Austin Climate Protection Program

Annual Report 2009

April 2009

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Austin Climate Protection Program
CoolAustin.org

Executive Summary

Program Overview

The Austin Climate Protection Program (ACPP) builds on the City of Austin's portfolio of environmental programs. The program seeks to make the City's operations carbon-neutral by 2020 and to support greenhouse gas reductions throughout the Austin community. The program is shaped by five sub-plans, outlined below:

- ***Municipal Plan*** – Make all City of Austin facilities, vehicles, and operations carbon-neutral by 2020.
- ***Utility Plan*** – Cap carbon dioxide emissions from existing power plants; expand conservation and renewable energy programs to reduce Austin Energy's carbon footprint; and make any new electricity generation carbon-neutral.
- ***Homes and Buildings Plan*** – Update building codes for new buildings to be the most energy-efficient in the nation; pursue energy efficiency upgrades for existing buildings; and enhance Austin Energy's Green Building program.
- ***Community Plan*** – Engage Austin citizens, community groups, and businesses to reduce greenhouse gas emissions throughout the community.
- ***"Go Neutral" Plan*** – Provide tools and resources for citizens, businesses, organizations, and visitors to measure and reduce their carbon footprint.

This annual report documents the City's progress in meeting its Council-established goals and the ACPP's involvement since its inception in related City-wide programs and initiatives. The ACPP's Annual Report of April 2008 and the City of Austin Inventory Report of October 2008 are included in the report's analysis.

Program Accomplishments

The ACPP has begun the process of embedding climate protection as a core mission in the City's operations and is laying a foundation for empowering individuals, businesses, and other organizations in the community to reduce their climate impact. Through March 2009, the ACPP has avoided approximately 188,453 tonnes of carbon dioxide-equivalents (CO_2-eq.). CO_2-eq. is a measure of total greenhouse gas emissions, each of which has a different effect on increasing atmospheric temperatures. For example, methane has 21 times the global warming impact of CO_2. To put ACPP's greenhouse gas reduction achievements in perspective, 188,453 tonnes of CO_2-eq. is equivalent to the emissions from the electricity used by 26,100 U.S. homes each year. This figure should be considered a conservative estimate, as all of the work being done through the ACPP will ultimately contribute to direct emission reductions or inspiring others to modify their behavior to reduce or avoid emissions through their actions.

Measuring the sum of greenhouse gases that an entity contributes to the atmosphere—frequently referred to as a "carbon footprint" or a "greenhouse gas inventory"—is a critical first step for taking action to reduce one's climate impact. ACPP staff conducted two greenhouse gas inventories: one to account for the greenhouse gases emitted from the City of Austin's municipal operations, and one to capture the emissions contributed by the community. In 2007, the City of Austin municipal operations inventory was 168,000 tonnes of CO_2-eq., equivalent to the annual greenhouse gas emissions from the electricity used by 23,300 U.S. homes each year—slightly less than the avoided emissions from ACPP's programs.

The preliminary total 2007 greenhouse gas emissions for Travis County were just under 15 million tonnes of CO_2-eq., equivalent to the annual greenhouse gas emissions from the electricity used by 2.1 million U.S. homes each year. Based on this data, the average Travis County resident emitted 14 tonnes of CO_2 emissions from energy use (electricity, natural gas, and transportation fuel) in 2007. Comparatively, the average United States citizen emits 20 tonnes of energy-related CO_2 per year (30 percent larger than average Travis County resident), and the average Texas resident emits 27 tonnes of energy-related CO_2 per year (twice as large as the average Travis County resident).

The ACPP has made significant strides in reducing the City's and the community's carbon footprint through projects and programs being implemented in the following areas: collaboration, education and outreach, and mitigation and innovation.

COLLABORATION

The ACPP serves as a thread weaving the City's environmental and energy programs together. As a result, the program has a City-wide scope, with ACPP staff regularly interacting with other Austin Energy divisions, City departments and offices, and regional entities. Within the City, the ACPP and the inter-departmental Climate Action Team it convened in January 2008 have influenced City-wide policies. The team delivered a report to the City Manager's Office and City Council in October 2008, which identified measures the departments would like to see implemented to reduce greenhouse gas emissions from the City's operations and the larger Austin community. Several of the recommendations, including development of comprehensive Green Fleet, Green Information Technology, and Green Purchasing policies, have been adopted or are in the process of being implemented. The ACPP is actively working with the City Manager's Office and departments to identify policies and activities that will simultaneously reduce costs and emissions.

The City has also been successful in encouraging energy conservation in new and existing buildings and in expanding the amount of energy that Austin Energy gets from renewable resources, such as wind, solar, and biomass. A series of building energy code changes is being phased in through 2015 to help make new buildings in Austin the most energy-efficient in the nation. Energy use in existing buildings is being reduced through Austin Energy's demand side management programs, which drive down citizens' energy use during peak demand periods in the late afternoon and evening, and through a new ordinance passed by the Council last year that requires existing buildings to receive an energy audit within a certain timeframe or upon sale of the building. The Energy Conservation Audit and Disclosure (ECAD) Ordinance takes effect in June 2009. ACPP staff is working with Austin Energy's Energy Efficiency Services program to maximize the climate benefits of the program.

Additionally, ACPP staff has collaborated with a range of regional entities, including the Capital Area Council of Governments, the CLEAN AIR Force of Central Texas, St. Edwards University, the Lower Colorado River Authority, Travis County, the City of San Antonio, and the City of Denton, among others. The ACPP is working with these groups to develop their own carbon footprints and to combine efforts to simultaneously reduce greenhouse gas and ozone-forming emissions.

EDUCATION AND OUTREACH

As part of a suite of education and outreach initiatives, ACPP staff has developed an interactive employee training seminar focused on the ACPP and ways employees can reduce their climate impact in the office and at home. As of today, over 500 employees, including Department Directors, have received the training. Participants have found the instructors to be "engaging" and have given the seminar an average score of 4.82 on a 5-point scale (with 1 being the lowest and 5 being the highest score).

In addition to the internal education component, the ACPP recognizes it has an obligation to educate the community about the risks and opportunities associated with climate change. The ACPP is focused on engaging the community through community involvement efforts, education pilot projects, and tools for individual learning. The ACPP team has tabled and spoken at over 60 events through March 2009 and will continue to participate in events throughout the coming year. An example of the depth and breadth of groups that the program has reached include: Austin citizens, the local business community, school groups and classrooms, energy efficiency professionals, library managers, Texas Department of Transportation employees, and the Sunset Valley City Council.

To date, the ACPP has emphasized a multi-sector education and outreach through individual events. However, a more comprehensive community engagement and marketing campaign is in the works. A Community Advisory Committee first convened in November 2008 to kick-start the community engagement process. This group will expand in the coming months to convene a larger Austin Climate Community Group that will help ACPP staff reach a broader audience through existing communication networks. ACPP staff is evaluating a web-based social marketing strategy to carry its climate protection message throughout the community.

The ACPP is also developing several tools to enhance its educational efforts, including a program website that was launched in July 2008, and an upcoming online carbon calculator that will allow households to calculate their carbon footprint. The calculator will be a powerful tool for educating citizens about how their daily activities can create greenhouse gas emissions and actions that Austin residents can take to reduce their carbon footprint. The Austin-specific calculator is expected to go live in fall 2009 and will offer a number of unique features not currently available in the majority of carbon calculators, such as links to online utility bills and quantification of emissions from less traditional greenhouse gas sources (e.g., water use).

MITIGATION & INNOVATION

The ACPP has a broad scope to mitigate the impact of climate change through mitigation and climate response. The first mitigation objective is achieved through the projects and programs being implemented in the above categories, as well as through the ACPP's involvement with the Urban Heat Island Mitigation program and with some innovative alternative transportation projects. Climate change preparedness is a new initiative for the ACPP and is under way through projects with the City's Hazard Mitigation Plan, the Centers for Disease Control and Prevention (CDC) and ICLEI (Local Governments for Sustainability).

The urban heat island effect occurs on days of increased temperatures when the air in central Austin can be 2 to 9 degrees warmer than surrounding areas due to the urban environment. Urban trees play a strategic role in reducing the effect, in addition to the host of other ecosystem services they provide. The City Council directed implementation of several urban forest initiatives over the past 10 years. The ACPP, in partnership with the Parks and Recreation Department (PARD) and Watershed Protection and Development Review (WPDR), is actively trying to expand this urban forest through measurement and preservation of our existing trees and planting of additional trees. The ACPP is helping to quantify the carbon storage benefit of the community's trees and lending support to the land preservation effort so that the City continues to grow in a sustainable manner.

One innovative program launched as a result of interdepartmental collaboration is the *City Cycle* bike share program. Building off the early success of WPDR's bike sharing program, the ACPP launched a City-wide program in 2008. The bikes are available for City employees to use for traveling between City

offices. ACPP and Austin Energy's solar program staff also initiated a solar scooter pilot project in March 2009 that seeks to reduce fossil fueled vehicle trips at local events by providing solar-powered scooters.

The ACPP has recently begun the conversation about how the City will continue to provide critical services in light of rising temperatures, more severe weather events, and dwindling water availability, among other climate-induced changes. The team is beginning to explore adaptation planning through a pilot project with the CDC and involvement with ICLEI in developing an index for measuring the sustainability and resiliency of communities.

Looking Forward

The Austin Climate Protection Plan must benefit the citizens and the City while preparing the community for carbon regulation. To this end, the ACPP staff continues to work with all City departments and to engage the community as a whole to identify and implement measures that will result in carbon emission and cost reductions. Inventories of City and community emissions will be updated and maintained to document the success of emission reduction efforts. Measures will be implemented to reduce energy and water use, encourage recycling and composting, and identify and develop methods of transportation that do not depend on fossil fuels. With the development of programs and projects that promote renewable energy sources and encourage sequestration opportunities, the ACPP will address emissions that cannot be constrained.

The ACPP will continue to deliver economic, environmental, and societal benefits to the community through its every activity while working toward the goal of carbon neutrality for the City of Austin.

1 Introduction

In February 2007, the Austin City Council passed Resolution No. 20070215-023 (see Appendix A), establishing the Austin Climate Protection Plan. The Austin Climate Protection Plan is divided into five sub-plans, which are outlined below.

- ***Municipal Plan*** – Make all City of Austin facilities, vehicles, and operations carbon-neutral by 2020.
- ***Utility Plan*** – Cap carbon dioxide emissions from existing power plants; expand conservation and renewable energy programs to reduce Austin Energy's carbon footprint; and make any new electricity generation carbon-neutral.
- ***Homes and Buildings Plan*** – Update building codes for new buildings to be the most energy-efficient in the nation; pursue energy efficiency upgrades for existing buildings; and enhance Austin Energy's Green Building program.
- ***Community Plan*** – Engage Austin citizens, community groups, and businesses to reduce greenhouse gas emissions throughout the community.
- ***"Go Neutral" Plan*** – Provide tools and resources for citizens, businesses, organizations, and visitors to measure and reduce their carbon footprint.

The Austin Climate Protection Program (ACPP) was created to implement the provisions of the Climate Protection Plan. To help clarify the program's intended scope, ACPP staff developed vision and mission statements. The vision of the ACPP is:

> *To ensure a healthy environment and sustainable climate for tomorrow.*

The mission of the ACPP is:

> *To develop and promote innovative programs and bold initiatives to reduce greenhouse gases and improve air quality in our community, thereby establishing Austin as a national leader in climate protection.*

The program is housed and administered by Austin Energy (see Appendix B for an organizational chart of the team), but retains a City-wide scope, connecting climate protection-related programs and initiatives throughout the City. This report provides an update on the program's progress through March 2009 and outlines ACPP's upcoming priorities.

The reader should note that the terms 'carbon' and 'greenhouse gases' are used interchangeably to refer to gases that absorb outgoing radiation and warm the Earth's atmosphere. Greenhouse gases include, but are not limited to, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydroflourocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF_6). The accumulation of these greenhouse gases in the atmosphere contributes to global climate change. Climate change not only impacts temperature (both warming and cooling), but it also alters precipitation and weather patterns. As a result of climate change caused by increasing concentrations of greenhouse gases, in Central Texas, we will likely experience more intense precipitation events followed by more intense, and perhaps more prolonged, drought periods. The Central Texas region may also experience warmer weather year-round, with fewer freezes during the winter and a prolonged "warm" season.[1] On a global scale, these climatic changes have the potential to significantly alter ecosystems and the way humans experience life on earth.

[1] Union of Concerned Scientists, "Texas, Climate Projections." Online. Available: http://www.ucsusa.org/gulf/gcstatetex_cli.html. Accessed: April 21, 2009.

2 Program Goals

Specific goals and, in some cases, attainment dates were articulated by the Austin City Council via the Austin Climate Protection Plan resolution. City Council also defined many of the intermediate objectives to help reach the program's goals. ACPP staff is working with other City departments and offices to craft department-/office-level greenhouse gas reduction goals to help City facilities, vehicles, and operations become carbon-neutral by 2020.

Table 1 provides programmatic goals and objectives categorized by sub-plan and the City department and departmental division responsible for achieving that objective. Figure 1 illustrates an implementation timeline. All program goals are to be achieved by 2020, with a start date of 2007. In most cases, mention of specific years refers to the calendar year (CY). The energy demand savings goal, however, operates on a fiscal year (FY) basis. Counting of cumulative megawatts (MW) towards this goal started in FY2007 to align with existing Austin Energy reporting protocol. All solar MW installed since Austin Energy's solar rebate program began, will contribute towards the 100 MW solar goal, not just those installed since 2007.

Table 1. Austin Climate Protection Plan Goals and Objectives

Goal / Objective	Responsible City Department / Division
Municipal Plan	
Goal 1: Make all City facilities, vehicles, and operations carbon-neutral by 2020	
Objective 1a: Create a greenhouse gas emissions inventory for the City's municipal operations against which progress in becoming carbon-neutral can be measured	Austin Energy / ACPP
Objective 1b: Power all City facilities with renewable energy by 2012	Austin Energy / Market Research Planning and Development, ACPP
Objective 1c: Convert City vehicle fleet to electricity and non-petroleum fuels, using "mitigation, and other measures as necessary" to negate any remaining vehicle greenhouse gas emissions	Financial and Administrative Services Department / Fleet Services
Objective 1d: Develop employee climate protection education program, including training and incentives	Austin Energy / ACPP
Goal 2: Establish an interdepartmental Climate Action Team to establish short-term and long-term targets for reducing greenhouse gas emissions[1]	
Objective 2a: Deliver report to City Council with a comprehensive plan for meeting identified greenhouse gas emission reduction targets within one year of establishing team	Austin Energy / ACPP
Objective 2b: Develop and implement departmental climate protection plans to maximize greenhouse gas reductions and minimize energy consumption	Austin Energy / ACPP; all departments
Goal 3: Support state and federal legislation to reduce greenhouse gas emissions	
Objective 3a: Monitor, analyze, and comment on applicable federal greenhouse gas legislative and regulatory proposals	City of Austin Governmental Relations; Austin Energy / Regulatory and Government Affairs, ACPP
Objective 3b: Monitor, analyze, and comment on applicable state and/or regional greenhouse gas legislative and regulatory proposals	City of Austin Governmental Relations; Austin Energy / Regulatory and Government Affairs, ACPP

Goal / Objective	Responsible City Department / Division
Utility Plan	
Goal 4: Establish a CO_2 cap and reduction plan for existing power plant emissions	
Objective 4a: Use estimates of historical and future year CO_2 emissions through 2020 to determine appropriate CO_2 cap and reduction plan	Austin Energy / Environmental Care and Protection
Objective 4b: Use Goals 5-8 and other measures to comply with CO_2 cap and reduction plan	Austin Energy / Environmental Care and Protection, Energy and Market Operations, Solar, Energy Efficiency Services
Goal 5: Achieve 700 MW of energy demand savings by 2020	
Objective 5a: Establish annual MW savings targets and enhance demand side management programs to achieve targets	Austin Energy / Energy Efficiency Services
Goal 6: Obtain 30 percent of energy needs from renewable resources by 2020	
Objective 6a: Estimate future energy needs through 2020 and evaluate renewable energy options for technological availability, greenhouse gas emissions, cost, reliability, and community support	Austin Energy / Energy and Market Operations, Solar, Strategic Planning
Goal 7: Install 100 MW of solar energy capacity by 2020	
Objective 7a: Expand solar rebate program to increase MW installed	Austin Energy / Solar
Objective 7b: Evaluate utility-scale solar energy options for technological availability, greenhouse gas emissions, cost, reliability, and community support	Austin Energy / Energy and Market Operations
Objective 7c: Assess available rooftop space through Austin Energy service territory that is amenable to solar energy production	Austin Energy / Strategic Planning
Goal 8: Make any new energy generation carbon-neutral	
Objective 8a: Evaluate low greenhouse gas emitting technologies, feasibility of carbon capture and storage, and “mitigation and other prudent measures” for any new generation	Austin Energy / Environmental Care and Protection; Energy and Market Operations

