. The GHG programs were also featured in numerous newspaper articles, television and radio segments.

2006 Work Plan

As previously mentioned, the GHG program has a total of \$258,000 to spend in 2006. The Trash Tax increase is set to expire at the end of 2006, at which time it is desired that a long-term funding source will be implemented. A key activity for 2006 will be researching and analyzing the five funding options approved for additional consideration by Council at the December Study Session. Staff will review the consultants' funding report with the Climate Action Plan Committee, which is scheduled to meet every two weeks from January to June to discuss the Climate Action Plan and potential funding sources. Staff will also seek input from other departments, city advisory boards, and the public throughout the research and development process. As the funding source is being developed, staff will refine programmatic details to prepare for the implementation of the Climate Action Plan.

The programs and activities for 2006 will continue to build on the foundation laid by the city's 2004 and 2005 activities and attempt to raise additional awareness of the Goal, encourage voluntary emissions reduction actions, and increase participation in available programs. In 2006, staff will continue existing programs, such as the energy and water audit programs, weatherization, and will continue to work with commercial and residential stakeholders. Staff will also target sectors previously unaddressed by the GHG program, such as multifamily, rental, and affordable housing. The city will expand its partnerships with other organizations to best leverage the city's efforts and available funding.

Conclusion

The activities completed in 2005 will result in direct annual GHG emissions reductions of over 14,000 metric tons. It is anticipated that energy savings will result from the audit programs, as businesses implement some of the recommended measures. Additionally, while the direct impacts of education, outreach, and increased energy costs are difficult to quantify and measure, increased public awareness of energy- and climate change-related issues will likely lead to increased voluntary actions to conserve energy and reduce GHG emissions. The 2005 reductions represent a small reduction in the context of the larger goal; however, it represents over a ten-fold increase in emissions reductions over 2004 city activities. Through its website, public presentations, outreach, and programs, the city is establishing itself as an important and reliable community resource.

1 Report is available at <http://www.environmentalaffairs.com/energy>

2 Report is available at <http://www.environmentalaffairs.com/energy>

3 The baseline is the average of total emissions from 1998 through 2001.



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