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NREL is a national laboratory of the U.S. Department of Energy, Office of Energy Efficiency & Renewable Energy, operated by the Alliance for Sustainable Energy, LLC.

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NREL's Clean Energy Policy Analyses (CEPA)

The CEPA suite of analyses and activities explore clean energy development and policy implementation at the regional, state, and local levels and disseminate that information to interested stakeholders. The activities gauge the effectiveness of and interactions between clean energy policies, provide insight into regional activities, investigate the interactions between local and state-level policies, and convene leading thought leaders to develop innovative regional, state, and local clean energy policies. The goal is to provide information to decision makers, researchers, and other stakeholders regarding the status of, barriers to, and possibilities for increased energy efficiency and renewable energy development at various levels of governance. For more information, see www.nrel.gov/cepa/. This report focuses primarily on energy use in electricity and buildings. For more information on transportation policies at the state and local level, please see the Alternative Fuels Data Center: www.afdc.energy.gov/afdc/.

Executive Summary

This report examines the successes and difficulties that two large cities, Denver, Colorado and Austin, Texas, have experienced in implementing their respective city-wide energy plans. The report considers factors that have assisted or hindered putting energy initiatives from each plan into practice, including political, financial, and logistical realities. The report also examines the goals and design of each plan, and how throughout the implementation process the cities have altered expectations or the direction of energy initiatives included in the plans. This report provides state and local government policy makers and analysts with a more nuanced understanding of the successes and challenges distinct cities encounter in putting a city-wide energy plan into practice, including the following general lessons from the experiences of Denver and Austin.

- **Importance of state support:** A city without a municipally owned utility (MOU) can develop and deploy local energy programs, but will likely have more options and a greater impact if supportive state-level energy policies are in place. An aggressive state renewable portfolio standard will aid a city in advancing its energy/climate goals by requiring the local utility to supply city residents and businesses with cleaner energy generated from renewable resources. City energy programs also benefit from the establishment of state demand-side management requirements for utilities.
- **Financial commitment from the city:** City funding for staff and energy initiatives provides organizational and administrative stability for the implementation of a city-wide energy plan. A city with an MOU is well positioned to implementing local energy efficiency programs and increase renewable energy supplied to citizens, but will likely need to make a substantial political and financial commitment in dedicating utility revenues for energy program and initiatives. Cities with an MOU can also justify the use of utility-generated revenues on energy efficiency and renewable energy programs and initiatives as a less expensive alternative to purchasing additional generation resource capacity.
- **Leveraging partnerships with non-city entities:** Cities, particularly cities that don't make a significant city budget allocation towards the implementation of energy programs (either from the general fund or utility revenues), should look to leveraging financial and other resources from non-city partners. These partners can include federal, state, and other surrounding local governments, as well as local utilities, businesses, universities, and community organizations. Partnerships can provide a substantial boost to the impact of and participation in outreach initiatives included in energy plans.
- **Reliance on federal program funding:** Initiatives and programs of energy plans that rely heavily on funding from federal programs will likely be more difficult to sustain and maintain as federal energy program commitments fluctuate. Cities should look to develop energy programs dependent on multiple funding sources, striving to develop energy initiatives that will be viable even if federal dollars are unavailable.
- **Benefits to targeting government operations:** Most cities have the opportunity to advance programs targeting energy use in government operations – including building

efficiency improvements, green fleets, and installing renewable energy on government facilities. Cities have greater control over government facilities energy use and can directly benefit from the cost savings from energy efficiency improvements. Cities can integrate energy efficiency improvements into capital improvement programs, utilizing existing funds available for building retrofits, equipment replacement, and maintenance.

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Introduction

Local governments in the United States typically have some measure of control over how energy is used within their jurisdictional borders, often with direct influence over land use matters, transportation planning and development, and building codes. Some local governments, such as cities with municipally owned utilities (MOUs), have substantial control over how energy is produced. Local governments also generally have a close relationship with the residents and businesses, providing an opportunity for direct engagement with constituents around energy issues. As a result, local governments are in a key position to develop and implement innovative energy policies that will play an important role in transforming how the United States uses and generates energy.