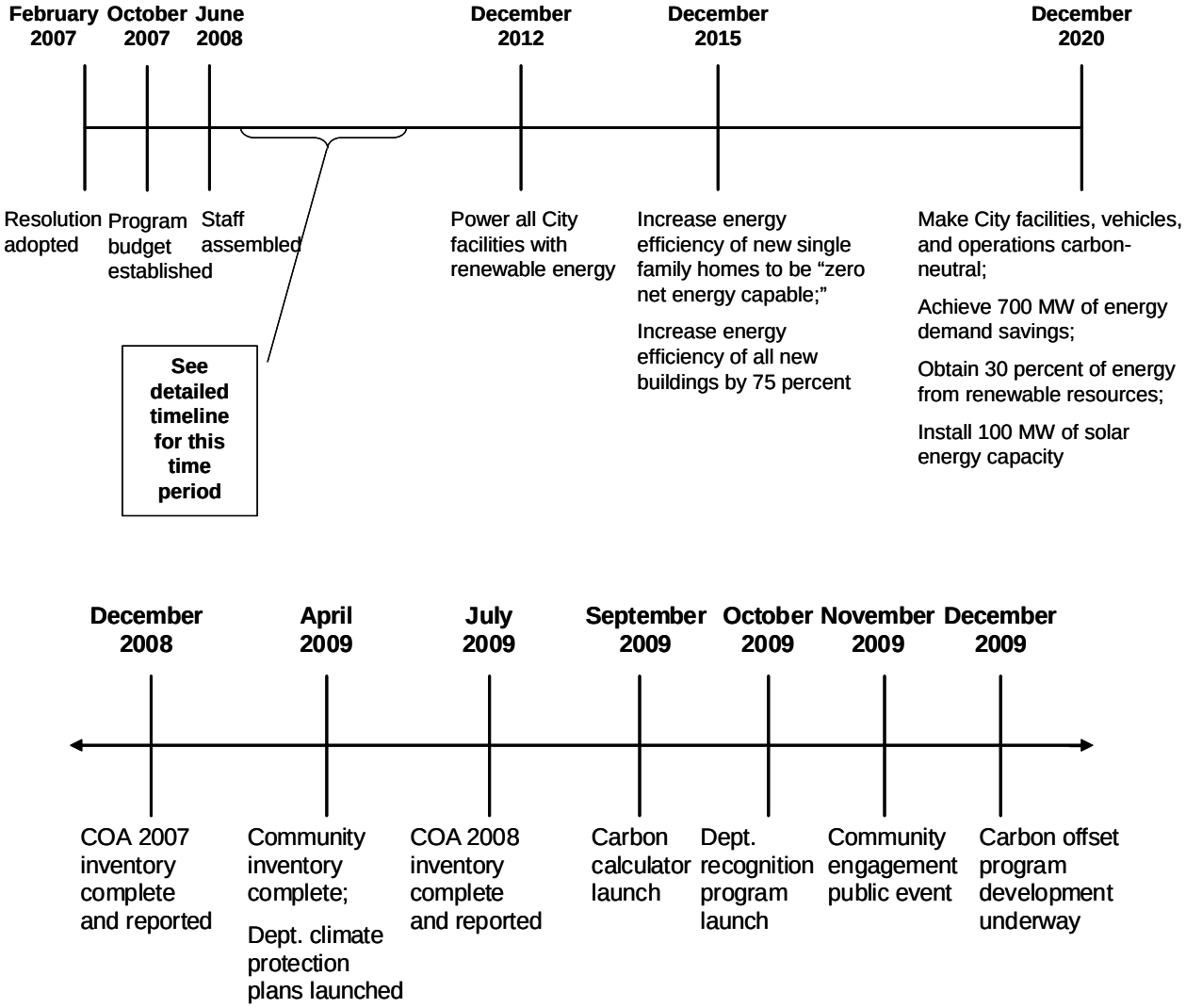
Goal / Objective	Responsible City Department / Division
Homes and Buildings Plan	
Goal 9: Develop the most energy-efficient building codes in the nation	
Objective 9a: Increase energy efficiency standards so that all new single family homes can be powered by onsite energy generation ("zero net energy capable") by 2015	Austin Energy / Green Building
Objective 9b: Increase energy efficiency standards for all new buildings by 75 percent by 2015	Austin Energy / Green Building
Goal 10: Aggressively pursue energy efficiency upgrades to existing building stock	
Objective 10a: Develop requirements for existing buildings to conduct an energy audit and evaluate energy efficiency upgrades upon being sold	Austin Energy / Green Building
Objective 10b: Facilitate energy audits and energy efficiency upgrades for existing buildings	Austin Energy / Energy Efficiency Services
Goal 11: Enhance Green Building program to encourage efforts at making buildings carbon-neutral	
Objective 11a: Increase technical assistance to Green Building customers	Austin Energy / Green Building
Objective 11b: Enhance marketing of Green Building program, including development of a carbon-neutral certification to accompany applicable Green Building ratings	Austin Energy / Green Building
Objective 11c: Develop policies requiring higher level Green Building ratings for buildings that are mandated to comply with a minimum Green Building rating	Austin Energy / Green Building
Community Plan	
Goal 12: Establish a stakeholder group of representatives of the Austin community to establish short- and long-term greenhouse gas emission reduction targets[1]	
Objective 12a: Create a greenhouse gas emissions inventory from all sources community-wide against which progress in meeting greenhouse gas reduction targets can be measured	Austin Energy / ACPP
Objective 12b: Deliver report to City Council with a comprehensive plan for meeting identified greenhouse gas emission reduction targets within one year of establishing team	Austin Energy / ACPP

Goal / Objective	Responsible City Department / Division
Goal 13: Cooperate with other local/regional entities to provide assistance with their own climate protection programs and work on regional greenhouse gas reduction strategies	
Objective 13a: Provide climate protection-related program development, technical, and other assistance to local/regional entities as requested	Austin Energy / ACPP
Objective 13b: Participate in regional planning bodies' efforts to reduce greenhouse gas emissions and mitigate the impacts of climate change locally/regionally	Austin Energy / ACPP
"Go Neutral" Plan	
Goal 14: Provide tools to help citizens, businesses, organizations, and visitors become carbon-neutral	
Objective 14a: Develop an Austin-specific online calculator to measure households' carbon footprint	Austin Energy / ACPP
Objective 14b: Make available customized carbon footprint assessments for businesses and organizations	Austin Energy / ACPP
Objective 14c: Develop a menu of greenhouse gas reduction projects that citizens, businesses, organizations, and visitors can help fund through the purchase of carbon offsets	Austin Energy / ACPP
Objective 14d: Create recognition program for households, businesses, and other organizations that achieve carbon neutrality	Austin Energy / ACPP
Objective 14e: Promote the concept of carbon neutrality to visitors by offering carbon offsets for purchase by travelers, conventions, tradeshows, and festivals	Austin Energy / ACPP

Notes:

[1] The creation of a Climate Action Team was identified by the City Council as part of the Community Plan component of the Austin Climate Protection Plan resolution. When interpreting the resolution, staff separated the Climate Action Team—comprised of staff from most City departments primarily focused on reducing greenhouse gas emissions from municipal operations (internal focus)—from a community stakeholder group—comprised of representatives from various community sectors (e.g., business, education, regional planning bodies, environmental organizations) focused on reducing greenhouse gas emissions throughout the Austin community (external focus).

Figure 1. ACPP Implementation Timeline



Ongoing Activities Include:

- Austin Climate Community Group
- Website updates and redesign
- Greenhouse gas protocol development
- Climate Action Team (CAT) meetings
- Policy monitoring
- Green purchasing policy development
- Employee education and outreach
- Community education and outreach
- Marketing development
- Identification of carbon-reducing activities

3 Program Accomplishments

The following section discusses the City's progress in meeting the Austin Climate Protection Plan goals and describes areas of collaboration with other City programs and initiatives. The program has begun the process of embedding climate protection as a core mission in the City's operations and is laying a foundation for empowering individuals, businesses and other organizations in the community to reduce their respective carbon footprints.

Table 2 shows the accumulated greenhouse gas savings that the program has accomplished through 2008 and projections for future reductions based on programs currently underway. Through March 2009, the ACPP has avoided approximately 188,453 tonnes of CO_2-equivalents (CO_2-eq.). CO_2-eq. is a measure of total greenhouse gas emissions, each of which has a different effect on increasing atmospheric temperatures. For example, methane has 21 times the global warming impact of CO_2. To put ACPP's greenhouse gas reduction achievements in perspective, 188,453 tonnes of CO_2-eq. is equivalent to the emissions from the electricity used by 26,100 U.S. homes each year. Table 2 includes only those projects for which avoided greenhouse gas emissions can be calculated. The cumulative figure should be considered a conservative estimate, as all of the work being done through the ACPP will ultimately contribute to direct emission reductions or empowering others to modify their behavior to reduce or avoid emissions through their actions.

Table 2. Cumulative and Projected Greenhouse Gas Emissions Avoided by the ACPP
(cumulative through December 2008, except where noted in the table)

	Avoided CO_2-eq. Tonnes	
Program / Project	**Through 2008[1]**	**Future Projections[2]**
Austin Energy - Energy Generation		
Solar PV Rebate Program	2,800 (through March 2009)	N/A
City Departments on Green Choice	33,900	47,200 (FY09)
Austin Energy - Energy Conservation		
Demand Side Management (existing buildings)	123,400	N/A
Energy Conservation Audit and Disclosure (existing buildings)	N/A	365,300 (10 years)
Single-family Homes Building Code Changes (new buildings)	3,700	
Commercial & Multi-family Building Code Changes (new buildings)	12,200	N/A
Compact Fluorescent Lamp Recycling Program	200 (through March 2009)	N/A

Program / Project	Avoided CO_2-eq. Tonnes Through 2008[1]	Future Projections[2]
Austin Energy - Clean Cities		
Electric Vehicle Incentive Program	690	775 (per year)
Fleet Services		
Alternative Fuel Use	1,800	N/A
Solid Waste Services		
Single Stream Recycling	9,500	104,500 (3 years)
Communications & Technology Management		
Power Management Software	N/A	1,700 (annually)
EPEAT Computer Purchases	9	8 (FY09)
Green Purchasing		
"No Gasoline Mower" Contracts (PARD only)	N/A	45 (annually)
Vehicle Trip Reduction		
I-Ride Transit Program	240 (through March 2009)	450 (CY2009)
City Cycle Bike Share Program	<1	2 (annually)
Solar Scooter Pilot Project	<1	N/A
Urban Heat Island Mitigation		
Large Shade Tree Program	2	16 (50 years)
Austin Community Trees Program	1	20 (50 years)
NeighborWoods Program	10	410 (50 years)
Total Avoided CO_2-eq. Tonnes through 2008	**188,453**	**N/A**

Notes:

[1] Avoided CO_2-eq. emissions are cumulative through December 2008, except where noted in the table.
[2] Avoided CO_2-eq. emissions are projected for various time periods as noted in the table. Because the time periods do not align, cumulative future avoided emissions are not calculated.

3.1 Carbon Accounting

Measuring the sum of greenhouse gases an entity contributes to the atmosphere—frequently referred to as a "carbon footprint" or a "greenhouse gas inventory"—is a critical first step for taking action to reduce an entity's climate impact. ACPP staff conducted two greenhouse gas inventories: one to account for the greenhouse gases emitted from the City's municipal operations and one to capture the emissions contributed by the community. Each of these inventories is discussed below.

Key Accomplishments: Carbon Accounting

- First city to report municipal greenhouse gas emissions to The Climate Registry, an international greenhouse gas registry
- Completed multi-sector greenhouse gas emissions inventory for Travis County
- Participated in development of international greenhouse gas emissions reporting

3.1.1 CITY OF AUSTIN MUNICIPAL GREENHOUSE GAS INVENTORY

The first greenhouse gas inventory captures all emission sources associated with the City's day-to-day operations in 2007. This inventory provides a baseline assessment of the City's carbon footprint at the time the Austin Climate Protection Plan resolution was passed. ACPP staff will update the inventory annually to quantitatively measure progress towards meeting the program's greenhouse gas reduction goals. The City's inventory will also be reported annually to The Climate Registry using a standardized reporting protocol and verification procedure that will enable local governments to compare their emissions.

The City's greenhouse gas emissions are categorized by direct and indirect emission sources. To prevent double counting, direct and indirect emission sources cannot be reported in the same category. Direct emissions sources are referred to as "scope 1 emissions," and indirect emissions are referred to as "scope 2 emissions." "Scope 3 emissions" typically do not have an established calculation methodology or are not under the operational control of the City and therefore are not required to be reported.

The following three tables show the City's emissions by scope. Table 3 displays scope 1 emission sources. Emissions from Austin Energy's power plants, Austin Water Utility's wastewater treatment system, and the City-owned FM 812 landfill are driven by customer demand and therefore cannot be directly reduced by City employees; although, operational changes can be made over the long-term. Scope 2 emissions result from electricity used by City departments and are shown in Table 4. Finally, some scope 3 emissions related to the City's municipal operations are captured in Table 5.

Table 3. City of Austin Direct (Scope 1) Greenhouse Gas Emissions by Source, CY2007

Greenhouse Gas Emission Source	CO_2-eq. Tonnes
Power Plants	6,103,632
FM 812 Landfill	233,567
City Vehicles & Off-road Equipment	45,534
Wastewater Treatment	16,584
Building Heating	18,600
Air Conditioning Refrigerants	606
Stationary Generators	493
Total Emissions	**6,419,009**

Table 4. City of Austin Indirect (Scope 2) Greenhouse Gas Emissions by Source, CY2007

Greenhouse Gas Emission Source	CO_2-eq. Tonnes
Austin Water Utility Process Electricity Use	112,883
City Buildings Electricity Use	92,579
Streetlights and Traffic Signals Electricity Use	18,156
Total	**223,618**

Table 5. City of Austin Indirect (Scope 3) Greenhouse Gas Emissions by Source, CY2007

Greenhouse Gas Emission Source	CO_2-eq. Tonnes
Waste Generated by City Buildings	3,608
Personal Vehicle Use for Business Purposes	626
Total	**4,234**

Figure 2 graphically displays the City's greenhouse gas emissions inventory, totaling approximately 168,000 tonnes of CO_2-eq. This figure focuses on emission sources for which City employees have some control in reducing emissions and therefore does not include the community demand driven services (i.e., scope 1 power plant, FM 812 landfill, or wastewater treatment emissions or scope 2 Austin Water Utility process electricity emissions). Appendix D describes the carbon footprint data in more detail.

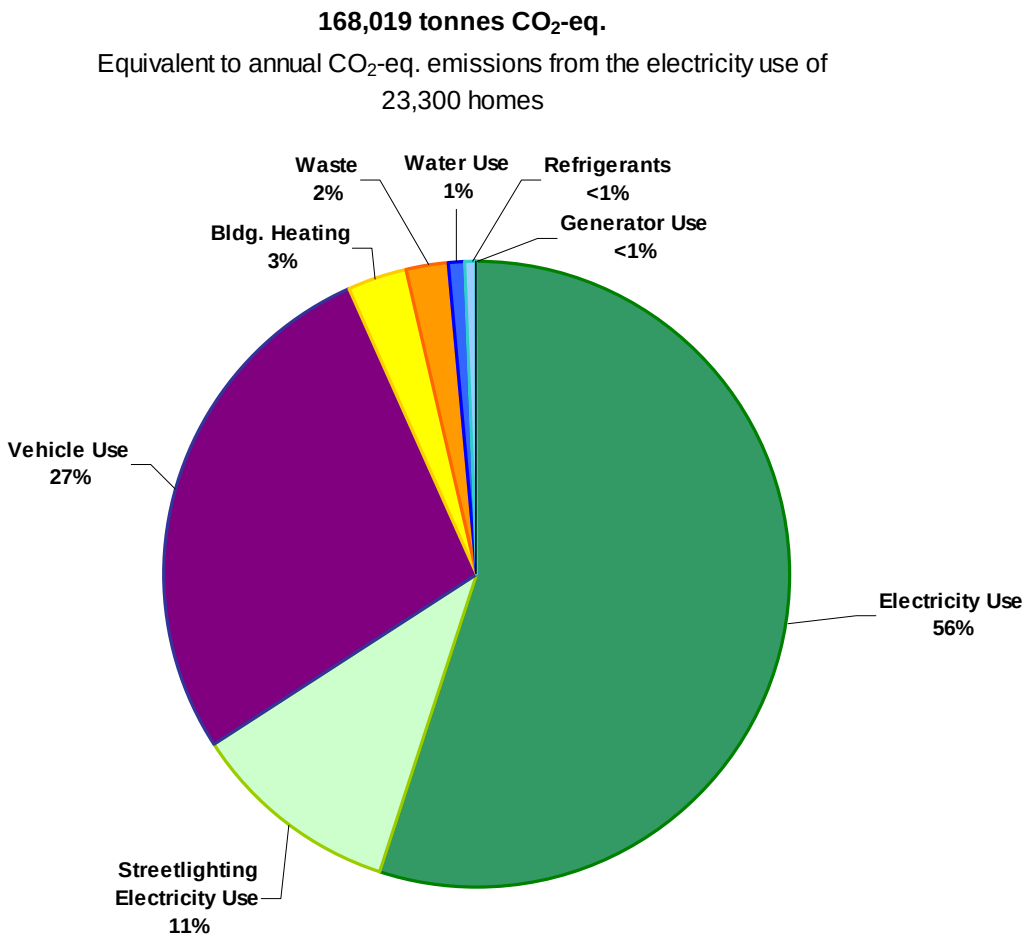


Figure 2. City of Austin Municipal Operations Carbon Footprint by Source, CY2007

3.1.2 COMMUNITY GREENHOUSE GAS INVENTORY

The second greenhouse gas inventory provides a comprehensive inventory for the community of Travis County. In line with the municipal operations inventory, the Travis County inventory uses a baseline of 2007 emissions. The Travis County inventory will be updated every three years to measure changes in greenhouse gas emissions for the community. The preliminary total 2007 greenhouse gas emissions for Travis County were just under 15 million tonnes of CO_2-eq. This number may increase as the data is further refined.

The main greenhouse gas emission sources for the community are energy use, transportation, and waste. Energy use includes emissions from electricity and natural gas consumption by residential, commercial, and industrial sectors. Transportation includes emissions from on- and off-road vehicles, passenger and freight trains, school and Capital Metro transit buses, and air travel in the region. Waste includes emissions from landfills and wastewater treatment plants. Figure 3 shows the breakdown of these major emissions in the community; Appendix D provides charts with additional detail for each of the emission source categories.

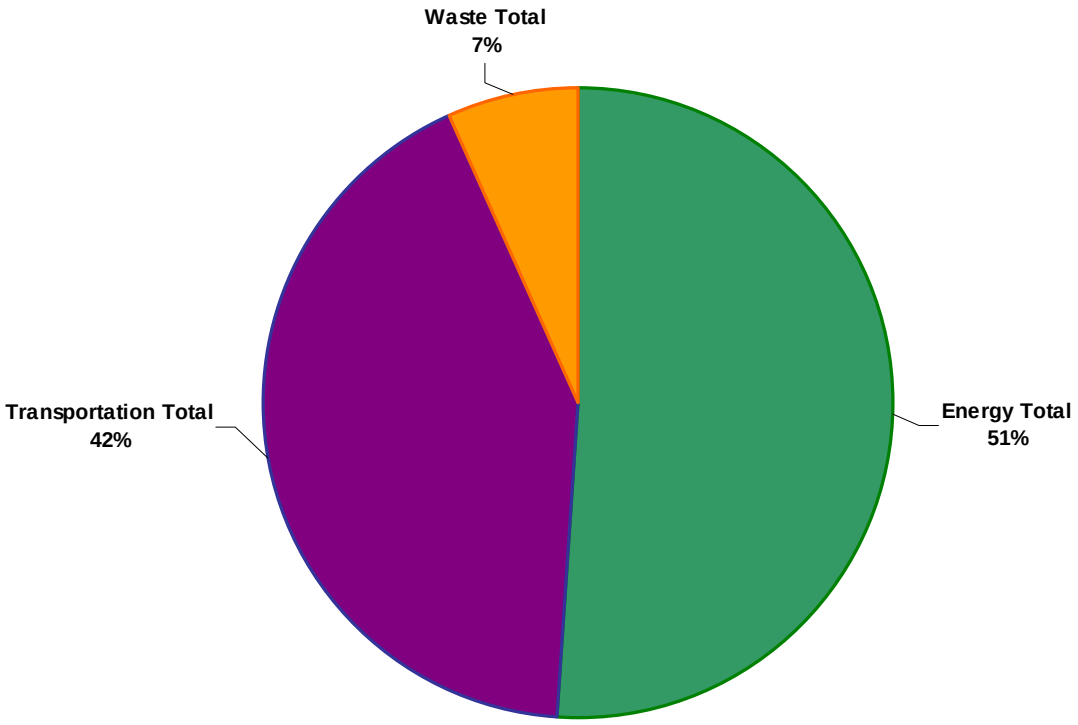


Figure 3. Travis County Carbon Footprint, CY2007

The average Travis County resident emitted 14 tonnes of CO_2 emissions from energy use (electricity, natural gas, and transportation fuel) in 2007. Comparatively, the average United States citizen emits 20 tonnes of energy-related CO_2 per year,[2] and the average Texas resident emits 27 tonnes of energy-related CO_2 per year.[3] Figure 4 displays the per capita carbon footprints of the average Travis County, U.S., and Texas resident, where the Travis County resident's per capita carbon footprint is 30 percent smaller than the U.S. citizen's carbon footprint and half of the Texas citizen's carbon footprint.