Over the last decade, many city governments have taken action on energy policy issues beyond transportation, land use, and building codes, developing and implementing initiatives and programs intended to promote energy efficiency improvements and renewable energy projects at city facilities and across the community. City leaders elect to advance these local energy programs to achieve cost savings, improve local air quality and quality of life, boost economic development, and establish the city as an environmental leader.

An increasing number of cities are embracing the concept of energy planning, where a city develops a plan to organize, prioritize, and track energy policy initiatives and programs (Masters & Randolph, 2008). In recent years, most cities with significant energy policy programs have incorporated energy initiatives into climate-oriented energy plans, known as climate action plans or climate protection plans. These climate-oriented energy plans provide an accounting of initiatives and policies that a city anticipates will reduce greenhouse gas (GHG) emissions. Although these plans target GHG emissions reductions as the primary goal, they also function as local energy plans, incorporating and defining strategies that promote efficient use of energy and development of renewable energy projects.

This report examines climate-oriented energy plans adopted by two large cities: Denver, Colorado and Austin, Texas. The report looks at the following questions:

- How are the plans structured to address the political, fiscal, and logistical realities of the city?
- What sort of success has each city had in implementing their energy initiatives of their plans?
- What have been the obstacles to implementing these energy initiatives?
- How have the cities had to alter the design and expectations for the plans?
- What role do community, business, utility, and other government partners play in implementing the energy initiatives?
- What financial resources were utilized in funding energy initiatives under the plans?
- What results have been tracked?

This report will not directly compare and contrast the structure and implementation of the energy plans of Denver and Austin. Instead, the report will provide a separate case study of the implementation process and status of each energy plan, examining how each city has structured, adopted, and adapted energy initiatives outlined in the plan. Through these case studies, this report hopes to build a more nuanced understanding of the successes and challenges distinct cities encounter in putting a comprehensive citywide energy plan into practice.

Background on Local Energy Plans

Historical Context

In the late 1970s and early 1980s, a dramatic spike in energy costs prompted a number of local governments to make local energy conservation a priority and pursue policies that to promote energy efficiency and renewable energy in their communities (Randolph, 1981). Despite progress made by a number of cities during this period, energy policy fell from the list of priorities of most local governments as energy prices collapsed by the mid-1980s (Masters & Randolph, 2008).

Local governments, particularly cities, began to reexamine a role for local-driven energy policy in the 1990s, motivated largely by concerns over energy costs, energy security, and urban sustainability. City leaders began to look beyond land use and transportation planning and building codes, expanding local energy programs to include initiatives that promoted efficient energy use and installation of renewable energy systems at city-owned facilities and local residences and businesses.

As concerns over climate change increased through the late 1990s and 2000s, more city governments began to address energy use in their communities. Organizations and city networks were formed that encouraged cities to make commitments and develop strategies for reducing GHG emissions.¹ City energy programs and initiatives began to be incorporated into climate-oriented energy plans, often referred to as climate action plans or climate protection plans, which were developed and adopted by cities to establish targets and strategies for reducing GHG emissions. These climate-oriented energy plans are used by cities to plan, organize, prioritize, and track energy programs and initiatives, providing a general outline of a city's comprehensive energy strategy (Wheeler, 2008).

Characteristics of Local Energy Plans

Energy plans are typically the central product of an energy planning process employed by local governments seeking a comprehensive strategy for addressing local energy issues. This energy planning process is well defined in a number of documents, but the basic step-by-step framework is shown in Figure 1 (DOE, Community Greening: How to Develop a Strategic Energy Plan, 2009).

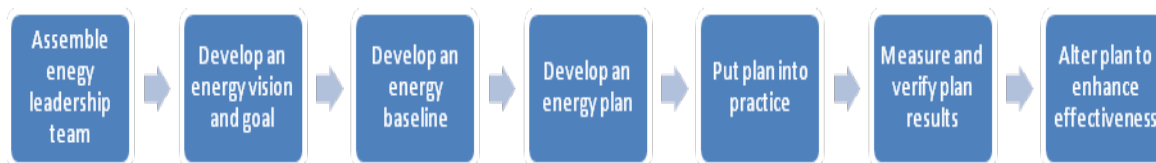


Figure 1. Step process for local energy planning

Local energy plans vary in scope, depending on the goals set forth by the leadership and characteristics of the community. In addressing the scope of the energy plan, a city may choose to target energy use in government operations, across the broader community, or both. Cities

¹ Organizations and networks include ICLEI-Local Governments for Sustainability (www.icleiusa.org/), U.S. Conference of Mayors Climate Protection Agreement (www.usmayors.org/climateprotection/agreement.htm), and the Sierra Club's Cool Cities Program (<http://coolcities.us/>).

may target only government operations because that is where they have the most control over energy use.² Expanding an energy plan to include the broader community often requires greater voluntary participation from the residents and businesses of the city to meet plan objectives, as well as a sizable political, and often financial, commitment from the city government. Cities may choose to develop energy plans that target the broader community in an effort to reduce the city's environmental impact, reduce energy costs for residents, and boost local economic development (DOE, Community Greening: How to Develop a Strategic Energy Plan, 2009).

A significant factor influencing the scope and content of an energy plan is whether a city has an MOU. A substantial number of cities in the United States have an MOU, where the city owns and operates the utility supplying the city and its citizens with electricity.³ An energy plan adopted by a city with an MOU will often include goals and strategies for the utility to obtain more electricity generated by renewable energy resources.⁴ An MOU may also allow the city opportunity to establish programs funded directly from revenues generated by the MOU's business operations. Cities without an MOU typically have little to no control over how the power supplied to the city is generated, and often depend on the state to establish policies requiring the servicing utility to promote energy efficiency and meet defined renewable energy generation requirements.

Transportation, infrastructure, and land use planning are integral to addressing energy consumption by a community, and can be included in a city's energy plan. Many cities have incorporated these elements into their climate-oriented energy plans. For example, Seattle, Washington and Boston, Massachusetts have adopted climate-oriented energy plans with substantial strategies targeting transportation and land use in the broader community.⁵ However, many cities elect to address energy strategies for reducing energy use through energy plans that are separate and distinct from transportation and land use plans.

Report Methodology and Structure

This report will focus on the energy plans of two cities: Denver, Colorado and Austin, Texas. Both cities developed and adopted climate-oriented energy plans containing strategies designed to promote efficient use of energy and renewable energy in government operations and across the broader community. Both cities have had citywide plans in place since 2007, so each has had time to begin implementing energy action items included in their respective plans. Denver provides an example of an energy plan where the city does not have control over the local utility (an investor-owned utility operating in several states), while Austin is a city with an MOU.

² State and local governments also opt to target government operations as a way to demonstrate the technical and economic feasibility and desirability of making energy improvements to residents and businesses in the broader community. Ideally, such "lead-by-example" activities will encourage private sector members of the community to adopt sustainable energy practices.

³ Communities that have publicly owned utilities include some of the nation's largest cities – Los Angeles, San Antonio, Seattle, Orlando, and Austin. For a listing of publicly owned utilities, see American Public Power Association at <http://publicpower.org/aboutpublic/ppstatelistings.cfm?navItemNumber=20965>.

⁴ Seattle and Los Angeles, other major cities with MOUs, also have climate-oriented energy plans that include targets and strategies for their respective utilities.

⁵ See the Seattle Climate Action Plan (www.seattle.gov/archive/climate/docs/SeaCAP_plan.pdf) and Boston Climate Action Plan (www.cityofboston.gov/climate/pdfs/CAPJan08.pdf).

Denver and Austin both address transportation and land use planning largely through plans separate from their respective climate-oriented energy plans. This report will examine only the limited transportation, land use, or zoning initiatives included in the climate-oriented energy plans of Denver and Austin and will not discuss plans beyond the climate-oriented energy plans.⁶

Information used in the report was obtained through publicly available sources, discussions with individuals inside and outside of the National Renewable Energy Laboratory, and interviews and correspondences with key city staff responsible for implementing the energy plans of Denver and Austin.