[2] Energy Information Administration, "Table H.1cco2 World Per Capita Carbon Dioxide Emissions from the Consumption and Flaring of Fossil Fuels, 1980-2006," *International Energy Annual 2006*. Online. Available: http://www.eia.doe.gov/pub/international/iealf/tableh1cco2.xls. Accessed: April 21, 2009.

[3] Compiled from the following sources:

Energy Information Administration, "Table 3. State Emissions by Year (Million Metric Tons of Carbon Dioxide)." Online. Available: http://www.eia.doe.gov/environment.html. Accessed: April 21, 2009.

U.S. Census Bureau, "Table 1: Annual Estimates of the Population for the United States and States, and for Puerto Rico: April 1, 2000 to July 1, 2005," (NST-EST2005-01). Online. Available: http://www.census.gov/popest/states/NST-ann-est2005.html. Accessed: April 21, 2009.

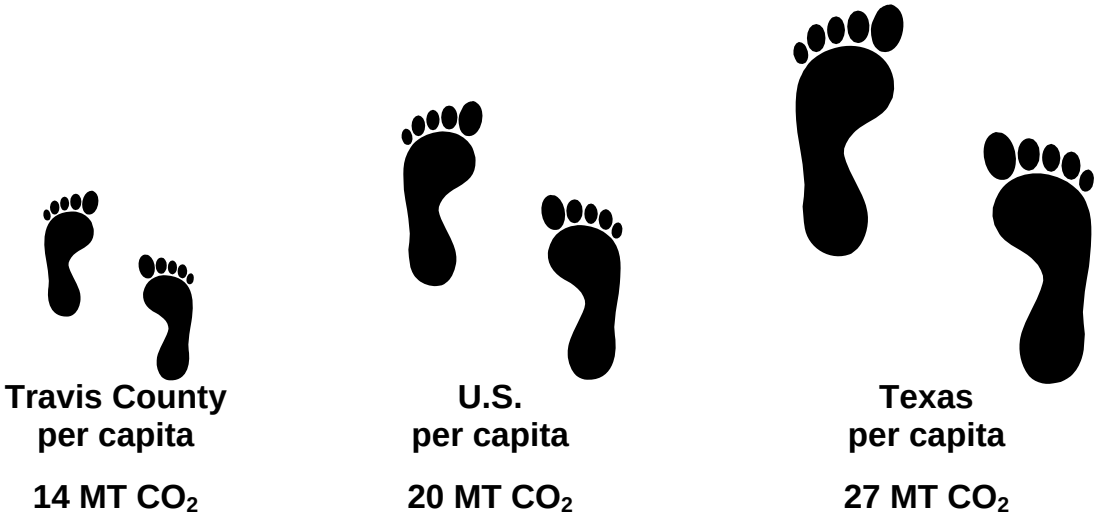


Figure 4. Comparison of Travis County, Texas, and U.S. Energy-related CO_2 Emissions per Capita

3.1.3 PROTOCOL DEVELOPMENT

ACPP staff has actively participated in developing the emissions reporting protocol that will be used by all local government members of The Climate Registry (TCR). Austin is leading the way in local government greenhouse gas reporting as the first local government to report its municipal operations inventory to TCR, an international greenhouse gas reporting body. This is especially valuable as TCR, or a system very much like it, is likely to become the foundation for a federally adopted national greenhouse gas reporting program. As the first local government to report its emissions to TCR, Austin Beta tested TCR's Local Government Operations Protocol and reporting software. In the coming months, the ACPP will collaborate with TCR and other local government stakeholders to develop a community-based reporting protocol to compliment the Local Government Operations Protocol.

3.2 Internal Collaboration

3.2.1 INTRA-DEPARTMENTAL COLLABORATION WITH AUSTIN ENERGY – ENERGY GENERATION

Electricity production from non-renewable resources is a carbon-intensive process. Therefore, the Austin Climate Protection Plan established a number of voluntary goals to help Austin Energy reduce its carbon footprint ahead of federal mandate. As a result, Austin Energy is well positioned to hedge against higher fuel prices and other regulatory costs in a carbon-constrained economy.

3.2.1.1 CO_2 Cap and Reduction Plan

The Austin Climate Protection Plan requires Austin Energy to establish a voluntary CO_2 cap and reduction plan. Due to the uncertainty of future federal mandates for greenhouse gas emission reductions, Austin Energy has proposed a draft cap and reduction plan for the interim years between 2008 and when a federal cap-and-trade or other regulatory program begins. Austin Energy will evaluate its voluntary cap and reduction plan for longer-term emission reduction targets once a cap-and-trade bill has been passed and there is more certainty surrounding the magnitude of mandated greenhouse gas emission reductions and associated costs.

Austin Energy's proposed CO_2 cap and reduction plan includes a hard cap on CO_2 emissions at the level emitted in 2007. The draft reduction plan calls for a roughly 100,000-tonne CO_2 reduction each year between 2008 and 2014. Per this step-down reduction plan (which has not been adopted by City Council), Austin Energy's CO_2 emissions should have been no greater than 6.2 million tonnes in 2008. Actual 2008 emissions were roughly 6.3 million tonnes of CO_2, exceeding the 2008 proposed cap emissions and 2007 actual emissions by approximately 100,000 tonnes.

The increase in CO_2 emissions is largely attributable to the electricity Austin Energy purchases from the grid rather than from its own generating units. Austin Energy's renewable and nuclear energy supply makes its generation portfolio cleaner than the primarily coal and gas-based Electric Reliability Council of Texas (ERCOT) generation mix. Despite the overall increase in emissions, Austin Energy reduced CO_2 output from its three highest-emitting plants: the Holly Power Plant, which permanently shut down in October 2007; the coal-fired Fayette Power Project; and the natural gas peaking units at Decker Creek Power Station. Between 2007 and 2008, Austin Energy collectively reduced over 600,000 tonnes of CO_2 from these plants.

Key Accomplishments: Austin Energy Collaboration

- Proposed CO_2 cap and reduction plan
- Increased renewable energy to 14 percent of generation mix, nearly half of 30 percent goal
- Added City facilities to GreenChoice®, bringing total City renewable energy use to 19 percent
- Reduced customer peak energy demand by 140 MW, roughly 20 percent of 700 MW goal
- Laid foundation for Energy Conservation Audit and Disclosure Ordinance
- Implemented first round of energy code changes
- Initiated "Big Push" Air Quality campaign to reduce ozone and greenhouse gas emissions
- Provided incentives for 253 electric vehicles and encouraged use of alternative fuels in the community

3.2.1.1.1 30 Percent of Energy from Renewable Resources

The Austin Climate Protection Plan set a goal for Austin Energy to receive 30 percent of its energy needs from renewable resources by 2020. The plan specifies that a portion of the renewable energy come from 100 MW of installed solar capacity. Renewable energy, such as wind, biomass, and solar, emits no climate-forcing greenhouse gas emissions, thereby reducing Austin Energy's carbon footprint.

Within the past year, the Austin City Council approved two major new renewable energy projects by Austin Energy. The first is a 100 MW biomass power plant that was approved on August 28, 2008. The plant will be located in East Texas near Nacogdoches and will be the largest wood waste-burning power plant in the nation. The biomass plant is expected to be online in 2012, providing base load power to Austin Energy's customers 24/7.

On March 5, 2009, the City Council approved a 30 MW solar photovoltaic (PV) facility located in Webberville, about 20 miles from downtown Austin. The project will be online by the end of 2010 and will provide energy sufficient to power about 5,000 homes each year.

In addition to utility-scale solar applications, Austin Energy's solar PV rebate program is a key mechanism for achieving the utility's 100 MW solar goal. Between October 2003 and March 2009, Austin Energy solar rebate program participants have installed roughly 3.6 MW of solar PV capacity. The

program did not begin tracking the amount of annual energy produced by installed solar panels until October 2006. Since then, Austin Energy solar rebate program participants have generated approximately 2.5 million kilowatt-hours (kWh) of solar energy. By producing power on-site to meet their electricity needs, solar rebate program participants avoided the release of nearly 2,800 tonnes of CO_2 emissions from Austin Energy's power plants between October 2006 and March 2009. Austin Energy is also evaluating commercial rooftop space that is amenable to solar PV installation to expand the amount of distributed solar generation throughout the community.

Wind power is Austin Energy's largest renewable energy source. Austin Energy began receiving a new 165 MW supply of wind energy from West Texas in January 2009, bringing its total wind capacity to 439 MW. The new wind power brings Austin Energy's renewable energy portfolio to roughly 13 percent. With the addition of the solar plant in 2010 and the biomass plant in 2012, renewable energy will comprise approximately 20 percent of the utility's total energy supply. Based on current projections for how much energy the utility will need to generate between now and 2020, Austin Energy needs to secure roughly 835 MW of renewable energy by 2020 to meet its 30 percent renewable energy goal.

3.2.1.1.2 GreenChoice® for City Facilities

The Austin Climate Protection Plan requires all City facilities to be powered by emissions-free renewable energy through Austin Energy's award-winning GreenChoice® program by 2012. All General Fund departments, representing about 45 percent of all City electric accounts and approximately 19 percent of the City's total electricity use—up from 14 percent in 2007—are subscribed to GreenChoice® as of April 2009. In 2008, City facilities powered by renewable energy avoided roughly 33,860 tonnes of CO_2-eq. and are expected to avoid about 47,160 tonnes of CO_2-eq. in 2009. The remaining City departments will be transitioned to GreenChoice® by 2012.

3.2.1.1.3 New Generation Carbon-neutral

To meet Austin Energy's CO_2 cap and reduction plan, the Austin Climate Protection Plan Resolution states that any new fossil-fueled generating units must be carbon-neutral through "lowest-emission technologies, carbon capture and sequestration if it is proven to be reliable, mitigation and other prudent measures." This goal has been interpreted by Austin Energy staff as being subservient to the establishment of a CO_2 cap and reduction plan, which will drive down emissions over time. Austin Energy has proposed to add 200 MW of new generation at one if its natural gas-fired power plants in 2015. The technology used would be highly efficient and relatively low-emitting compared to older natural gas and coal-fired technologies, but the new generation will not be carbon-neutral. However, the addition will reduce CO_2 emissions from the level they would have been in the absence of the new generation because it displaces energy that would have been produced by an older, higher emitting power plant owned by Austin Energy or energy purchased from grid. The average CO_2 emission rate applied to grid-purchased power is higher than the average CO_2 emission rate for Austin Energy's power plants. Therefore, the addition—although not carbon-neutral on its own—is desirable in helping the utility meet its long-term CO_2 emissions reduction goal.

3.2.2 INTRA-DEPARTMENTAL COLLABORATION WITH AUSTIN ENERGY – ENERGY CONSERVATION

Austin Energy has avoided the need to build a 600 MW coal power plant through energy efficiency and conservation over the past two decades. As part of the Austin Climate Protection Plan, the utility is seeking to reduce its customers' peak demand for energy by an additional 700 MW, the equivalent of a second average size coal power plant, by 2020. This translates to a roughly 15 percent reduction in energy production and use.

The Austin Climate Protection Plan sets out a number of ambitious goals to help the City and the Community reach this 700 MW demand reduction goal. Austin Energy's Energy Efficiency and Green Building programs are taking the lead in this area and are implementing a number of innovative programs in order to achieve this goal. These programs are categorized by their impact on existing versus new buildings.

3.2.2.1 Energy Conservation for Existing Buildings

The City seeks to reduce energy use in Austin's existing buildings through Austin Energy's demand side management programs, which drive down citizens' energy use during peak demand periods in the late afternoon and evening, and through a new ordinance requiring existing buildings to receive an energy audit within a certain timeframe or upon sale of the building.

3.2.2.1.1 Demand Side Management Programs for Existing Structures

To meet Austin Climate Protection Plan goals, Austin Energy began counting the avoided demand for energy achieved by its conservation programs in FY2007, which began in October 2006. From October 2006 through 2008, Austin Energy's residential and commercial energy conservation programs and Green Building program reduced peak demand by 140 MW, which accounts for 20 percent of the 700 MW goal.

These demand savings also have associated energy savings and emissions reductions. Altogether, the programs saved approximately 214,400,000 kWh and approximately 123,400 tonnes of CO_2 emissions in 2007 and 2008.[4]

3.2.2.1.2 Energy Efficiency Upgrades for Existing Buildings

An Energy Efficiency Upgrades Task Force met for ten months between January and October 2008. The City Council adopted their recommendations in November 2008, as part of the Energy Conservation Audit and Disclosure (ECAD) Ordinance (Ordinance No. 20081106-047). The ordinance goes into effect June 1, 2009 and requires mandatory energy audits at the time of sale for single-family homes and within two years of the ordinance's effective date for commercial and multi-family residential buildings. The requirements are slightly different for each category (single-family, multi-family, commercial), but the goal is to provide information on building energy use to prospective tenants and buyers and encourage energy efficiency improvements. In almost all cases, energy improvements are voluntary, with performance targets established for each category. Progress in meeting the voluntary targets will be assessed after two years. If all of the voluntary targets for improvements are achieved these measures could avoid roughly 365,300 tonnes of CO_2 emissions over 10 years.

Austin Energy's Energy Efficiency Services staff has begun developing training for local energy auditing and retrofitting firms, as well as materials to help educate real estate professionals on the requirements and goals of the energy efficiency upgrades program. For more information on this ordinance, please visit: http://www.austinenergy.com/About%20Us/Environmental%20Initiatives/ordinance/index.htm.

3.2.2.2 Energy Conservation for New Buildings

The City of Austin is pursuing energy building code upgrades for residential, multi-family, and commercial properties. The Austin Climate Protection Plan established a goal of making all new single-family homes "zero net energy capable" by 2015, and provided energy efficiency targets for other

[4] Not including savings from building code that affect new buildings. These savings are summarized in section 3.2.2.2.

buildings within Austin's city limits. The Plan also has requirements for enhancing Austin Energy's Green Building program.

3.2.2.2.1 Zero Net Energy Capable Homes

A zero net energy home is defined as a single-family home that is 65 percent more efficient than a home built in Austin in 2006. With the addition of on-site renewable energy generation, a zero net energy home will use only as much energy as it generates over the course of a year. This goal will be achieved through local amendments to the 2006, 2009, 2012, and 2015 versions of the International Energy Conservation Code. The first round of changes took effect in January 2008 and improved the overall efficiency of new homes by 11 percent compared to homes built to code in 2006. Based on the 2,538 homes built in 2008, these changes resulted in CO_2-eq. emissions savings of over 3,700 tonnes.

3.2.2.2.2 Energy Efficiency Requirements for Multi-Family and Commercial Buildings

By 2015, other new buildings in Austin will be 75 percent more energy-efficient by code than they would have been in 2006. In 2008, updates to multi-family and commercial building codes combined for roughly 12,200 tonnes of avoided CO_2-eq. emissions.

Austin Energy's Green Building staff is working with City building inspectors and plan reviewers to identify areas of non-compliance with the current building codes and to develop training to improve compliance.

3.2.2.3 Green Building Program Enhancements

Green Building staff has compiled a list of existing City requirements for buildings that must be rated through the Green Building program and will work on developing recommendations for making these rating requirements consistent. Future work in this area will include consideration of mechanisms to encourage higher ratings targets for building projects that are required to meet a minimum Green Building rating, an evaluation of Green Building technical services offerings, and development of a carbon-neutral certification for green buildings.

3.2.3 INTRA-DEPARTMENTAL COLLABORATION WITH AUSTIN ENERGY – AIR QUALITY PROGRAM

Many parallels exist between the Climate Protection and Air Quality programs. Both programs were created as voluntary undertakings to reduce emissions. The missions of both programs are designed to influence municipal operations as well as encourage behavior change throughout the community as they seek to respond to the threats of climate change and unhealthful levels of ground-level ozone. They also share a synergy in that actions that are taken to reduce one type of pollutant frequently reduce emissions of the other. Both programs' missions are accelerated due to the threat of impending regulation—carbon cap and trade for the ACPP and designation as violating the federal air quality standard for ozone for the Air Quality Program.

In March 2008, the U.S. Environmental Protection Agency (EPA) significantly strengthened the air quality standard for ground-level ozone, which is a harmful lung irritant. The EPA revised the 8-hour ozone standard downward from 0.08 parts per million (ppm) to 0.075 ppm. With this new ruling, ozone emissions must remain below 0.075 ppm to avoid designation by the EPA as a "nonattainment" area in violation of the Clean Air Act. A nonattainment area is a geographic area where air pollution levels persistently exceed federal air quality standards for ozone and other pollutants that threaten human and environmental health. Austin currently monitors at 0.077 ppm for ozone, just over the regulatory trigger.

If the Austin area can push its emissions downward during the current ozone season, from April through October 2009, the region may be able to avoid nonattainment designation and help meet Austin Climate Protection Plan goals because of the dual benefit between greenhouse gas and ozone emission reduction efforts. The Air Quality program is stepping up its efforts to reduce the City's ozone-forming emissions and reaching out to the community to do its part to slash emissions through a regional campaign called "The Big Push."

The majority of the pollutants that contribute to ozone formation in the Austin area are emitted by vehicles and off-road equipment. Transportation-related greenhouse gas emissions are also a significant component of the community's carbon footprint. Therefore, the ACPP and Air Quality encourage City employees and community members to reduce their impact by driving less and driving cleaner vehicles, among other measures.

3.2.4 INTRA-DEPARTMENTAL COLLABORATION WITH AUSTIN ENERGY – CENTRAL TEXAS CLEAN CITIES PROGRAM

The Central Texas Clean Cities program, with support from the ACPP, offers an electric vehicle incentive program for Austin Energy customers. Eligible electric vehicles include bicycles, scooters, mopeds, motorcycles, and neighborhood electric vehicles purchased from an approved local dealership. The program grants incentives of $100 to $500 per vehicle, depending on the vehicle type, distance traveled per battery charge, and speed. $38,500, or approximately 65 percent of the approved budget ($60,000), has been expended to date. From April 2007 through March 2009, program participants have received rebates to offset the purchase of 137 scooters, 82 bicycles, 20 motorcycles, 11 neighborhood electric vehicles, one electric sports car, and 2 electric vehicle conversions. Assuming the electric vehicles replaced a gasoline vehicle equivalent, the program avoided roughly 690 tonnes of CO_2-eq. between April 2007 and December 2008. Each participating electric vehicle will avoid about 3 tonnes of CO_2-eq. each year they are in use. Therefore, the current 253 electric vehicles have the potential to avoid approximately 775 tonnes of CO_2-eq. per year.

3.2.5 INTER-DEPARTMENTAL COLLABORATION

One of the ACPP's strengths is its multi-disciplinary nature that allows it to bridge City departments in an effort to bring climate-related City programs and services together to reduce the City's carbon footprint and expand its reach into the community. A number of the ACPP's programmatic partnerships are discussed below.

Key Accomplishments: Inter-Departmental Collaboration

- Developed a City Fuel Conservation Policy
- Increased alternative fuel vehicles in City vehicle fleet to 54 percent
- Supported Zero Waste Initiative and single-stream recycling
- Encouraged adoption of green IT practices
- Launched a City Green Purchasing Program
- Created Climate Action Team and departmental climate protection plans to make municipal operations carbon-neutral

3.2.5.1 Collaboration with Fleet Services

The Austin Climate Protection Plan established a goal for all City vehicles to be carbon-neutral by 2020. Carbon neutrality will require all City vehicles to be powered by biofuels or electricity from emissions-free renewable energy. To progress towards this goal, an inter-departmental team, including ACPP staff, developed a Fuel Conservation Policy (Administrative Bulletin No. 09-01) that was adopted by the City Manager on March 6, 2009. The policy outlines the City's requirements for minimizing fuel consumption and associated greenhouse gas and other air pollutant emissions. The policy sets guidelines for reducing the

environmental impact of (1) the in-use vehicle fleet, (2) future vehicle purchases, and (3) driver behavior. Given volatile fuel prices and budgetary constraints, it is noteworthy that many of the strategies identified by the policy reduce costs while simultaneously reducing greenhouse gas emissions.