For each city, the report discusses and describes the following:

- Characteristics of the city
- The city's relationship with local utility
- Historical background and context regarding local energy planning efforts
- Development, scope, and content of the energy plan
- Support from the community, businesses, utility, and/or state
- Implementation status and progress of each energy initiative included in the energy plan
- Trends and future prospects.

The American Recovery and Reinvestment Act of 2009 provided funding to local governments for energy programs through the Energy Efficiency and Conservation Block Grant (EECBG) Program.⁷ Both Denver and Austin have received and used EECBG funding for various energy initiatives under their respective climate-oriented energy plans. Although this report will indicate how EECBG funds were used for selected energy initiatives, it will not provide a detailed accounting of how each city's EECBG funds were used.

⁶ Denver's Climate Action Plan (DCAP) includes a land use strategy of supporting dense development in urban areas, as well as transportation strategies to develop alternative transportation sources. However, the DCAP does not anticipate land use and transportation recommendations to result in significant, near-term energy use reductions – less than 4% of total projected energy/GHG reductions from all DCAP strategies. The Austin Climate Protection Plan does not include significant land use and transportation measures.

⁷ For more on EECBG, see www1.eere.energy.gov/wip/eecbg.html.

Denver

Background

Located at the eastern edge of the Rocky Mountains, the City and County of Denver has a population of nearly 600,000 and is the center of a metropolitan area of over 2.8 million people (U.S. Census Bureau, 2010). The capital of Colorado, Denver serves as the regional commercial and transportation hub for the Rocky Mountain Region. Denver has a diverse economy, consisting of telecommunications, oil and gas, and mining industries, among others. The city's close proximity to extensive outdoor amenities and a growing dependence on outdoor tourism places the natural environment as a key part of the city's identity (Bulkeley & Betsill, 2003).

Xcel Energy

Denver is served by Xcel Energy, an investor-owned utility (IOU) regulated by the Colorado Public Utilities Commission (PUC). Colorado state law requires that utilities enter into a franchise agreement with local governments to serve customers in its jurisdiction. Under its 2006 franchise agreement with Xcel, Denver negotiated a number of energy-related benefits from Xcel, including the establishment of a pilot demand-side management (DSM) program for municipal facilities and green building program for low-income residents (Merritt, 2006).⁸

Xcel offers a number of energy efficiency and renewable energy programs to the city, residents, and businesses. Xcel provides financial incentives to customers for energy efficiency improvements and solar photovoltaic (PV) projects. The utility also offers a green power option through the Windsource program, where customers voluntarily pay a premium for electricity generated from renewable sources.⁹

Local Energy Policy History

Denver first began to formally address local energy policy in the early 1990s. In 1991, Denver's City Council passed a resolution committing the city to International Council for Local Environmental Initiatives (ICLEI) Urban CO₂ Reduction Project, an international initiative that sought to encourage the development of local strategies to reduce energy use and greenhouse gas (GHG) emissions through achieving milestones, including developing a local action plan to reduce the city's GHG emissions. Although the resolution carried little legal weight, Mayor Wellington Webb and the city council envisioned establishing Denver as an environmental leader through the city's involvement in the ICLEI project (Bulkeley & Betsill, 2003).

In the 1990s, Denver developed an energy plan that included energy initiatives focused on cost effective, energy improvements in government operations. In 1993, Mayor Wellington E. Webb signed an executive order creating the first Green Fleets program in the nation, which established a comprehensive program to make Denver's municipal fleet vehicles more efficient. (Greenprint

⁸ A franchise agreement permits a company to conduct business within a township, village, city, or other local government unit. Typically utilities are granted exclusive franchises to serve in a specified area. Franchises are granted by both states and municipalities. Municipalities often charge a franchise fee as a way to generate revenues and to compensate for use of municipal rights-of-way (Energy, 2002).

⁹ Windsource power is sold to Xcel customers in 100-kilowatt-hour (kWh) blocks. The current Windsource rate is \$2.16 per block. An average residential customer using 675 kWh per month and signing up for 100% . Windsource would expect an average increase of around \$15 on their monthly bill. For more on Windsource, see www.xcelenergy.com/Colorado/Residential/RenewableEnergy/Windsource_/Pages/WindSource.aspx.

Denver, 2009). Another program created in the mid-1990s focused on retrofitting municipal buildings with energy-efficient lighting (Bulkeley & Betsill, 2003).

In 2000, the Denver City Council adopted the Denver Comprehensive Plan 2000, a document that established sustainability as a key component of future city policy and planning decisions (City and County of Denver, 2000). The city council adopted various other plans developed by other city departments, which serve as supplements to Plan 2000.¹⁰

After committing to the U.S. Mayors' Climate Protection Agreement, Mayor John Hickenlooper signed a series of executive orders in 2006 and 2007 to codify the Greenprint Denver Initiative and establish the Greenprint Denver Office within the mayor's office (Greenprint Denver, 2007).¹¹ Greenprint Denver had a small staff within the mayor's office and dozens of committee members from 10 city departments and was tasked to coordinate sustainability activities within city departments and "...to position Denver as a national leader in sustainability by developing and implementing solutions to resource challenges and working with city agencies to ensure that all city policy and program decisions incorporate 'triple bottom-line' analysis, balancing short- and long-term economic, social, and environmental considerations." (Greenprint Denver, 2006).

The Greenprint Denver Plan developed by Mayor Hickenlooper's staff served as the guiding document for the city's sustainability efforts. The plan established sustainability goals for city government, including energy and emissions, waste, transportation and land use, economic development, water, and urban forestry. In addition to the goals for the city government, the plan set a citywide energy and emissions goal – "reduce per capita greenhouse gas emissions by 10% below 1990 levels by 2011," as well as a goal of developing a plan for reducing GHG emissions across the entire community (Greenprint Denver, 2006).

Denver's Climate Action Plan Development, Authority, and Structure

To meet the goal of reducing citywide GHG emissions, Mayor Hickenlooper established the Greenprint Denver Advisory Council, appointing 33 civic, business, university, and government leaders to the council. The Greenprint Denver Advisory Council led the effort to develop Denver's Climate Action Plan (DCAP), a climate-oriented energy plan that would serve as a guiding document for the city in its efforts to address the energy use across the community.

The city formally adopted the DCAP in 2007 through an executive order signed by Mayor Hickenlooper (Pankratz, 2007). DCAP included a set of recommended strategies for reducing the GHG emitted by the city and community, largely through implementing a series of energy programs and initiatives for promoting energy efficiency and renewable energy use in city government operations and across the community (Mayor's Greenprint Denver Advisory Council, 2007).

¹⁰ See Denver's Department of Community Planning and Development to access the other plans, which include master plans focused on parks and recreation, pedestrian and bike access, and an integrated land use and transportation plan www.denvergov.org/Planning/ComprehensivePlan2000/tabid/431882/Default.aspx.

¹¹ The U.S. Conference of Mayors Climate Protection Agreement commits signatories to 1) strive to meet or better the Kyoto Protocol GHG emissions targets, a 7% reduction from 1990 levels by 2012, in their own communities, and 2) advocate for stronger state and federal GHG policies and programs. By 2010, 1044 U.S. mayors had signed the agreement. For more information on this agreement, see www.usmayors.org/climateprotection/agreement.htm.

Table 1 provides a summary of the energy recommendations included in DCAP.

Table 1. Energy Action Items and Initiatives Included in Denver’s Climate Action Plan

	Action Item	Individual Energy Initiatives
Community-Wide Energy Initiatives	Residential Climate Challenge	<ul style="list-style-type: none"> • Promote the purchase of green power from Xcel Energy • Promote participation in Xcel’s DSM programs by residences • Boost the use of compact fluorescent lighting (CFL) • Increase smart meter installation • Offer free home energy audits • Neighborhood energy efficiency promotion
	Corporate Climate Challenge	<ul style="list-style-type: none"> • Promote participation in Xcel’s DSM programs by Denver businesses • Promote the purchase of green power from Xcel • Boost access to employee commuter benefits
	Incentivize Energy Conservation	<ul style="list-style-type: none"> • Establish a tiered-rate structure for electricity
	Energy Efficiency for New and Existing Buildings	<ul style="list-style-type: none"> • Strengthen energy efficiency standards in building codes • “Time of Sale” Energy Audit and Disclosure Project
	Support Alternative Transportation Strategies	<ul style="list-style-type: none"> • Parking subsidies for car-share programs, and high-fuel economy or alternatively fueled vehicles
City Government Operation Energy Initiatives	City Leading by Example	<ul style="list-style-type: none"> • Pursue energy savings using the Xcel’s DSM program • Purchase green power through the utility for city facilities • Increase city fleet motor pool/car share program