To reduce in-use vehicle emissions, Fleet Services staff is identifying vehicles that are underutilized and can therefore potentially be eliminated or replaced with a vehicle from the City-wide vehicle rental pool. They are also helping departments determine which vehicles are oversized for their intended use and could be replaced with smaller, more fuel-efficient vehicles.

In addition to reducing the number of underutilized or oversized vehicles, Fleet Services has been increasing its portfolio of alternative fuels. Fifty-four percent of City vehicles now operate on alternative fuels, including E85, which is a blend of 85 percent ethanol and 15 percent gasoline; B20, which is a blend of 20 percent plant-based diesel and 80 percent petro-diesel; compressed natural gas (CNG), and propane. All City vehicles that were previously running on petro-diesel are now running on B20, and a growing number of flex-fuel vehicles (vehicles that can run on both gasoline and E85) are being added to the City's fleet. The City also has six refuse haulers, two Honda Civics, and one passenger van running on CNG, with more CNG vehicles to be added in the future. Table 6 shows the distribution of vehicles by fuel type as of March 2009. A map of the City's fueling stations with a list of fuels available at each site may be viewed online at: http://www.batchgeocode.com/map/?i=904f4f49704b78a8caac1611457ef0da.

Table 6. City Vehicles by Fuel Type

Vehicle Fuel Type	No. of Vehicles	% of Total
Gasoline	2,052	46%
B20	1,647	37%
E85	277	6%
Propane	254	6%
Hybrid-electric	160	4%
Electric	34	1%
CNG	9	<1%
Total	**4,424**	**100%**

While none of these fuels are completely carbon-neutral, they do emit fewer greenhouse gases than conventional gasoline and diesel. Using E85, B20, and CNG in the City's vehicle fleet in 2008 reduced the City's vehicle carbon footprint by approximately 4 percent (1,800 tonnes CO_2) versus if the City had used exclusively gasoline, diesel, and propane.[5] E85 and CNG use are currently limited by the availability of fueling sites. Fleet Services and Air Quality Program staff are investigating additional alternative fueling sites to increase use of both fuels, which will in turn lower greenhouse gas and ozone emissions.

To take advantage of the growing low-carbon fueling infrastructure, Fleet Services is focused on replacing eligible vehicles with alternative fuel, electric, and hybrid-electric vehicle options. The priority

[5] The City has been using propane for a number of years, so it is not considered a new alternative fuel brought on as a result of the ACPP.

will be to implement electric and plug-in hybrid-electric technology as it emerges, followed by the most efficient vehicle available for the intended use of the vehicle, as well as low-emitting alternative fuels.

The Fuel Conservation Policy requires all City of Austin employees to avoid unnecessary idling, eliminate unnecessary and unauthorized vehicle trips, and practice fuel-efficient driving. Fleet Services has begun providing monthly fuel consumption reports to the departments to make them aware of the amount of fuel they use. This will also enable the departments to incentivize their employees to reduce fuel use as a cost-saving and carbon reduction measure. The Watershed Protection and Development Review (WPDR) department has reduced its work groups' fuel usage by 3 percent to 10 percent by holding competitions among work groups to see which group can reduce fuel usage the most.

3.2.5.2 Collaboration with Solid Waste Services

The Solid Waste Services (SWS) department has adopted a goal to reduce the amount of waste Austinites send to the landfill by 90 percent by 2040. Implementing single-stream recycling is a key tool to help the City achieve this ambitious goal. Single-stream recycling allows customers to discard their recyclable materials in one bin, thereby spurring recycling participation.

Producing materials and consumer products is an energy- and greenhouse gas-intensive process. Recycling materials avoids the need to manufacture virgin materials, thereby avoiding unnecessary energy use and associated greenhouse gas emissions. Based on preliminary data, SWS estimates that the single-stream recycling program has increased residential recycling rates by 40 percent. Furthermore, the single-stream recycling bin is larger than the previous recycling bin, which allows SWS to pick up recycling every other week. This reduces the number of vehicle trips and decreases fuel use and wear and tear on our City's roads. Even without a City-owned or private Material Recovery Facility in the immediate Austin area, SWS and ACPP staff have estimated that single-stream recycling has the potential to reduce greenhouse gas emissions by approximately 114,000 tonnes over the first three years of the program.

3.2.5.3 Collaboration with Communications & Technology Management and Austin Energy Information Technology (IT)

Computers and monitors City-wide consume over 5.3 million kWh, the equivalent of 530 homes' electricity use, per year. Not all of this electricity is converted to usable energy to power the computer equipment. Some energy is given off as heat, which warms the surrounding office space and increases the need for air conditioning. This additional air conditioning demand increases the computing-related electricity use to over 6.6 million kWh per year, contributing roughly 3,700 tonnes of CO_2-eq. annually.

The ACPP is working with Austin Energy's IT division and the Communications and Technology Management (CTM) department to reduce the environmental impact of the City's IT operations through the adoption of a comprehensive Green IT Policy. The Climate Action Team, an inter-departmental team of City staff working to identify greenhouse gas reduction measures throughout the City, proposed that CTM pursue the following cost-saving emissions reduction strategies: (1) install power management software in all City computers and monitors; (2) adopt green IT purchasing standards; and (3) implement data center energy efficiency upgrades. Each of these strategies is described in more detail below.

3.2.5.3.1 Power Management Software

Power management software allows the central IT department to turn computers on and off remotely. Remote access enables the IT department to maintain control over system updates and patches, while encouraging employees to turn off their computers and monitors when not in use. CTM, in collaboration

with Austin Energy's IT division, is conducting a pilot study looking at the effectiveness of power management software. Based on a computer and monitor count from July 2008, the City could annually save over 3 million kWh; approximately 1,700 tonnes of CO_2; and roughly $270,000 in electricity costs by installing power management software in all of its non-critical computers and monitors.

3.2.5.3.2 Green IT Purchasing Standards

The Electronic Product Environmental Assessment Tool (EPEAT) is a tiered set of environmental purchasing guidelines for IT equipment. EPEAT-rated equipment meets ENERGY STAR 4.0 minimum energy efficiency requirements and significantly reduces the environmental impact of electronics through the materials used, handling of products at the end of their useful life, etc. Purchasing EPEAT-rated equipment reduces the environmental impact of the City's IT operations and has the potential to save thousands of dollars in operating cost savings over the life of the equipment.

Since October 2008, Austin Energy's IT department has been purchasing 100 percent EPEAT Gold-rated computers and monitors, which are the greenest EPEAT products available. Austin Energy has purchased 160 desktop computers and 60 laptops since October 2008, resulting in the avoidance of 9 tonnes of CO_2-eq. over the life of the computers. Austin Energy plans to purchase an additional 125 desktops and 60 laptops through the end of FY09, which would avoid an additional 8 tonnes of CO_2-eq. ACPP staff is encouraging CTM to adopt Austin Energy's purchase specifications for Gold-rated equipment to further reduce the City's IT environmental impact.

3.2.5.3.3 Data Center Energy Efficiency Upgrades

In 2008, the U.S. Department of Energy and others completed a Data Center Demonstration Study of the City's main data center and made several recommendations for energy efficiency upgrades. ACPP staff is encouraging CTM to undertake the recommended improvements, which would reduce annual energy consumption by approximately 393,000 kWh. This amount of avoided energy use could annually save the City roughly $32,000 in operating costs and avoid the release of 200 tonnes of CO_2-eq. per year.

3.2.6 COLLABORATION WITH PURCHASING OFFICE

The ACPP is working with the Purchasing Office and a consultant to develop a comprehensive Green Purchasing Policy to apply to all products and services the City purchases. In the Spring of 2009, the City Council will consider a Resolution directing the City Manager to develop and implement a comprehensive Green Purchasing Policy. This resolution grants the Purchasing Office the authority to develop bid specifications and other contract language to guide the City's purchases in an environmentally responsible manner. The Purchasing Office has already begun updating contract language to incorporate "Best Value" evaluation criteria that allow for the consideration of environmental impact and other non-fiscal measures in addition to cost.

The City has already claimed its first green purchasing success with the award of its first "No Gasoline Mowers Allowed" contract for landscaping services. By using commercially available propane mowers, which can be operated during ozone action days, this contract and future "No Gasoline" landscaping contracts will avoid the release of at least 40 pounds of CO_2-eq. each year per acre mowed.[6] If the nearly 2,500 acres of parkland, turf, and roadsides for which the Parks and Recreation Department (PARD) is responsible were mowed using propane mowers, PARD could reduce its annual greenhouse gas emissions by over 45 tonnes of CO_2-eq. Adding all of the mowed lands maintained by all City departments would

[6] Assumes each acre is mowed 12 times per year.

increase these avoided emissions exponentially. As a result, the City plans to make all future landscaping solicitations incorporate 'Best Value' standards and the 'Preference for Low-Emissions Equipment' evaluation criteria to promote improved air quality and reduced greenhouse gas emissions.

3.2.7 COLLABORATION WITH THE PARKS AND RECREATION DEPARTMENT

On January 10, 2008, the Austin City Council passed Resolution No 20080110-052 directing the City Manager to develop a plan to make the annual Trail of Lights Festival carbon-neutral. The Parks and Recreation Department (PARD), in conjunction with the ACPP, submitted a plan that identified six prioritized recommendations that, if funded and implemented, would result in significantly reduced greenhouse gas emissions for future Trail of Lights operations. These recommendations included strategies to reduce vehicle emissions from the transport of Trail of Lights patrons, special needs individuals, and Trail of Lights production staff and equipment. The report also recommended using renewable energy from Austin Energy's GreenChoice® program to zero out the event's electricity emissions. Finally, the report encouraged the Trail of Lights to increase its recycling efforts by maximizing the availability of recycling receptacles and promoting recycled material usage by vendors.

The 2008 Trail of Lights Festival implemented a number of the recommendations. Zilker Park, where the event is held, was placed on GreenChoice®. In addition, some of the holiday lights were switched from traditional incandescent lights to high efficiency light-emitting diode (LED) lights. Horses replaced the petroleum-fueled truck that previously pulled Santa's sleigh during the opening procession, and on-site parking prices were raised to $15 per vehicle to encourage attendees to take public transit or other non-motorized forms of travel. To reduce waste and associated greenhouse gas emissions, PARD used recycled paper and ink to produce its Trail of Lights guide. SWS also ramped up its recycling efforts through the recruitment of Keep Austin Beautiful volunteers to educate attendees on the proper way to dispose of recyclable material. Finally, cardboard generated by on-site vendors and other event staff was recycled for the first time. The ACPP hopes to work with PARD and its partners to implement additional greenhouse gas reduction measures at future Trail of Lights Festivals.

3.2.8 MULTI-DEPARTMENTAL COLLABORATION

3.2.8.1 Climate Action Team

Per the language of the Austin Climate Protection Plan, the Climate Action Team was intended to be comprised of inter-departmental City personnel, community stakeholders, and technical experts to develop a community-wide greenhouse gas emissions inventory and emission reduction targets and strategies. For ease of implementation, the Climate Action Team includes only City staff. A community group has recently been formed separately from the Climate Action Team and is discussed in more detail under the Austin Climate Community Group.

The Climate Action Team convened for the first time in January 2008. The team delivered a report to the City Manager's Office and City Council in October 2008, that identified measures the departments would like to see implemented to reduce greenhouse gas emissions from the City's operations and the larger Austin community. The Climate Action Team recommendations are included as Appendix C. A number of the recommendations, including the Green Fleet, Green IT, and Green Purchasing policies, have been adopted or are in the process of being implemented. Some of these recommendations were also reported for the Dollars and Sense initiative. The ACPP continues to work with the City Manager's Office and departments to identify policies and activities that will simultaneously reduce costs and emissions.

3.2.8.2 Departmental Climate Protection Plans

One component of the Austin Climate Protection Plan requires City staff to develop and implement departmental climate protection plans to reduce each department's carbon footprint and, in many cases, reduce operating costs as a co-benefit. These climate protection plans will help the City reach its goal of making its operations carbon-neutral by 2020.

The departmental climate protection plans seek to reduce greenhouse gas and other air pollutant emissions from the following sources: energy, water, and transportation fuel use; solid waste; and purchasing. The plans also include strategies to help the City respond to climate change through adaptation measures—such as planting native trees and other vegetation that store carbon dioxide, keeping it out of the atmosphere, and incorporating forward-looking climate models in our energy and water demand forecasts. Employee education will be a critical component to ensure the long-term success of the plans in engraining climate-conscious decision-making and behavior change within the departments.

The plans incorporate other City-wide sustainability initiatives, such as the Interdepartmental Sustainability Working Group, Administrative Bulletin No. 05-01 related to the *Designation of Energy Manager and Establishment of Energy Efficiency Policy*, Administrative Bulletin No. 09-01 related to fuel conservation, the Green Purchasing Policy being developed by the Purchasing Office, and departmental Ozone Action Day Plans managed by Austin Energy's Air Quality Program.

ACPP staff, in coordination with other City departments, Capital Metro, CLEAN AIR Force, and Commute Solutions, convened representatives from each City department on April 10, 2009 to kick-off the departmental plan effort. ACPP staff has met with 15 departments to help shape their climate protection plans and will be holding bi-monthly work sessions through May to help the departments finalize their plans. The plans are expected to be adopted this summer, and departments will report progress in meeting their goals via an online reporting system.

ACPP staff will be developing a recognition program in the coming months for departments, buildings, and employees that show measurable progress in helping the City meet its 2020 carbon-neutrality goal. This recognition program will be tied to greenhouse gas reduction commitments made in the departmental climate protection plans.

3.3 External Collaboration

The ACPP has partnered with a number of regional entities to quantify and reduce greenhouse gas emissions from the community. A sample of these collaborative efforts is discussed in this section.

Key Accomplishments: External Collaboration

- Created a support team to help organizations complete greenhouse gas inventories
- Worked with regional partners to incorporate greenhouse gas reduction strategies in local air quality programs
- Encouraged use of public transportation and non-driving alternatives

3.3.1 GREENHOUSE GAS INVENTORY COLLABORATION

ACPP staff has formed a greenhouse gas inventory support team to work with local and regional organizations that need help conducting a greenhouse gas inventory. Currently, the team has worked with six groups, including the Capital Area Council of Governments, St. Edwards University, the Lower Colorado River Authority, Travis County, the City of San Antonio, and the City of Denton. Assistance has ranged from giving presentations on

preparing a greenhouse gas inventory to detailed conference calls to answer questions and discuss the inventory process. The support team is investigating developing other tools, such as an inventory toolkit, to assist organizations with their greenhouse gas inventories.

3.3.2 COLLABORATION WITH THE CLEAN AIR FORCE

The ACPP has had preliminary conversations with the CLEAN AIR Force of Central Texas about broadening the organization's mission to include greenhouse gas emission reporting and promotion of greenhouse gas reduction measures throughout the five-county Austin metropolitan statistical area. The ACPP and the CLEAN AIR Force recognize the dual benefit of promoting ozone and greenhouse gas reduction measures to help the Austin area remain in attainment of the federal ozone air quality standard and to help regional entities prepare for future greenhouse gas regulations.

Clean Air Partners is a program of the CLEAN AIR Force that works with Central Texas businesses to develop air quality programs with an emphasis on reducing vehicle emissions. The program also facilitates annual reporting of emissions that contribute to ozone formation by area businesses and recognizes those businesses that show measurable progress in reducing their emissions. ACPP and Clean Air Partners staff are exploring ways to include greenhouse gas emissions reporting and recognition through Clean Air Partners existing methods.

3.3.3 COLLABORATION WITH CAPITAL METRO I-RIDE PROGRAM

The City of Austin continued to offer free Capital Metro bus passes to employees in FY2009. The ACPP has been promoting participation in Capital Metro's i-Ride program to encourage the use of alternative transportation, decrease congestion, reduce air pollution, and decrease greenhouse gas emissions. From October 2008 through March 2009, more than 3,500 bus passes were distributed. Over this period, riders avoided approximately 240 tonnes of greenhouse gas emissions by riding the bus rather than driving their personal vehicles. If current participation rates continue, the City employee i-Ride program can be expected to avoid roughly 450 tonnes of CO_2 emissions, $51,854 in bus ride costs, and $169,670 in fuel savings[7] annually.

3.3.4 COLLABORATION ON TRAILS MASTER PLAN

The Trails Master Plan workgroup was formed in response to City Council Resolution 20080424-064 requesting City staff to develop a coordinated effort between City departments to facilitate the creation of new trails for bicycle/pedestrian transportation and recreation. ACPP staff is participating in this effort. Travis County, the Capital Area Metropolitan Planning Organization (CAMPO), the Texas Department of Transportation (TxDOT), and Capital Metro are also participating to better coordinate regional actions. This project will assist in reducing greenhouse gas emissions by creating an interconnected non-motorized network of on-road routes and off-road trail corridors that may encourage non-vehicular travel.

3.4 Internal Education & Outreach

As part of a suite of education and outreach initiatives, ACPP staff has developed an interactive employee training seminar. The customizable seminar provides an overview of

Key Accomplishments: Internal Outreach

- Delivered climate protection training seminar to over 500 City employees
- Instructors received excellent reviews on seminar delivery and engagement

[7] Based on the Energy Information Administration's reported average price of $3.13 per gallon of regular unleaded gasoline sold in Texas in 2008.

climate change and its causes, describes the major components of the Austin Climate Protection Plan, discusses each department's carbon footprint, outlines how to calculate an individual's carbon footprint, and promotes taking action to reduce greenhouse gas emissions. The seminar is available as part of the City's training curriculum, and participating employees receive education credit towards their 16 required hours each year. To reach new City of Austin Employees, ACPP staff is working to include an abridged version of the seminar to be presented during New Employee Orientation.

Due to the large number of City employees, ACPP staff is identifying key employees in each department to be trained to deliver the seminar within their respective departments. The ACPP education coordinator will also present the seminar directly to departmental staff upon request. After department directors were notified of the climate protection training in early December 2008, requests for the seminar have increased exponentially. As of March 2009, all employees of the Municipal and Community Courts, 311 operators, and members of the Purchasing Offices' Sustainability Division and the Economic Growth and Redevelopment Services Office's Small Business Development Program have completed the training. Fleet Services and the Department of Aviation will receive training in May and June, respectively.

Participants complete a five-question performance survey at the conclusion of the training. The results have been overwhelmingly positive. The average score based on a scale of 1-5, with 5 being the highest, is 4.82. Participants have found the instructors to be "engaging and [they] made the material interesting."

3.5 External Education & Outreach

In addition to the internal education component, the ACPP recognizes it has an obligation to educate the community about the risks and opportunities associated with climate change. The ACPP is focused on positively engaging the community by informing diverse sectors about the ACPP program and educating individuals and organizations on actions they can take to reduce their carbon footprint. Ultimately, the ACPP hopes to target the climate impact and mitigation and education options available in the following key areas: transportation, land use planning, emerging technologies, waste management, natural areas, and multi-generational community education.