The advisory council selected the action items in Table 1 based on evaluation criteria that prioritized technical, economic, and political feasibility. The advisory council anticipated that the energy programs included in Table 1 would reduce citywide GHG emissions 75% toward the 2012 goal established by the Greenprint Denver Plan (Greenprint Denver, 2007).¹²

Most DCAP action items emphasize leveraging resources of the utility, nongovernmental organizations, and state and federal government programs. In terms of financial resources, the city does not dedicate line-item funding for putting DCAP action items into place, apart from funding staff for the Greenprint Denver office, and select initiatives of some city departments (such as the green fleet program within Denver Public Works and a green business training program supported by the Office of Economic Development). City departments have provided funding and staff for the implementation of some DCAP programs. In addition, energy initiatives targeting improvements in energy use in municipal buildings have utilized the city's capital improvement fund (City and County of Denver, 2008). The Greenprint Denver office is tasked with leveraging non-city resources, both financial and personnel, to advance the action items in DCAP.

State Support

The implementation of DCAP action items significantly benefit from clean energy policies adopted at the state government level. Since 2007, a number of these state clean energy policies have been put into place under Colorado Governor Bill Ritter's New Energy Economy initiative (Martin & Brannon, 2009).¹³

Colorado's Renewable Portfolio Standard

Colorado adopted a renewable portfolio standard (RPS) through a ballot initiative in 2004. The RPS required Xcel and other IOUs in the state to get 10% of their energy from renewable energy resources by 2015. In 2007, the Colorado State Legislature doubled the requirement for IOUs to 20% by 2020. In 2010, the Colorado State Legislature further increased the RPS for IOUs, requiring 30% by 2020 (DSIRE - Database of State Incentives for Renewables & Efficiency, 2010). The RPS also requires that IOUs meet a certain percentage of renewables through distributed generation systems, rather than through utility-scale generation.

To meet its requirements under the state's RPS, Xcel can integrate renewable electricity sources by 1) directly generating electricity from renewable resources or 2) through purchasing electricity or renewable energy credits (RECs) from an owner of renewable resources.

The RPS has had a substantial impact on Denver's ability to reach the targets and goals set by DCAP. To meet its RPS obligations, Xcel has increased the amount of renewable energy it supplies to Denver customers, mainly through acquiring power from large wind farms. Increasing the amount of electricity from renewable sources decreases the GHG emissions factor

¹² The remaining emissions reduction were anticipated to largely come from a voluntary travel offsets program, with minor contributions from enhanced recycling programs, a green concrete policy, and incentives for density in urban areas.

¹³ For more on the State of Colorado's efforts, visit the Colorado Governor's Energy Office website at <http://rechargecolorado.com/>.

associated with electricity used by the city, residents and businesses.¹⁴ Essentially, the state's RPS has allowed Denver to move toward meeting GHG emissions targets by providing the city with cleaner electricity, even before the city, residents, and businesses reduce energy use through energy efficiency programs or increase distributed energy generation through solar PV programs.¹⁵

In addition, to meet its distributed generation requirement under the RPS, Xcel implemented the Solar Rewards Program, which provides rebates to residences, businesses, and third-party developers who install solar PV systems. Xcel also purchases RECs from customers who install solar PV. Xcel can then use the RECs to meet its RPS obligations. The DCAP incorporates the financial incentives offered through the Solar Rewards Program into several of the energy strategies.

State Demand-Side Management Programs

In 2007, the Colorado Legislature passed a bill that ordered the Colorado PUC to establish energy savings goals for electric and natural gas utilities and to provide utilities with financial incentives for implementing cost-effective DSM programs.¹⁶ Under authorization from the PUC, Xcel established a range of DSM programs that offer rebates to residential and business customers for the purchase of energy-efficient products or improvements. These DSM financial incentives are also incorporated into many of the prominent DCAP strategies.

Other State Support

Colorado offers other elements of support for renewable energy and energy efficiency deployment. In addition to establishing the state RPS, the 2004 voter-approved initiative required the PUC to adopt standards for net metering and interconnection (DSIRE - Database of State Incentives for Renewables & Efficiency, 2010).

The Greenprint Denver staff coordinates city efforts with the State of Colorado Governor's Energy Office (GEO) to avoid duplicating policies or programs. Both entities publicize the programs of the other, leveraging outreach for complementary programs.

Community-Wide Energy Initiatives

DCAP proposes a number of community-focused energy action items. Major community-focused components of DCAP are the Corporate and Residential Climate Challenges. The Corporate Climate Challenge includes a set of voluntary energy initiatives targeting the city's corporations, industries, and businesses. These initiatives focus on encouraging participation in Xcel's DSM and Windsource programs, as well as the expansion of employee commuter benefits.

The Residential Climate Challenge includes a set of voluntary energy programs targeting residences, creating "...a package of programs to bring money-saving energy efficiency

¹⁴ GHG emissions factors express how much equivalent carbon dioxide (CO_{2e}) is emitted per unit of energy or material consumed. For example: kilograms of carbon dioxide equivalent emitted per kilowatt-hour (kWh) of electricity consumed, or kg-CO_{2e}/kWh.

¹⁵ From interviews with Denver City staff.

¹⁶ For a further discussion of the DSM programs offered by Xcel, see www.swenergy.org/programs/utilities/colorado.htm.

measures to homes, subsidized in part by the city.” (Mayor's Greenprint Denver Advisory Council, 2007) The Residential Climate Challenge included programs that encourage energy conservation, green power purchases, and alternative modes of transportation. The programs are designed to enhance community outreach and leverage partnerships with local non-profit organizations, businesses, and Xcel Energy.

This section discusses the action items under the Corporate and Residential Climate Challenges, as well as other community-wide energy action items included in DCAP.

Energy Initiatives under the Residential Climate Challenge

Neighborhood Energy Blitz

A part of DCAP's Residential Climate Challenge, the Neighborhood Energy Blitz program was established as an outreach initiative, designed to directly provide residents with services and resources that will help them save money on their utility bills, increase the comfort of their homes, while concurrently have a positive environmental impact.¹⁷ The Blitz program is designed and executed by neighborhood “Green Teams” consisting of residents who volunteer to go door-to-door canvassing community to inform their neighbors of available energy programs, including access to subsidized energy audits, DSM and solar rebates, Windsource power, free income-qualifying energy efficiency upgrade and insulation programs, and weatherization assistance for low-income residences, including options for renters.

In 2008, Greenprint Denver facilitated the forming of a collaborative group of city departments, businesses, and non-profits, which became known as the Neighborhood Energy Action Partnership (NEAP).¹⁸ NEAP utilizes local non-profits to provide and organize the community outreach, using volunteers to canvass the neighborhoods. Through the Blitz program, NEAP initially sought to target 29 low-income neighborhoods, offering access to weatherization services to qualifying residences. This model is currently used citywide with the help of neighborhood residential Green Teams.

The Blitz program model was piloted in the fall of 2008 with funding from the GEO, while the expanded citywide outreach program receives funding from multiple sources including the city's Office of Strategic Partnerships, GEO, and federal grants. Data are collected from each Blitz program and are tracked through the city's Department of Environmental Health. Using 105 volunteers, 2,457 homes were contacted with 465 households receiving at least one energy-efficient measure. NEAP and Green Team outreach programs anticipate canvassing at least 20 neighborhoods, speaking to at least 10,000 residents, and signing up over 1,800 households with services.

¹⁷ Boulder County, Colorado, also has a similar program called Neighborhood Energy Sweeps, established in 2006. For results on this program, see www.bouldercounty.org/find/library/housing/lpecsweepsstats.pdf.