Key Accomplishments: Community Outreach

- Engaged a broad cross-section of the community through participation in over 60 events
- Developed a comprehensive and transparent assessment of the major greenhouse gas emission sources in the community
- Convened community stakeholders to begin the dialogue on how to reduce the community's carbon footprint
- Provided educational tools, including a Web site, energy meters, and an in-development carbon calculator, to the community
- Created climate and air quality curriculum for a local school district

The ACPP team has developed a comprehensive community greenhouse gas inventory to serve as a baseline against which future emission reduction efforts in the above areas can be measured. This inventory will help guide community decisions on how to best allocate resources to reduce the community's carbon footprint.

3.5.1 AUSTIN CLIMATE COMMUNITY GROUP

The Community Advisory Committee, to be expanded as the Austin Climate Community Group, first convened in November 2008 to kick-start the community engagement process. This group is composed of

a diverse cross-section of community leaders representing multiple sectors of the Austin community as listed in Table 7.

Table 7. Community Advisory Committee Members

Community Sector	Committee Member
Business	• Greater Austin Chamber of Commerce
Environmental	• Austin EcoNetwork
Education	• University of Texas at Austin
	• Austin Independent School District
Health	• Community Action Network
Industry	• Freescale Semiconductor
Non-profit Organization	• Meals on Wheels
Regional Planning	• Capital Area Council of Governments
Transportation	• Capital Metro

The engagement process is being expanded to include a broader cross-section of the Austin community. A stakeholder and public engagement event designed by the Austin Climate Community Group will be held in the fall. The purpose of this event will be to introduce the group to the community and to catalyze an ongoing community dialogue on climate change. Modern social media strategies that include web-based platforms are being evaluated to use as an engagement tool leading up to and after the event. The goal is to generate a forum for community dialogue on climate issues. Special effort is being taken to ensure that the dialogue will be spread through existing groups and efforts in the area. Each sector of the community will be able to tailor the discussions to their respective areas in order to best distill information through a common language.

To date, emphasis has been placed on multi-sector education and outreach through individual events. The Advisory Committee and ACPP staff is prioritizing the development of a comprehensive engagement strategy this year.

3.5.2 COMMUNITY INVOLVEMENT

The ACPP team has tabled and spoken at over 60 events through March 2009 and will continue to participate in events throughout the coming year.

An example of the depth and breadth of groups that the program has reached include: Austin citizens, the local business community, school groups and classrooms, energy efficiency professionals, library managers, TxDOT employees, and the Sunset Valley City Council. In addition, the ACPP has recently begun collaborating with the influential and far-reaching faith-based community to spread its climate protection message. For example, ACPP staff assisted the Metropolitan Community Church in developing a “carbon-free” lent schedule and presented energy efficiency tips to Saint John Episcopal Church in March 2009. Figure 5 shows an ACPP staff member at a recent Earth Day event at Whole Foods that gave the team a chance to reach out to more than 100 people.

Figure 5. ACPP Staff Member at Whole Foods Earth Day Event

3.5.3 OUTREACH PILOT INITIATIVES

The ACPP also piloted several outreach initiatives to educate and assist the community, most notably a compact fluorescent lamp (CFL) recycling program, education series throughout local libraries, and coordination with the Austin Independent School District (AISD) to incorporate climate change curriculum.

3.5.3.1 CFL Recycling Program

Replacing incandescent light bulbs with CFLs provides an easy way for individuals to reduce their climate impact. Austin Energy has a CFL rebate program to encourage the use of CFLs. However, CFLs contain a small amount of mercury that requires them to be disposed of in a safe manner. The ACPP recognized the need for a simple way for the community to dispose of their used CFLs. In conjunction with Austin Energy's CFL rebate program, the ACPP started recycling centers at several area light and fixture retail locations and is negotiating with local HEB grocery stores to participate in the recycling program.

Through April 2009, the program has recycled more than 800 CFLs from eight participating locations, keeping this waste stream out of area landfills. Assuming the CFLs replaced 60 watt (W) incandescent bulbs with 15 W CFLs that burned for an average of 3 hours per day, the minimum 800 bulbs recycled avoided 360,000 kWh and 200 tonnes of CO_2-eq. emissions over their lifetimes.

3.5.3.2 "Go Green" Library Series

ACPP staff participated in the "Go Green" series at area public libraries during spring 2009. The program also purchased 100 "Kill-A-Watt" devices that provide users an instant reading of electrical appliances'

energy use. The intent is to inform the public about their energy use and the associated climate impact so that they will be inspired to reduce their emissions through conscious efforts to reduce energy use. The Kill-A-Watt units have been donated to library branches for citizens to check out. The ACPP is also working with library branches to identify and procure resource materials related to climate change.

3.5.3.3 Climate Change Curriculum Development

The ACPP recognizes the power that area schools have in educating the next generation (and their parents) to protect the climate. In summer 2008, the ACPP worked with Austin Energy's Air Quality Program to develop science-based curriculum on air quality and climate change. The curriculum uses hands-on laboratory experiments to introduce pre-schoolers to air quality and climate change concepts. It also educates them on easy things they can do with their classmates and families to protect the environment.

Building upon this effort, staff initiated discussions with AISD in fall 2008 to incorporate climate change in the school district's science curriculum. The ACPP has also partnered with AISD on climate change presentations at several area schools in conjunction with Science Day activities.

3.5.4 TOOLS FOR COMMUNITY ENGAGEMENT

A critical component in achieving the aggressive goals set forth in the Austin Climate Protection Plan is engaging the Austin community. The ACPP is developing several tools to enhance its educational efforts, including a program website that was launched in July 2008 and an upcoming online carbon calculator that will allow households to calculate their carbon footprint.

3.5.4.1 Program Website

To facilitate widespread education, a program website (http://www.coolaustin.org) was created to distribute the program's message, provide resources to measure and reduce one's carbon footprint, update the public on the program's progress in achieving its goals, and receive feedback from the community. The site features a specific climate-related topic each month, along with an "action of the month" that calls citizens to action on a particular subject that will help them reduce their carbon footprint. This site also provides information to the public about various City programs and community events that can help them reduce their climate impact.

Figure 6 shows the number of visits to the website since its launch in July 2008. Traffic to the ACPP website is climbing back up after a dip last fall. To date, 406 individuals are part of the online Austin Climate Community. Members receive e-mail updates about the program and notification of upcoming events, including a monthly "carbon-neutral" happy hour where members of the City and community can interact and share ideas for taking climate action.

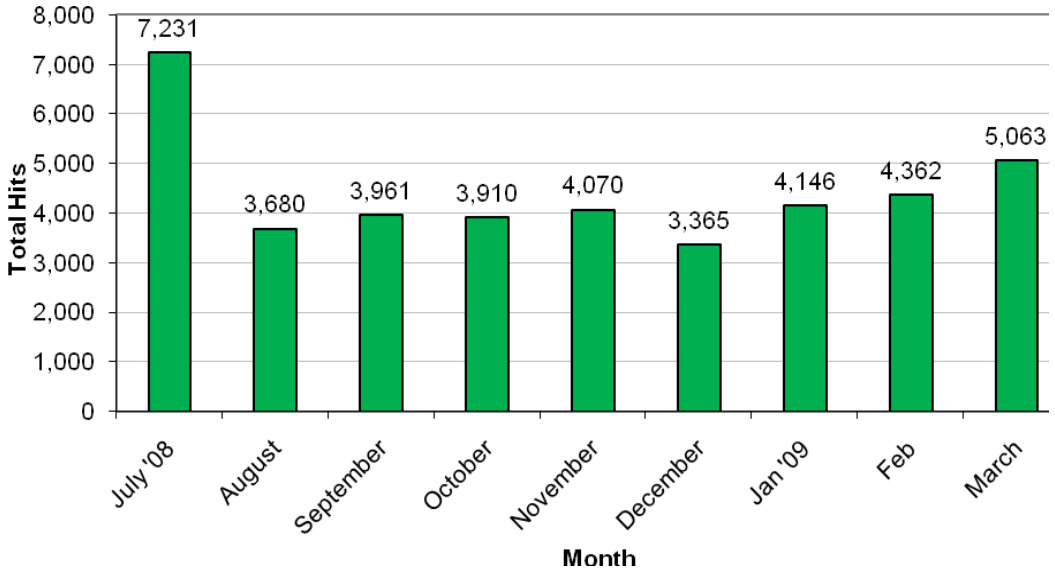


Figure 6. Monthly Visitor Traffic to ACPP website, July 2008 through March 2009

3.5.4.2 Carbon Calculator

The ACPP is contracting with an external vendor to create an online residential carbon footprint calculator for Austin residents. The calculator will be a powerful tool for educating citizens about how their daily activities can create greenhouse gas emissions and actions that Austin residents can take to reduce their carbon footprint. The Austin-specific calculator is expected to go live in fall 2009 and will offer a number of unique features not currently available in the majority of carbon calculators. First, the calculator will give City of Austin utility customers the ability to automatically upload utility account information. The calculator will also allow users to calculate emissions from water and wastewater usage along with emissions from energy use, solid waste generation, and other daily activities. The calculator will provide users with tips and links to local programs and incentives that will assist residents in reducing their carbon footprint, and a social networking component will allow residents to build online communities with common goals for reducing greenhouse gases.

3.6 Mitigation & Innovation

The ACPP has a broad scope to mitigate the impact of climate change through greenhouse gas reduction and to begin to help the Austin community prepare for the effects of a changed climate. The first mitigation objective is achieved through previously mentioned projects and programs, as well as through the ACPP's involvement with the Urban Heat Island Mitigation program and with some innovative new technology projects that are described in more detail below. Climate change preparedness is a new initiative for the ACPP and is getting under way through a project with the Centers for Disease Control and Prevention (CDC).

3.6.1 URBAN HEAT ISLAND MITIGATION PROGRAM

The Urban Heat Island Effect occurs on days of increased temperatures when the air in central Austin can be 2 to 9 degrees Fahrenheit warmer than surrounding areas due to the urban environment. Factors that contribute to this urban warming include: fewer trees, which provide shade and cooling through evaporation of water through their leaves; black-topped parking lots and roofs, which absorb the sun's heat during the day, reradiating it back into the atmosphere late into the night; and waste heat from vehicles and air conditioners which add heat to the air. The City is working to mitigate this effect through public education (see http://www.ci.austin.tx.us/urbanheatisland/); promotion of green roofs; and tree planting programs.

Key Accomplishments: Mitigation & Innovation

- Promoted urban forest protection and expansion to increase local carbon sinks
- Implemented a successful employee bike share program that serves as a model for other cities
- Partnered with a local event to showcase solar-powered transportation technology
- Published an article in the *Journal of Environmental Health* on climate change preparedness

The City recognizes that urban trees provide a range of ecosystem services, including urban heat island reduction, CO_2 and other air pollutant emission reductions, stormwater control, and economic benefits to the City. The ACPP, in partnership with PARD and WPDR is actively trying to expand the City's urban forest through measurement and preservation of our existing trees and planting of additional trees. The ACPP is helping to quantify the carbon sequestration benefit of trees and lending support to the land preservation argument so that the City grows in a responsible manner.

3.6.1.1 Urban Forest Inventory

In the summer of 2008, PARD completed a partial tree survey of 16 of the City's main arterial streets, 24 City parks, and select representative neighborhood zones. The survey identified nearly 150 different tree species throughout the City. Based on the tree survey results, PARD has estimated that the City's urban forest reduces annual energy use by approximately 10,000 Megawatt-hours (MWh) and has the potential to store approximately 106,000 tonnes of CO_2 per year. PARD is developing a master plan for how it will provide long-term care and maintenance to maximize the life of Austin's urban forest.

3.6.1.2 Large Shade Tree Program

Austin Energy began its large shade tree program in 2004. The trees are provided for Capital Improvement Projects and in parks and neighborhoods to promote tree shading of streets, trails, and sidewalks. The contract requires native or adapted trees that are locally grown in containers and average 5 inches in diameter. This provides a shade tree large enough to allow pedestrian traffic near the tree.

The large shade tree program is timely as there are a multitude of construction projects being undertaken that will require the planting of new trees. The availability of these trees will ensure that these projects will make an environmentally positive impact on the Austin community. Between March 2008 and March 2009, 637 new trees were planted through the program, keeping nearly 2 tonnes of CO_2 out of the atmosphere over the past year. Over the expected 50-year life of the trees, they have the potential to sequester roughly 70 tonnes of CO_2.

3.6.1.3 Austin Community Trees Program

Austin Community Trees (ACT) is a collaborative neighborhood tree planting program in which participating neighborhoods partner with the Neighborhood Planning and Zoning Department, PARD, WPDR, and Austin Energy. The goal of the program is to help qualifying neighborhoods increase their canopy cover to 40 percent or higher. ACT planted 235 trees between March 2008 and March 2009. Homeowners agree to plant the trees in a pre-determined location that maximizes shade cover and therefore reduces air conditioning need. Not counting the avoided greenhouse gas emissions from reduced air conditioning use, the 235 ACT trees sequestered nearly 1 tonne of CO_2 over the one-year period. Over the expected 50-year life of the trees, they have the potential to sequester roughly 20 tonnes of CO_2.

3.6.1.4 NeighborWoods Program

The NeighborWoods program helps reduce the Urban Heat Island Effect by planting trees along residential streets and sidewalks in the Austin Energy service area. Between March 2008 and March 2009, 3,543 trees were planted, absorbing approximately 10 tonnes of CO_2. Over their 50-year expected life, they have the potential to sequester roughly 410 tonnes of CO_2.

The program is administered by a local non-profit organization whose mission is to grow Austin's urban forest through tree planting, education, and community partnerships. Similar to ACT, homeowners must agree to plant the trees in a pre-determined location that maximizes shade cover and must commit to water and maintain the trees. Figure 7 displays the location of trees planted through the NeighborWoods program since the start of FY08. The clusters of yellow dots represent trees planted.

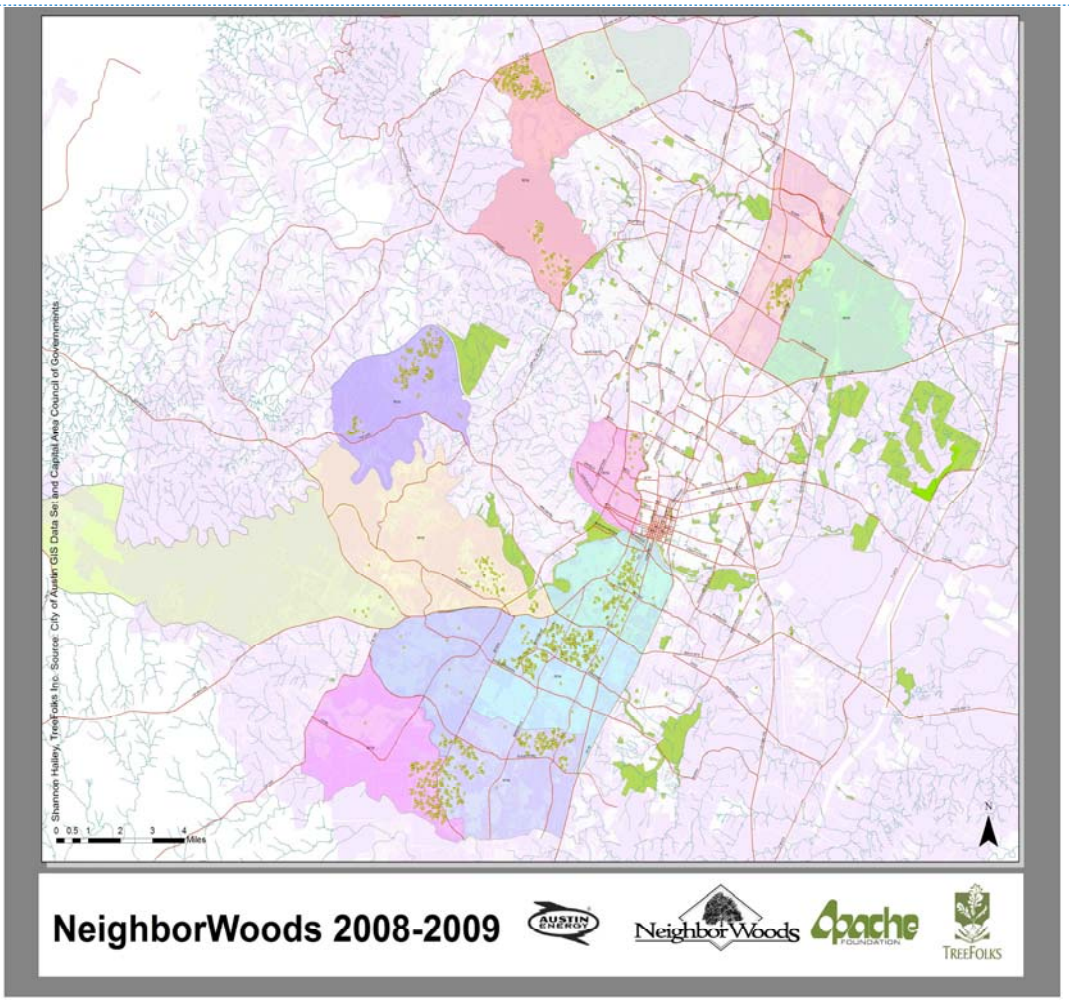


Figure 7. Location of NeighborWoods Tree Plantings, October 2008 through March 2009

3.6.2 LOCAL CARBON-REDUCING PROJECTS

3.6.2.1 Bike-share Program

One innovative program that was launched as a result of Climate Action Team discussions is the *City Cycle* bike share program. WPDR started its own intra-departmental bike-share program in 2007. The WPDR representative to the Climate Action Team shared his department's success with the program, leading ACPP staff to develop a City-wide program that would not only reduce greenhouse gas and other air pollutant emissions associated with vehicle travel, but also would reduce fuel costs, promote physical fitness, and encourage employees to reduce the number of vehicle trips they take both on and off the clock. The ACPP has purchased 15 automatic-shift bicycles that City employees can use during the work day to get to meetings or to grab lunch in a non-polluting way. The bikes are located at key central locations near downtown, and the ACPP hopes to expand the program to additional locations in the future.

The program began as a pilot project with three bikes located at ACPP's office building in July 2008. Through February 2009, users of the bikes participating in the pilot project made 110 trips, averaging 1.8

miles roundtrip. Based on the pilot results, *City Cycle* has the potential to annually avoid over 80 gallons of gasoline, saving roughly $260 in gasoline costs[8] and 1,600 pounds of CO_2-eq. each year.

Motivated by the success of the City employee bike share program, the ACPP has begun preliminary discussions with the Public Works Department's Bicycle and Pedestrian Program and community bicycle stakeholders to develop a community bike share program similar to Paris' Vélib program.

3.6.2.2 Solar Scooter Pilot Project

ACPP and Austin Energy's Solar staff launched a solar scooter pilot project in March 2009. The pilot project is geared toward reducing vehicle trips at local events by providing electric scooters and a solar charging station to charge the scooters. South by Southwest (SXSW) was the first event to use the scooters, a benefit of their 2008 donation to Austin Energy to retire renewable energy credits (RECs) on the organization's behalf. SXSW made this donation to help reduce the environmental impact of their corporate operations leading up to the 2008 SXSW events. The REC proceeds were designated for designing an innovative solar project. ACPP, Solar, and SXSW staff collaborated to develop the solar scooter project. The scooters were ridden 78 miles for four days during the event, avoiding roughly 90 pounds of CO_2-eq.

With the high volume usage of the scooters during the event, SXSW is eager to continue with the project next year, employing more scooters and more solar charging stations. In addition, the ACPP and Austin Energy's Solar Program are teaming with the University of Texas and the Denmark government to duplicate the project for a Denmark music festival, Roskilda, in July 2009.

The four scooters used for the pilot project have been leased for six months. For the remainder of the lease period, the scooters will be used by City employees as an emissions-free transportation alternative during the work day. A decision to lease or purchase additional scooters will be made based on their frequency of use and magnitude of greenhouse gas emissions avoided during the pilot project.

3.6.3 CLIMATE CHANGE PREPAREDNESS

The ACPP is making significant strides in lessening the impact of climate change for current and future Austinites. However, the nature of the greenhouse effect is such that impacts already have been and will continue to be felt for the foreseeable future. Therefore, it is paramount that the City also begins to plan for local adaptation to a changing climate. The ACPP has recently begun the conversation about how it will continue to provide its critical services in light of rising temperatures, more severe weather events, and dwindling water availability, among other climate-induced changes. The team is beginning to explore adaptation planning through a pilot project with the Centers for Disease Control and Prevention (CDC), the City's Hazard Mitigation Plan in the Office of Homeland Security and Emergency Management, and participation with ICLEI (Local Governments for Sustainability) in developing a climate preparedness program for local governments.

3.6.3.1 CDC Health Indicators Project

In collaboration with the CDC Working Group on Climate Change, the ACPP is piloting an approach to link public health and local climate change programs. This project was developed in conjunction with a fellow in the CDC-sponsored Environmental Public Health Leadership Institute. The ACPP-CDC team

[8] Based on the Energy Information Administration's reported average price of $3.13 per gallon of regular unleaded gasoline sold in Texas in 2008.

will use the combined data to track the progress of its climate mitigation strategies, set future priorities, and identify health and other co-benefits.[9]

3.6.3.2 ICLEI Climate Preparedness Steering Committee

ICLEI, an international non-profit dedicated to helping communities become more sustainable, has launched a national effort to develop climate adaptation strategies and tools for local governments. ACPP sits on the steering committee for this emerging effort to help local governments implement adaptation strategies into their day-to-day activities. The goal of the workgroup is to help ICLEI develop a full adaptation program that will provide tools and resources for local governments. Because of its early leadership role, Austin will be given early access to the tools and strategies that the group produces.

[9] For an overview of the project, please see: N. Prudent et al., "Addressing Climate Change and Local Public Health: The Austin Climate Protection Program and the CDC Working Group on Climate Change Collaboration." *Journal of Environmental Health*, vol. 71, no. 8 (2009), pp. 18-19.

4 Looking Forward

The ACPP represents a new front in the City's pursuit of sustainable operations and development, building on a world-class record and reaching to new heights in community engagement around thinking and action that meets the needs of today while ensuring that the needs of future generations will also be met. The future holds challenges in how the City will mitigate its climate impact and continue to provide services in light of changing climatic conditions, as well as opportunities for meeting those challenges. But one principle emerges, among all others, as an element of success. The ACPP must simultaneously deliver economic, environmental and societal benefits in every activity. This "triple bottom line" metric of success must be the touchstone for the program going forward and suggests a visionary standard for many, if not all, City of Austin endeavors.

While there is still much work to be done, the ACPP has begun to close the gap on many of its aggressive goals, from developing customized departmental climate protection plans to reducing the carbon footprint of the City's vehicle fleet. Looking forward, the program will continue to focus on mitigation efforts that not only reduce greenhouse gas emissions but also save the City and its citizen's money. As the federal government increases regulatory and legislative pressure on carbon emissions, the ACPP will continue to stay ahead of the curve by ensuring City operations and Austin Energy are prepared and receive credit for its years as a leader in carbon reduction.

The ACPP will remain the thread that weaves carbon mitigation into the culture and practice of City operations and the broader community. The ACPP provides an effective avenue for securing a continuous commitment to climate protection by striving to reduce greenhouse gas emissions in a cost-effective manner, despite the natural turbulence and changes inherent in municipal operations. The report concludes with a sample of some of the ACPP's priorities for the coming year.

4.1 Community Engagement

The program will continue to intensify its community engagement efforts while expanding the Community Advisory Committee to include as many sectors as possible. This multi-sector committee is working to build communication conduits and networks throughout the Austin community, from neighborhood groups to the business community. The program recognizes the critical importance of community support and engagement in meeting its goals and in creating long-term programmatic presence.

While ACPP has been actively engaged with the community by supporting and facilitating many outreach and education events, a formal and sustaining social media strategy has been an emerging focus. Despite programmatic successes in many areas, ACPP staff recognizes the need for increased focus and coordinated strategy in external engagement and communication. The ACPP remains committed to continued progress in achieving its municipal goals while moving forward with increasing focus on external communication and engagement.

The ACPP has begun working with the advisory group to identify local networks of supporters. A marketing and outreach campaign will be designed with these networks and the communities they represent in mind. The ACPP envisions the creation of a blog and other online communication forums to spark ongoing dialogue among community members. Next steps for the ACPP team include identifying social media platforms based on stakeholder feedback, developing an external social media strategy with input from volunteer networks, enhancing the ACPP website, and expanding and refining a training program for ACPP volunteers to help spread the climate protection message.

These efforts will culminate in a community climate change event hosted by the City in the fall. Using this event and other strategies discussed above, the ACPP intends to build a team of informed volunteers who have been trained to understand climate issues, manage and build online conversations, hold public meetings, and harness Web 2.0 tools and strategies to maintain low-overhead access and community involvement.

4.2 Community Recognition Program

ACPP staff has been asked to manage the reinstatement of the annual Environmental Awards to acknowledge community environmental leaders as selected by the City of Austin Environmental Board, Resource Management Commission, Solid Waste Advisory Commission, and Water and Wastewater Commission from 1983 through 2001. The award program, if developed, would expand upon the previous version of the Environmental Awards with the addition of a Climate Protection component. ACPP and Air Quality staffs are working with the aforementioned boards and commissions, as well as the Electric Utility Commission, to evaluate program options and develop a plan of action. Priority will be given to recognizing individuals, groups, and businesses that have proven instrumental in helping the community reach its climate and environmental protection goals.

4.3 Local Carbon Reduction Projects

The ACPP will continue its work in identifying and catalyzing local carbon reduction projects that also contribute to Austin's renewable energy portfolio. The carbon offset market and related carbon offset project development guidelines are constantly in flux, but tremendous opportunities exist in developing locally beneficial projects. The ACPP has established a Local Carbon Reduction Project Fund that will enable users of the online carbon calculator to make contributions to projects that reduce greenhouse gas emissions in the local Austin area to help mitigate their carbon footprint. Event organizers, businesses, and other organizations seeking to lessen their climate impact may also contribute to the fund. The types of projects that may be developed include tree planting projects, landfill gas capture for energy production, and installing solar energy on affordable housing projects, among other ideas proposed by the community. Again, the program will be guided by a focus on triple bottom-line solutions to emerging carbon opportunities and challenges.

4.4 Policy Monitoring and Response

The ACPP has made it a priority to stay at the front edge of carbon policy and regulatory development. Early involvement in the development of the local government and electricity utility greenhouse gas emissions reporting protocols has paid indirect dividends by preparing Austin Energy and the City for upcoming federal reporting requirements. The ACPP has developed an in-house expertise on emerging carbon management, reporting and offset protocols, and program development that should serve the City well in maintaining a forward-leaning posture while other entities scramble to respond to regulatory and legislative changes.

4.5 Flexibility to Evolve

While the ACPP has certainly felt the natural turbulence of building a programmatic platform on the ragged-edge of an emerging arena, the foundation has been laid for continued innovation and leadership in climate issues. While increasing the structure of internal operations has become a recent priority,

maintaining a degree of programmatic flexibility is important in responding to a broader carbon landscape that is evolving by the day.

As climate change accelerates in global effect and regional impact, it is increasingly pertinent that the City evaluate, plan, develop, and integrate climate preparedness across its operations. This allows the City and Austin Energy to reduce future risk and maximize its planning effectiveness. The ACPP is part of the ICLEI advisory committee on adaptation and is actively involved in tool development and climate response planning. While climate preparedness is a peripheral function of the ACPP program, it serves as an example of an arena that has recently emerged as a priority in federal direction and funding and an area in which the City of Austin is preemptively positioned to lead.

The program moves forward in 2009 with sustained commitment, vision and enthusiasm. Climate change represents a challenge, and the ACPP provides the, focus and adaptability to exemplify the adage of thinking globally and acting locally. The City holds strong to its mission to make Austin the most livable city in the nation, and its leadership through Austin Climate Protection Plan is an example of its impact well beyond its city limits.

Glossary

Adaptation: Adjustment in natural or human systems in response to actual or expected climatic conditions or their effects, which moderates harm or exploits beneficial opportunities.

Air Quality Program: A City-wide program with the mission of (1) developing and implementing programs that reduce the impact of the City's activities on regional air quality; (2) promoting air quality education and outreach to citizens and local businesses; and (3) working with regional partners to promote healthy air in Central Texas.

Alternative Fuel: Any fuel that is not 100 percent gasoline or diesel, including: Compressed Natural Gas (CNG), Liquid Natural Gas (LNG), Propane, Ethanol, Biodiesel, Hydrogen (fuel cell or internal combustion), and Electricity (grid-connected or battery, including hybrid technologies).

Austin Climate Protection Plan: A plan created by Resolution No. 20070215-023, which was passed by the Austin City Council in February 2007, to reduce greenhouse gas emissions from the City's operations and throughout the Austin community.

Austin Climate Protection Program: A City-wide program created to implement the Austin Climate Protection Plan with the mission of developing and promoting innovative programs and bold initiatives to reduce greenhouse gases and improve air quality in the Austin community, thereby establishing Austin as a national leader in climate protection.

Beta test: A test for a computer product prior to commercial release. Beta testing is the last stage of testing, and normally can involve sending the product to *beta test sites* outside the company for real-world exposure or offering the product for a free trial download over the Internet.

Biomass: Plant material, vegetation, or agricultural waste used as a fuel or energy source.

Carbon Dioxide-equivalents: A metric measure used to compare the emissions from various greenhouse gases based on their ability to cause an equivalent amount of atmospheric warming.

Carbon Sequestration: Process of removing atmospheric carbon dioxide and storing it through biological processes (trees, plants) or through underground storage.

Clean Air Act: Federal legislation relating to the reduction and control of air pollution.

Climate Change: A change in the climate, usually referred to when discussing global warming, that is observed over a period of decades and is based on the historical climate of an area.

Climate Registry, The: A nonprofit collaboration among North American states, provinces, territories and Native Sovereign Nations that sets consistent and transparent standards to calculate, verify, and publicly report greenhouse gas emissions into a single registry.

Climate Response: Used interchangeably with *adaptation*.

Compost: To digest organic material from waste to an end-product of fertilizer.

Demand Side Management: Actions that influence the quantity or patterns of use of energy consumed by end users, such as actions targeting reduction of peak demand during periods when energy-supply systems are constrained.

Departmental Climate Protection Plan: A department-level plan for identifying strategies for reducing greenhouse gas emissions and preparing for a locally changing climate.

Direct Emissions: An emission from a source owned and controlled by the entity reporting its emissions. Examples of direct emission sources include emissions from a power plant owned by the reporting entity and emissions from the tailpipe of a vehicle owned by the reporting entity.

Ecosystem: A natural unit consisting of all plants, animals, and micro-organisms in an area functioning together with all of the non-living physical factors of the environment.

Electric Reliability Council of Texas: An oversight body that operates the electric grid and manages the deregulated electricity market for 75 percent of Texas.

Electronic Product Environmental Assessment Tool: A tiered (bronze, silver, gold) set of environmental purchasing guidelines for IT equipment that evaluates the lifecycle environmental impact of the product.

Energy Efficiency Administrative Bulletin: Administrative Bulletin No. 05-01, originally dated February 1, 2005 and updated April 16, 2008, that establishes Austin Energy as the City's Energy Manager and requires each department to develop an Energy Efficiency Policy.

ENERGY STAR®: A joint program formed between the United States Environmental Protection Agency and the United States Department of Energy to identify and label highly energy-efficient building products.

Flex-fuel Vehicle: A vehicle that can run on both gasoline and E85.

Green Purchasing Policy: A City-wide policy being developed by the Purchasing Office to reduce the environmental impact of the products and services that the City purchases.

GreenChoice®: Austin Energy's retail renewable energy program; all City facilities are required to be subscribed to GreenChoice by 2012.

Greenhouse Gas: Any gas that absorbs outgoing radiation and warms the Earth's atmosphere. Greenhouse gases include, but are not limited to, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydroflourocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexaflouride (SF_6).

Hedge: To make an investment to counter an existing investment that simultaneously decreases the potential gain and loss in value of the original investment.

Hybrid-electric Vehicle: A vehicle that uses an electric motor and an internal combustion engine to power the vehicle.

Indirect Emissions: An emission from a source not owned or controlled by the entity reporting its emissions. An example of indirect emissions sources is the purchase of electricity.

Nonattainment: A violation of federally mandated air quality standards as established by the Clean Air Act.

Ozone Action Day: A day where weather patterns and emissions of pollutants that contribute to ground-level ozone combine to create conditions that predict ozone emissions will exceed the federal air quality standard that day. On these days, the City of Austin's Air Quality Program and regional air quality

entities alert City staff and community residents to take simple, voluntary actions to reduce their ozone-forming emissions.

Ozone Action Day Plans: Department-level plans for identifying strategies for employees to reduce ozone-forming emissions on Ozone Action Days.

Peak Demand: A period of strong consumer demand for energy. Austin Energy's typical peak demand period is between 4 p.m. and 8 p.m. on week days.

Photovoltaic: The field of technology and research related to the application of solar cells for energy by converting sun energy directly into electricity.

Plug-in Hybrid-electric Vehicle: A hybrid-electric vehicle with batteries that can be recharged by connecting a plug to an electric power source.

Recycle: To collect, separate, or process materials that would otherwise enter a landfill and return them to use in the form of new products.

Renewable Energy: Energy generated from naturally replenishing resources. Examples of renewable energy sources include: wind, solar, biomass, geothermal, hydro, tidal, etc.

Single-occupant Driving: The use of a personal vehicle by one person (driver).

Single Stream Recycling: Form of recycling that allows customers to place all types of recyclables into one disposal bin.

Telework: To conduct computer-based work remotely outside a central office environment, usually done at the employees home, but can also include telecommuting centers or other locations.

Urban Heat Island Effect: A measurable increase in ambient urban air temperatures resulting primarily from the replacement of vegetation with buildings, roads, and other heat-absorbing infrastructure.

Zero Net Energy Home: A single family home that is 65 percent more energy-efficient than a home built in Austin in 2006.

Acronyms

ACPP: Austin Climate Protection Program

AISD: Austin Independent School District

B20: Blend of 20 percent plant-based diesel and 80 percent petro-diesel

CAMPO: Capital Area Metropolitan Planning Organization

CDC: Centers for Disease Control and Prevention

CFL: Compact Fluorescent Lamp

CNG: Compressed Natural Gas

CO_2-eq.: Carbon Dioxide-equivalent

CTM: Communications and Technology Management

CY: Calendar Year (January 1 through December 31)

E85: Blend of 85 percent ethanol and 15 percent gasoline

EPA: United States Environmental Protection Agency

EPEAT: Electronic Product Environmental Assessment Tool

ERCOT: Electric Reliability Council of Texas

FY: Fiscal Year (October 1 through September 30)

GHG: Greenhouse Gas

HEB: Howard Edward Butts Grocery Store

ICLEI: Local Governments for Sustainability

IT: Information Technology

kWh: Kilowatt-hour

LED: Light-emitting Diode

MW: Megawatt

MWh: Megawatt-hour

OZAD: Ozone Action Day

PARD: Parks and Recreation Department

ppm: Parts per million

PV: Photovoltaic

REC: Renewable Energy Credit

SWS: Solid Waste Services

SXSW: South by Southwest

TCEQ: Texas Commission on Environmental Quality

TxDOT: Texas Department of Transportation

W: Watt

WARM: WAste Reduction Model

WPDR: Watershed Protection and Development Review

Appendix A. ACPP-related City of Austin Resolutions

Resolution No. 20070215-023, establishing the Austin Climate Protection Plan, was passed by the Austin City Council in February 2007. The resolution called for the creation of an ordinance requiring all existing buildings to receive an energy audit and identify cost-effective energy efficiency upgrades. The City Council passed Resolution Nos. 20071213-064 and 20081106-048 and Ordinance No. 20081106-047 related to this energy efficiency upgrade requirement. The text of these resolutions and ordinances are provided in this appendix.

Table 8 outlines other ACPP-related resolutions that are mentioned throughout the report. These and other City of Austin resolutions can be downloaded from the City's website at: http://www.cityofaustin.org/edims/search.cfm.

Table 8. ACPP-related Resolutions Mentioned in Report

Resolution Title	Resolution No.
Austin Climate Protection Plan	20070215-023
Zero Net Energy Capable Homes	20071018-036
Interdepartmental Sustainability Working Group	20071129-045
Austin Energy Public Participation Process	20071213-057
Energy Efficiency Retrofit Taskforce	20071213-064
Carbon-neutral Trail of Lights	20080110-052
Pecan Street Project	20080925-084
Downtown LED Christmas Lights	20081002-014
Energy Efficiency Upgrade	20081106-048
Green Events	20081218-075
Lights-off Campaign	20090402-033
Zero Waste	20090115-050

In addition to the above resolutions, the ACPP has partially motivated and contributed to the development of Administrative Bulletin 09-01, which established a fuel conservation policy for the City.

City of Austin Resolution No. 20070215-023

WHEREAS, the City of Austin's mission is to make Austin the most livable city in the country; and

WHEREAS, the Inter-Governmental Panel on Climate Change has found unequivocally that climate change constitutes a serious and growing threat and that human activities are the primary source of increased atmospheric concentrations of global warming gases; and

WHEREAS, global scientific consensus predicts as a consequence of global warming costly and dangerous disruptions, including increased risk of flooding, drought and coastal storms, accelerated spread of disease and invasive species, severe property damage, economic loss, and threat to human life; and

WHEREAS, the United States represents less than five percent of the world's population but contributes more than thirty percent of the world's greenhouse gas emissions; and

WHEREAS, climate change calls for national and international responses, but ultimately greenhouse gas emissions are generated locally; and

WHEREAS, the federal government has failed to enact meaningful responses to reverse the threat of global warming; and

WHEREAS, leading U.S. companies have called for immediate measures to halt and reverse the threat of global warming; and

WHEREAS, cities and states throughout the U.S. are adopting greenhouse gas emission reduction targets and strategies; and

WHEREAS, the City of Austin continues to take a leadership role in addressing worldwide environmental concerns; **NOW, THEREFORE,**

BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF AUSTIN:

That the City Council directs the City Manager to develop and implement, and to report to the City Council annually upon the implementation and progress of, such policies, procedures, timelines and targets as are necessary to make Austin the leading city in the nation in the effort to reduce and reverse the negative impacts of global warming, including but not limited to the following initiatives:

1) Make all City of Austin facilities, fleets and operations totally carbon neutral by 2020 through measures including:

a. powering all City facilities with renewable energy by 2012;

b. making the entire City fleet of vehicles carbon neutral by 2020 through the use of electric power, non-petroleum fuels, new technologies, mitigation, and other measures as necessary, prioritizing the earliest possible conversion to such fuels and technologies and establishing timelines and benchmarks for such conversions;

c. developing and implementing departmental climate protection plans, including policies, procedures, targets, benchmarks and reporting for maximum achievable reduction of greenhouse gas emissions and energy consumption in all City departments;

d. developing an employee climate protection education program, programs and incentives to help employees reduce their personal impact on climate change, and training to help employees engage in community outreach for climate protection.

2) Make Austin Energy the leading utility in the nation for greenhouse gas reductions through measures including:

a. achieving 700 MW of new savings through energy efficiency and conservation efforts by 2020;

b. meeting 30 percent of all energy needs through the use of renewable resources by 2020, including at least 100 MW of solar power;

c. establishing a CO_2 cap and developing and implementing a CO_2 reduction plan for existing utility emissions;

d. achieving carbon neutrality on any new generation units using carbon-based fuels through the utilization of lowest-emission technologies, carbon capture and sequestration if it is proven to be reliable, mitigation and other prudent measures.

3) Implement the most energy efficient building codes in the nation and aggressively pursue energy efficiency retrofits and upgrades to existing building stock through measures including:

a. implementing building codes requiring all new single-family homes to be zero net energy capable by 2015;

b. implementing building codes to increase energy efficiency in all other new private and public sector buildings by at least 75 percent by 2015;

c. implementing policies identifying opportunities for energy efficiency retrofits and upgrades, and requiring all cost-effective retrofits and upgrades for all properties at the point of sale;

d. developing enhanced technical assistance and marketing incentives and standards for the Green Building Program, developing policies requiring achievement of upper-tier ratings in cases where green building is mandated as a product of City programs or negotiations, and developing an optional "Carbon Neutral" certification to accompany green building ratings.

4) Establish an interdepartmental City Climate Action Team responsible for creating an inventory of greenhouse gases generated from all sources community-wide, working with stakeholders and technical advisors, establishing short-term and long-term targets for reducing these emissions, and reporting back to the City Council in no more than one year with a comprehensive plan for meeting those targets. Key areas for study and policy development include but are not limited to:

a. transportation;

b. land use planning;

c. emerging technologies;

d. waste management;

e. natural areas, landscapes and other carbon sinks;

f. multi-generational community education.

5) Develop and implement a program to assist all citizens, businesses, organizations and visitors in achieving carbon neutrality through the following measures:

a. develop an Austin-specific online "carbon footprint calculator;"

b. make available individually-tailored carbon footprint appraisals to organizations as necessary;

c. develop a menu of greenhouse gas reduction strategies for local implementation that citizens and organizations can fund through the purchase of "carbon offset" credits, thereby reducing their own carbon footprint;

d. develop a program for recognition of households, businesses and other organizations achieving carbon neutrality;

e. promote carbon neutrality among visitors by providing mechanisms and incentives for the purchase of offset credits by travelers, conventions, tradeshows and festivals.

6) Cooperate with other local and regional entities to provide technical and investigational assistance and to coordinate region-wide greenhouse gas reduction strategies.

7) Support all appropriate Federal and State policies and legislation that will lead to the reduction of greenhouse gas emissions.

ADOPTED: February 15, 2007 **ATTEST:** Shirley A. Gentry

City Clerk

City of Austin Resolution No. 20071213-064

WHEREAS, cost-effective energy efficiency retrofits and upgrades increase housing affordability, reduce business costs and are a critical strategy for energy resource planning; and

WHEREAS, by unanimous adoption of Resolution No. 20070215-023, the Austin Climate Protection Plan, the City Council directed the City Manager to develop and implement such policies, procedures, timelines and targets as are necessary to make Austin the leading city in the nation in the effort to reduce and reverse the negative impacts of global warming; and

WHEREAS, as part of such effort, Resolution No. 20070215-023 directed the City Manager to identify cost-effective energy efficiency retrofits and upgrades that can be made to existing Austin homes and buildings and to propose requirements for the implementation of such retrofits and upgrades; and

WHEREAS, the City Council desires to create a task force of stakeholder representatives to make recommendations to the City Manager and City Council regarding such requirements for retrofits and upgrades; **NOW, THEREFORE,**

BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF AUSTIN:

1) That the Energy Efficiency Retrofit Task Force is hereby created to consider, identify and recommend such City Code and administrative requirements as may be prudent and necessary to implement Resolution 20070215-023 as it pertains to energy efficiency retrofits and upgrades to existing homes and buildings; and,

2) That the task force shall produce recommendations reflecting the following guidelines and mandates:

a. Efficiency retrofit and upgrade protocols shall apply to singlefamily, multifamily and commercial properties - including both owner- and renter-occupied properties. Efficiency retrofit and upgrade protocols may apply to institutional and industrial properties.

b. For all classes of properties, protocols shall include requirements for basic efficiency outcomes and may include incentives or requirements for advanced efficiency outcomes. Outcomes may be achieved through either prescriptive or performance-based measures.

c. Protocols shall require energy-use disclosure – through provision of historic energy consumption data, an energy rating system or another suitable method as recommended by the task force.

d. Protocols shall apply to owner-occupied residential properties at the point of sale. Protocols may apply to residential rental properties, commercial properties, and institutional and industrial properties by a date certain. Point-of-sale protocols shall be designed to minimize any disruption to or delay of property closings and shall take into account the value of energy savings accruing to property buyers.

e. Efficiency requirements shall be cost-effective. The task force shall recommend methodologies for defining and quantifying cost-effectiveness.

f. The task force shall consider and make recommendations regarding mechanisms for financing, verifying and enforcing efficiency upgrade and retrofit requirements; and

3) That the task force shall consist of individuals representing each of the following groups or constituencies. One individual may represent more than one constituency. Task force members shall be appointed by the Mayor:

a. Board of Realtors

b. "Green" Realtors

c. Real Estate Inspectors

d. Real Estate Appraisers

e. Mortgage Brokers

f. Mortgage Lenders

g. "Green" Lenders

h. Title Companies

i. County Clerks

j. Austin Multiple Listing Service

k. Energy Efficiency Auditors

1. Home Performance Contractors

m. The Resource Management Commission

n. The Electric Utility Commission

o. Affordable Housing Advocates

p. Consumer Protection Advocates

q. Energy Efficiency Advocates

r. Environmental Justice Advocates

s. The Austin Apartment Association

t. The Austin Tenants' Council

u. Small Multifamily Property Owners

v. The Building Owners and Managers Association

w. The International Facility Management Association

x. The U.S. Green Building Council Central Texas-Balcones Chapter

y. The American Institute of Architects

z. And/or other representatives as may be useful and necessary; and

4) That the task force shall provide a report of its findings and recommendations to the City Manager and Council by June 1, 2008; and

5) That the City Manager shall seek additional public input through the City Boards and Commissions process and provide a draft ordinance to Council by August 1, 2008 implementing the recommendations of the task force, along with the City Manager's recommendations regarding the provisions of such ordinance; and

6) The Energy Efficiency Retrofit Task Force shall be dissolved upon completion of the tasks set forth in this resolution.

ADOPTED: December 13, 2007 **ATTEST:** Shirley A. Gentry

City Clerk

City of Austin Resolution No. 20081106-048

WHEREAS, the City Council has established a goal of achieving 700 megawatts of energy efficiency savings by 2020 under the Austin Climate Protection Plan; and

WHEREAS, the City of Austin has nationally leading energy codes in place to achieve high levels of efficiency in new construction; and

WHEREAS, in order to have a significant impact on community-wide energy use in the coming decades, it is imperative that efficiency savings be achieved in homes and buildings constructed prior to the implementation of current energy codes; and

WHEREAS, cost-effective energy efficiency improvements are proven to increase housing affordability and lower business operating costs; and

WHEREAS, Austin Energy has a proven track record of employing energy efficiency as a strategy to avoid the need for additional electric generating capacity, thereby helping to keep electric rates lower for all Austin Energy customers; and

WHEREAS, through Resolution No. 20071213-064, the Council directed the City Manager to establish the Energy Efficiency Retrofit Task Force to identify and recommend City Code revisions to implement cost effective energy efficiency retrofits and upgrades to Austin homes and buildings; and

WHEREAS, the task force has issued its final report, dated September 17, 2008, to the Council; and

WHEREAS, the Council has enacted an ordinance creating Chapter 6-7 of the City Code, intended to adopt and implement various recommendations contained in the final report; and

WHEREAS, the Council desires to additionally adopt various performance measures and participation targets contained in the final report and establish directives to the City Manager to implement such recommendations; **NOW, THEREFORE,**

BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF AUSTIN:

1. The term "cost-effective improvements" means those energy efficiency improvements recommended by an energy audit under Chapter 6-7, up to a total cost of one-percent of the sale price or appraised value - as deemed by the City Manager to be appropriate - for residential facilities, that will likely generate a return in electric bill savings equal to or greater than the cost of the improvements, after applicable rebates, within seven years.

2. A goal is established that cost-effective improvements shall be made, prior to or within one-year of closing, to at least the following percentages of residential facilities that are sold:

    a. between June 1, 2009 and June 1, 2010: 25%;

    b. between June 1, 2010 and June 1, 2011: 45%;

    c. between June 1, 2012 and June 1, 2013: 65%; and

    d. after June 1, 2013: 85%.

3. A goal is established that cost-effective improvements shall be made to 80% of all multifamily dwelling units within the following time frames:

a. by June 1, 2011, for facilities built before 1970;

b. by June 1, 2013, for facilities built during the period from 1970

through 1979;

c. by June 1, 2015, for facilities built during the period from 1980

through 2000; and

d. by June 1, 2017 for facilities built during the period from 2000

and thereafter.

4. To advance progress toward the goals for multifamily facilities, the City Manager is encouraged to evaluate and, if feasible, to offer the following increased rebates for energy efficiency improvements that have a pay-back period greater than three years and that are made within the following time-frames:

a. 150% of the standard rebate amount for multi-family facilities

from June 1, 2009 until June 1, 2011; and

b. 125% of the standard rebate amount for multi-family facilities

from June 1, 2011 until June 1, 2013.

5. The City Manager is directed to gather and rank energy usage data on a per-square-foot basis for all multifamily facilities, and to make such data publicly available on-line to the extent permitted by law.

6. The following goals are established with respect to commercial facilities within the City:

a. Before June 1, 2014:

i. 40% of interior commercial square footage will be contained within commercial facilities that (1) have a score of at least 50 under the Energy Star Portfolio Manager rating system (or an equivalent score under such other rating system as may be adopted for use by the City Manager), or (2) have achieved a 20% improvement in energy efficiency above an already existing score of 50; or

ii. 80% of interior commercial square footage will be contained within commercial facilities that (1) have improved their scores by at least one half of the difference between their initial score an a score of 50 under the Energy Star Portfolio Manager rating system (or an equivalent score under such other rating system as may be adopted for use by the City Manager), or (2) have achieved at least a 10% improvement in their initial energy efficiency score.

b. Before June 1, 2016, 80% of interior commercial square footage will be contained within commercial facilities that (1) have a score of at least 50 under the Energy Star Portfolio Manager rating system (or an equivalent score under such other rating system as may be adopted by the City Manager), or (2) have achieved a 20% improvement in energy efficiency above an already existing score of 50.

7. The goals established in this resolution apply to facilities that receive service from Austin Energy. In calculating compliance with any of these goals, the City Manager shall not include facilities excluded from the application of Chapter 6-7.

8. The City Manager is directed to develop and implement such policies and procedures as may be reasonably required to further the goals adopted by this resolution.

9. On or near June 1, 2011, the City Manager shall provide a report to the City Council containing the data gathered and analyses made while implementing this resolution and Chapter 6-7, including the level of achievement made toward the goals of this resolution and recommendations for improving the effectiveness of the programs established by this resolution and Chapter 6-7.

ADOPTED: November 6, 2008 **ATTEST:** Shirley A. Gentry
City Clerk

City of Austin Ordinance No. 20081106-047

AN ORDINANCE ADDING A NEW CHAPTER 6-7 TO THE CITY CODE RELATING TO ENERGY CONSERVATION AUDIT AND DISCLOSURE REQUIREMENTS; CREATING AN OFFENSE AND IMPOSING PENALTIES UP TO $2,000 FOR EACH OFFENSE.

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF AUSTIN:

PART 1. The City Code is amended to add a new Chapter 6-7 to read:

CHAPTER 6-7. ENERGY CONSERVATION.

ARTICLE 1. General Provisions.

§6-7-1 DEFINITIONS.

In this chapter:

(1) COMMERCIAL FACILITY means a non-residential, civic, or commercial building and does not include an industrial building.

(2) DIRECTOR means the director of the Austin Electric Utility.

(3) MULTI-FAMILY FACILITY means a site with five or more dwelling units.

(4) OWNER means a person with a freehold interest in a facility to which this chapter applies.

(5) RESIDENTIAL FACILITY means a site with four or fewer dwelling units.

(6) TIME OF SALE means the date of the recording of a deed transferring legal title to real property to implement the sale of property.

§ 6-7-2 APPLICABILITY.

This chapter applies to a commercial, residential, or multi-family facility if the facility receives electric service from the Austin Electric Utility, as determined by the director.

§ 6-7-3 ADMINISTRATIVE RULES.

(A) The director shall adopt administrative rules for the implementation of this chapter.

(B) The rules shall be available for inspection at the Austin Electric Utility administrative offices during normal business hours.

§6-7-4 VARIANCES.

(A) The director may grant a variance from a requirement of this chapter if the director determines that, due to special circumstances unique to the applicant's facility and not based on a condition caused by actions of the applicant, strict compliance with provisions of this chapter would cause undue hardship. A variance granted under this subsection (A) must be limited to the minimum change necessary to avoid the undue hardship.

(B) In addition to the variance authorized in subsection (A), the director may grant a variance from a requirement in this chapter if the director determines that:

(1) application for a permit to substantially remodel or demolish the facility will be filed not later than 6 months after the time of sale; and

(2) in the case of remodel, the owner and the purchaser of the facility have entered into a binding agreement, in a form approved by the director, whereby the purchaser of the facility agrees to complete an energy audit within a specified period of time after remodel of the facility is complete.

(C) In addition to the variance authorized in subsection (A), the director may grant a variance from the requirements of Article 4 Commercial Facilities if the director determines that the facility is a data center or other high energy use facility that cannot be adequately evaluated using currently available audit or rating tools.

(D) A person may seek a variance by filing an application with the director. The director may require the applicant to provide information the director determines is necessary to evaluate the variance request.

§ 6-7-5 ENERGY AUDIT REQUIREMENTS.

(A) A residential or multi-family energy audit required under this chapter must:

(1) be conducted by a person certified as a building performance analyst or equivalent by an agency approved by the director; and

(2) use the audit and disclosure forms prescribed by rule under Section 6-7-3.

(B) A residential energy audit required under this chapter will meet the energy audit requirement of this chapter for a period often years after the audit is initially performed.

Article 2. Residential Facilities.

§ 6-7-11 Residential Energy Audit.

The owner of a residential facility must, before the time of sale of the facility, have an energy audit of the facility completed.

§ 6-7-12 Disclosure Required.

The owner of a residential facility must provide a copy of the energy audit required under this article to the purchaser or prospective purchaser of the facility before the time of sale and the person performing the audit must provide a copy of the energy audit to the director not later than 30 days after the audit is complete.

§ 6-7-13 Exemptions.

(A) This article does not apply to transfers of title to real property in the following circumstances:

(1) through a foreclosure sale or trustee's sale, or a deed in lieu of foreclosure;

(2) through a pre-foreclosure sale where the seller has reached an agreement with the mortgage holder to sell the facility for an amount less than the amount owed on the mortgage;

(3) through the exercise of or under the threat of eminent domain;

(4) from one family member to another family member without consideration;

(5) under a court order or probate proceedings; or

(6) under a decree of legal separation or dissolution of marriage, or property settlement agreement incidental to such a decree.

(B) This article does not apply to a residential facility if one or more of the following apply:

(1) the facility was constructed no more than ten years before the time of sale;

(2) the facility participated in the Austin Energy Home Performance with Energy Star program, or an equivalent Austin Electric Utility program, not more than ten years before the time of sale and either:

(a) performed at least three of the efficiency measures, or

(b) received a rebate of an amount prescribed by rule, but not less than

five hundred dollars ($500.00);

(3) the facility participated in the Austin Energy Free Weatherization Program, or an equivalent Austin Electric Utility program, not more than ten years before the time of sale;

(4) the purchaser of the facility qualifies for and has signed an agreement, in a form acceptable to the director, agreeing to participate in the Austin Energy Free Weatherization Program or an equivalent Austin Electric Utility program, not later than six months after the time of sale; or

(5) the facility is manufactured housing built on a permanent chassis and designed to be used without a permanent foundation.

Article 3. Multi-Family Facilities.

§ 6-7-21 Multi-Family Energy Audit.

(A) The owner of a multi-family facility which is at least ten years old on June 1, 2009 must have an energy audit of the facility performed not later than June 1, 2011.

(B) The owner of a multi-family facility not required to perform an energy audit under subsection (A) must have an energy audit of the facility performed not later than 10 years after construction of the facility is complete.

§ 6-7-22 Disclosure Required.

The owner of a multi-family facility must post and provide to current and prospective tenants the results of the energy audit required under this article. The results must be on a form and in locations prescribed by rule. In addition, the owner must provide a copy of the required audit to the director not later than 30 days after the audit is complete.

§6-7-23 High Energy Use Facilities.

(A) Regardless of the date of construction of the facility, the director shall issue a notice to the owner of a multi-family facility that the director determines has an average per-square-foot energy usage exceeding 150% of the average for multi-family facilities within the Austin Electric Utility service area.

(B) An owner who receives a notice issued under subsection (A) shall implement energy efficiency improvements to the facility sufficient to bring the facility to within 110% of the average per-square-foot energy usage of multi-family facilities within the City not later than eighteen months after receipt of the notice.

(C) An owner required to implement improvements under this section may apply to the director for additional time to complete the improvements, but must file the application not later than 90 days after receipt of the notice. If the director determines that more than eighteen months is required to complete the improvements, the owner may execute a contract in a form acceptable to the director whereby the improvements required under this section will be completed within a period of time determined by the director.

§ 6-7-24 Exemptions.

This article does not apply to a multi-family facility if:

(1) the owner completed comprehensive duct remediation work on the facility though participation in an Austin Electric Utility rebate program no more than ten years before June 1, 2009;

(2) HVAC equipment was replaced through an Austin Electric Utility rebate program in all units of the facility no more than ten years before June 1, 2009;or

(3) HVAC equipment was replaced with equipment meeting the requirements for an Austin Electric Utility rebate program, though not participating in the program, in all units of the facility no more than ten years before June 1, 2009.

Article 4. Commercial Facilities.

§ 6-7-31 Commercial Facility Rating.

(A) The owner of a commercial facility that is at least ten years old on June 1, 2009 must calculate an energy use rating for the facility not later than June 1, 2011, using an audit or rating system approved by the director.

(B) The owner of a commercial facility not required to calculate an energy use rating for the facility under subsection (A) must calculate an energy use rating for the facility not later than 10 years after construction of the facility is complete, using an audit or rating system approved by the director.

§ 6-7-32 Disclosure Required.

The owner of a commercial facility must make a copy of the energy rating calculation required under this article available to a purchaser or prospective purchaser of the facility before the time of sale and must provide a copy to the director not later than 30 days after the audit is complete.

Article 5. Enforcement.

§ 6-4-41 Presumption of Violation.

The record owner of property is presumed to be responsible for a violation of this chapter that occurs at a facility on the property.

§ 6-4-42 Penalty.

(A) A person commits a criminal offense if the person performs an act prohibited by this chapter or fails to perform an act required by this chapter. Each instance of a violation of this chapter is a separate offense.

(B) Each offense under this chapter is subject to a fine.

(1) Proof of culpable mental state is not required for a fine of up to $500.

(2) If the person acts with criminal negligence, a fine of up to $2,000.00 may be assessed.

(C) Proof of a higher degree of culpability than criminal negligence constitutes proof of criminal negligence.

(D) Prosecution of an offense and enforcement of other remedies under this chapter are cumulative.

PART 2. This ordinance takes effect on June 1, 2009.

PASSED AND APPROVED

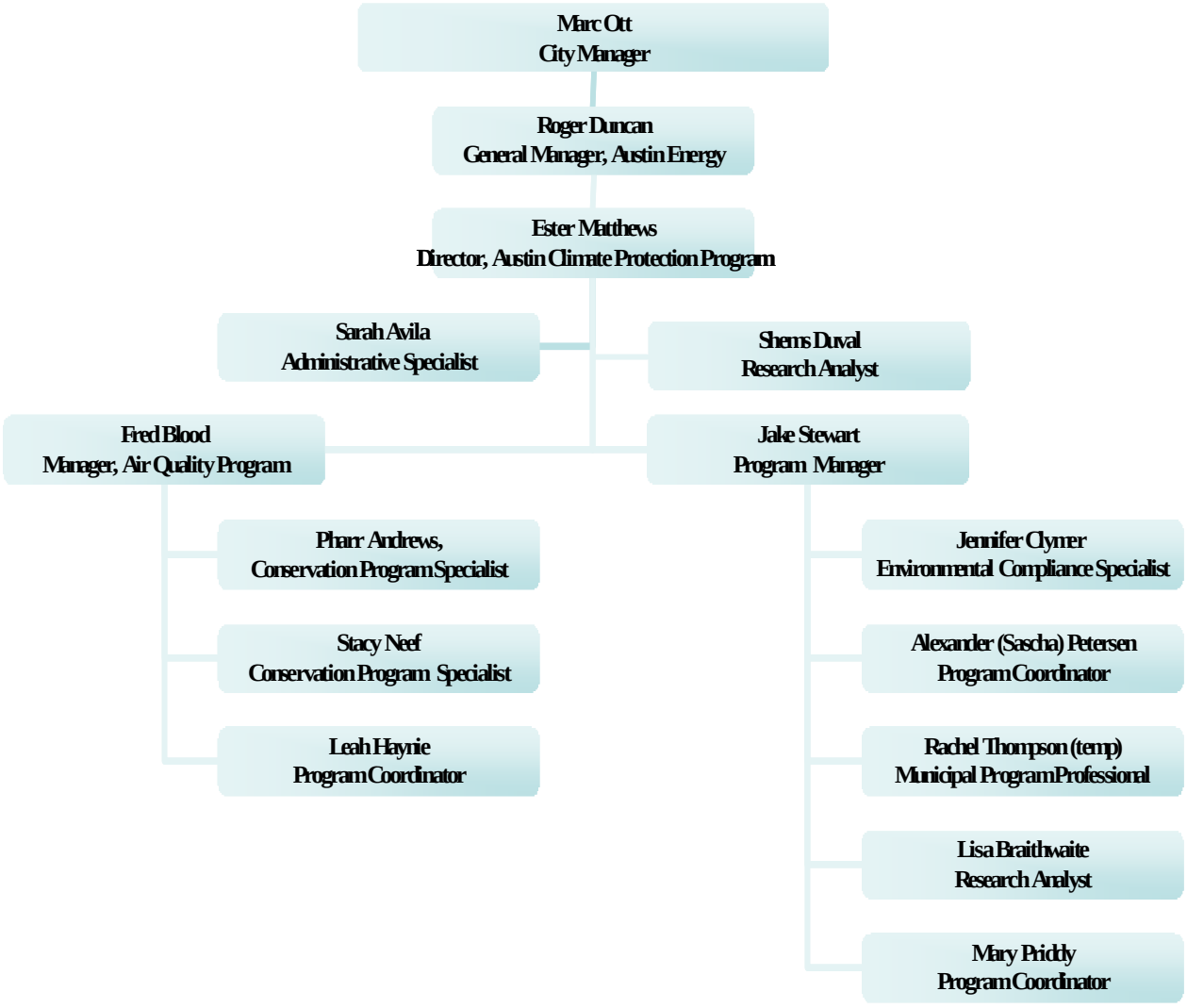
November 6, 2008

Will Wynn
Mayor

APPROVED: David Allan Smith
City Attorney

ATTEST: Shirley A. Gentry
City Clerk

Appendix B. ACPP Organizational Chart



Appendix C. Climate Action Team Recommendations, October 2008

The Climate Action Team was created on January 18, 2008 in response to a request from the City Manager's Office. This team consists of liaisons from the following City departments and offices: Economic Growth and Redevelopment Services Office, Fleet Services, Neighborhood Housing and Community Development, Neighborhood Planning and Zoning, Parks and Recreation, Public Works, Purchasing Office, Solid Waste Services, Watershed Protection and Development Review, Austin Water Utility, and Austin Energy.

This team had two goals: (1) provide the City Manager and City Council a list of suggested actions for ways to reduce the City's carbon footprint and (2) assist in collecting data for the City's greenhouse gas inventory. After over forty possible actions were analyzed and discussed, the list was reduced to ten recommended actions that will make the most impact in reducing greenhouse gas emissions. The Climate Action Team also encourages Council to enforce existing policies, such as the Energy Efficiency Administrative Bulletin and the City's Tree Preservation Ordinance, that promote climate protection activities.

The ten recommended actions are:

Continue to encourage high density, mixed use development served by a robust transit system and minimize new low density, single-use development. Several studies have shown that Americans living in compact urban neighborhoods with alternative commute options typically drive one-third fewer miles than those in auto-dependent suburbs. Reduced gas consumption results in much lower greenhouse gas emissions. For example, Portland invested in transit-oriented, mixed use development and saw an 8 percent reduction in annual CO_2 emissions.

Review and revise departmental capital improvement project (CIP) protocols to ensure that projected lifecycle energy, greenhouse gas, and other significant environmental aspects of proposed CIP projects are factored into the prioritized process. By including these in the rating system, the City would have a better understanding of the type of impact these projects would have on our carbon footprint.

Develop a green information technology (IT) policy to encourage energy conservation and emissions reduction in IT purchasing and operations. One energy-saving measure the City could take is installing power management software on all City computers. This project could save the city over $272,000 a year and eliminate approximately 1,700 tonnes of CO_2 emissions.

Develop a green fleet policy that will address: 1) downsizing the in-use vehicle fleet to take older, less efficient vehicles out of rotation; 2) ensuring new vehicle purchases prioritize electric, efficient, and alternatively-fueled vehicles to be carbon-neutral and free of dependency on fossil fuels by 2020; and 3) encouraging employees to drive in an efficient manner and to abide by the City's anti-idling policy. One way of improving driver behavior is to implement a comprehensive energy-efficient driver training course. The City of Edmonton, Canada implemented a similar program, which has led to a reduction of about 600 tonnes of CO_2 emissions per year and saved roughly $140,000 a year in reduced fuel costs.

Develop an environmentally preferable purchasing program for all City expenditures, including office supplies, construction materials and equipment, and bond packages. For example, Public Works allows a portion of the cement used for concrete in City projects to be replaced with fly ash, a combustion product of coal plants. Replacing one ton of cement with one ton of fly ash reduces emissions by 0.8 tonnes of CO_2. Requiring the use of concrete blended with fly ash would increase the amount of greenhouse gas savings.

Strengthen alternatives to single-occupant vehicle driving by increasing regional and in-town transit options, increasing rideshare options, creating high-occupancy vehicle lanes, raising parking rates in the Central Business District, decreasing four-wheel vehicle parking availability, increasing parking for low- to no-emitting two-wheeled vehicles (e.g., bikes and electric scooters), and supporting and expanding bicycle programs. On average, every vehicle mile not traveled eliminates 1 pound of CO_2 emissions.

Enhance preventative maintenance program for streetlights and traffic signals. This program would replace old faulty parts and equipment as well as install new sensors where vehicle and pedestrian sensors have failed. For instance, if the City were to more proactively manage vehicle and pedestrian traffic signals, it could save 4,400 tonnes of CO_2 emissions, roughly $1.6 million a year in citizen fuel costs, and improve operational efficiency of the traffic signals, thus reducing congestion, delays, and fuel consumption.

Replace plan and permit submittals with an electronic system for all applicable City departments. For example, implementing an electronic submittal system in the Watershed Protection and Development Review department has the potential of saving about 3,500 tonnes of CO_2 emissions per year. This would also translate into a monetary savings of roughly $430,000 a year in contractor fuel costs as well as additional costs savings in reduced printing and storage.

Implement a comprehensive travel reduction program City-wide. This would include allowing employees to telework, utilizing teleconferencing for long distance meetings, implementing a compressed work week, allowing for flex-time, and creating on-site lunch options. In 2003, the City of Austin piloted a telework program for about 600 employees. Results from that study demonstrated that there could be approximately 400 tonnes of CO_2 emissions avoided per year due to decreased vehicle trips (although additional energy-related savings could be realized if a compressed work week were implemented that allowed certain City buildings to shut down each week). On a yearly basis, it was also shown to save employees about $140,000 in fuel costs.

Develop carbon sequestration sinks at City properties and community-wide. Carbon sequestration draws CO_2 out of the atmosphere and removes it from atmospheric circulation. For example, restoring the Decker peninsula to native tallgrass prairie could result in annual CO_2 storage potential of roughly 1,800 tonnes per year once the prairie is a mature ecosystem.

Appendix D. Detailed Description of Greenhouse Gas Inventories

This appendix provides additional detail on the City municipal and Travis County community inventories. For the City municipal operations inventory, information is provided to further describe the types of greenhouse gases that are emitted, as well as more detailed information about what causes the emissions, as they were broken down in Tables 3 through 5 in Section 3.1.1. For the Travis County community inventory, a more detailed break-down of the community emission sources is provided, as well as a description of the data included in the inventory.

City of Austin Municipal Operations Inventory

In Table 3, which provided the City's direct (scope 1) greenhouse gas emissions, the following information was included:

- **Power Plants** - This includes carbon dioxide (CO_2), sulfur hexafluoride (SF_6), methane (CH_4), and nitrous oxide (N_2O) emissions from stack emissions, transmission loss, and coal pile emissions from Austin Energy power plants. These emissions are demand driven by Austin Energy customers, including City facilities and non-City facilities, and are not a reflection of the municipality's energy use exclusively.
- **FM 812 Landfill** - This includes CO_2 and CH_4 emissions produced from the FM812 landfill that is owned and operated by the City. The landfill is closed. When it accepted waste, it received waste from both City and non-City facilities, so it is not representative of only City facility-generated waste.
- **City vehicles & Off-road Equipment** - This includes CO_2, CH_4, and N_2O emissions from vehicles and mobile equipment owned and operated by the City.
- **Building Heating** - This includes CO_2, CH_4, and N_2O emissions from natural gas (and in one case, propane) used to heat City buildings.
- **Stationary Generators** - This includes CO_2, CH_4, and N_2O emissions that results from stationary generator fuel use, both diesel and natural gas fueled.
- **Air Conditioning Refrigerants** - This includes emissions of hexafluorocarbons (HFCs) and perfluorocarbons (PFCs) that result from the Kyoto Protocol-recognized refrigerants used in building air conditioning systems.
- **Wastewater Treatment** - This includes CH_4 and N_2O emissions from the wastewater treatment process.

In Table 4, which provided the City's indirect (scope 2) greenhouse gas emissions, the following information was included:

- **City Buildings Electricity Use** - The CO_2, CH_4, and N_2O emissions used to produce the electricity consumed by City departments. This includes metered electricity use only and therefore does not include the electricity needed to run Austin Energy's power plants (station service); these are included in the power plant emissions under scope 1 emissions.
- **AWU Process Electricity Use** - This includes CO_2, CH_4, and N_2O emissions from electricity used by Austin Water Utility water and wastewater treatment plants to pump and treat water that is delivered to customers. These emissions are not included in building electricity use because they are driven by customer demand.

- **Streetlight and Traffic Signals Electricity Use** - This includes CO_2, CH_4, and N_2O emissions from electricity used to power streetlights and traffic and pedestrian signals throughout the City.

In Table 5, which provided the City's indirect (scope 3) greenhouse gas emissions, the following information was included:

- **Waste Generated by City Buildings** - This includes CO_2, CH_4, and N_2O emissions from the full lifecycle—including production, transport, and disposal—of the waste generated by City buildings. Lifecycle emissions are estimated using EPA's WAste Reduction Model (WARM).
- **Personal Vehicle Use for Business Purposes** - This includes CO_2, CH_4, and N_2O emissions from employee vehicles that are used for official City business and for which mileage reimbursement is requested from the City.

Travis County Community Inventory

Figures 8 through 10 provide details about each of the major community emission sources identified in Figure 3. Energy use by community residents, businesses, and industry contributed roughly 7.6 million tonnes of CO_2-eq. in 2007. Transportation emissions from on- and off-road vehicles, passenger and freight trains, school and Capital Metro transit buses, and air travel in the region totaled about 6.3 million tonnes of CO_2-eq. Landfill and wastewater treatment contributed another 1.0 million tonnes of CO_2-eq. The landfill data is approximately 75 percent complete, so this figure is expected to increase with the addition of landfill gas data from the remaining two landfills in Travis County.

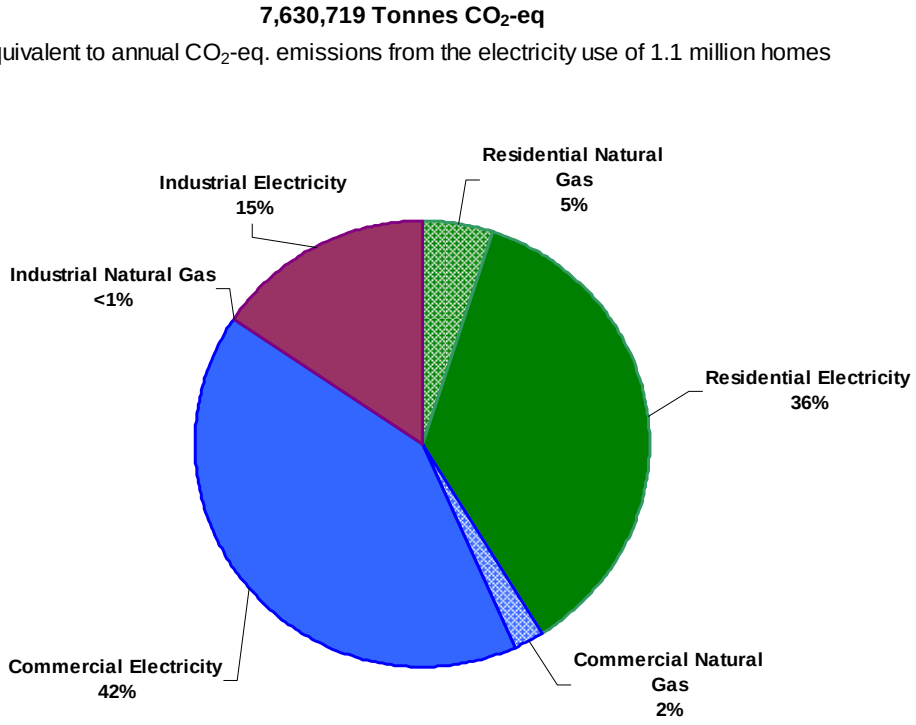


Figure 8. Electricity and Natural Gas Consumption Emissions in Travis County, CY2007

6,305,748 Tonnes CO_2-eq

Equivalent to annual CO_2 emissions from the electricity use of 875,000 homes

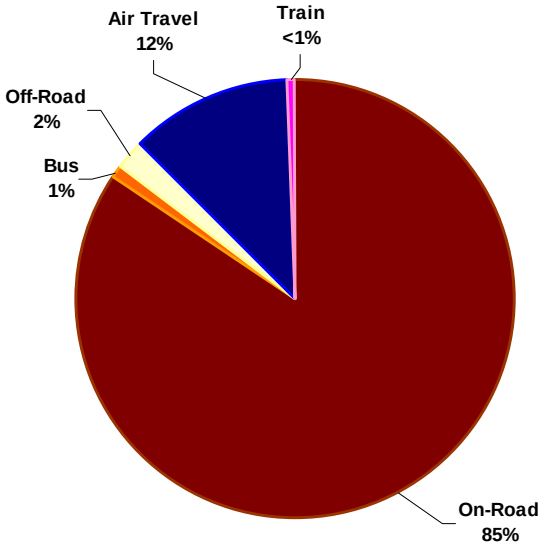


Figure 9. Transportation Emissions in Travis County, CY2007

1,017,091 Tonnes CO_2-eq

Equivalent to annual CO_2 emissions from the electricity use of 141,000 homes

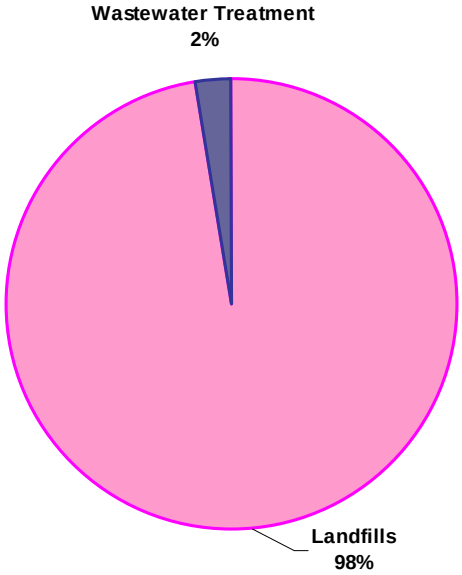


Figure 10. Wastewater and Landfill Emissions in Travis County, 2007

Preparing the Travis County community inventory required extensive data collection with assistance from several local businesses and research entities. Energy data was collected from Austin Energy, Bluebonnet Electric Cooperative, Pedernales Electric Cooperative, and Texas Gas Service. On-road vehicle emissions data were provided by the CAMPO using EPA Mobile 6 emissions model results. Off-road equipment emissions data were provided by the Texas Commission on Environmental Quality (TCEQ). Train emissions were estimated based on passenger and freight train mileage data provided by CAMPO. Air travel emissions were calculated using the total jet fuel used for refueling at Austin-Bergstrom International Airport, and bus emissions were estimated using fuel consumption data provided by Capitol Metro and Travis County school districts. Landfill emissions data was obtained from area landfill operators, and wastewater treatment plant emissions were estimated using data provided by TCEQ.