¹⁸ City departments participating in NEAP included the Department of Environmental Health, Office of Economic Development, and Office of Strategic Partnerships. Participating non-profit partners include Groundwork Denver, Mile High Youth Corps, and Energy Outreach Colorado. For more information on NEAP, see www.denvergov.org/DenverOfficeofStrategicPartnerships/Partnerships/NeighborhoodEnergyActionPartnership/tabid/436573/Default.aspx.

Compact Fluorescent Lamps Program

DCAP recommended promoting compact fluorescent lightbulb (CFL) use in Denver residences. The CFL program was initially envisioned as offering up to 10 CFLs per household, which proved financially unfeasible. Instead, the CFL program evolved into a component of the Blitz program, where volunteers offer a free CFL for their porchlight as a conversation starter when greeting residents. The GEO, Energy Outreach Colorado, Xcel, and WalMart have all played significant roles in this program. WalMart donated an initial 5,000 CFLs to begin the program, while GEO provided funding to allow Greenprint to purchase additional CFLs for giveaways in the Blitz program.

The outreach groups (i.e., NEAP and Green Teams) track the various participation rates. The city then converts that into energy savings and GHG reductions.¹⁹ For the ongoing program, as with the broader Blitz program effort, the willingness of residents to open their doors and engage in a discussion with canvassers determines how effective the CFL program can be.

Encourage Residents and Businesses to Purchase Green Power

To encourage increased participation in Xcel Energy's Windsource program, the city collaborated with Xcel Energy, Denver Public Schools, the GEO, and the Sierra Club to create the Denver Energy Challenge. In the Denver Energy Challenge, residents and businesses are encouraged to sign up for the Windsource program. High schools in neighborhoods with the highest participation in the Windsource program are rewarded by Xcel with energy education projects, providing an additional incentive to residents.²⁰ The Denver Energy Challenge was also incorporated and promoted through the Blitz program.

The city's Department of Environmental Health developed the Denver Energy Challenge program concept and enlisted the participating partners. The program required no direct outlays by the city. Xcel contributed money to the effort, committing up to \$125,000 in awards to Denver Public Schools. Xcel Energy also tracks neighborhood participation in Windsource and provided direct marketing through bill inserts to Denver customers in spring 2010. The initial phase of the program ended August 2010. Phase II is currently being finalized.

The \$10-\$20 per month premium for the green power remains a barrier. However, participants can sign up for Windsource in 100-kilowatt-hour (KWh) blocks and do not need to sign up for the full 100% of their monthly electricity consumption. In either case, the program has shown to be effective in motivating Windsource participation in several neighborhoods.

Other Residential Climate Challenge Energy Initiatives Not Led or Pursued by the City

Several of the recommended programs included in the DCAP's Residential Climate Challenge were not pursued by the city. Some of these initiatives were supplanted by similar programs led by non-city entities, while others were not continued by any entity. Table 2 lists these programs.

¹⁹ For more information on results, see the NEAP program Web page www.denvergov.org/DenverOfficeofStrategicPartnerships/Partnerships/NeighborhoodEnergyActionPartnership/tabid/436573/Default.aspx

²⁰ For more information on the Denver Energy Challenge, see www.denverenergy.org/.

Table 2. Energy Initiatives Included in the DCAP Residential Climate Challenge Not Led or Pursued by the City

Action Item	Reason Action Item Was Not Pursued or Led by the City	Outcome
Home Energy Audits: Offer free energy audits to home owners.	Xcel unveiled a subsidized energy audit program for the homeowner.	Xcel’s energy audit program is promoted through the Blitz program. In 2009 and 2010, at least 378 people have signed up for subsidized Xcel energy audits through the Blitz program.
Smart Meter Installation: Increase the adoption of smart meters by making them more affordable to home owners through subsidized smart meter installation.	As a part of a pilot program, the city partnered with a local university to study the effectiveness of smart meters in reducing home energy use. The timeline for this effort has been longer than expected and funding is due to end in spring 2011.	The city is now assuming that promotion of smart meters would be handled more effectively by Xcel or the state.
Individualized Travel Marketing Pilot: DCAP calls for the establishment of a transit concierge program that would allow people to plan their transit and other alternative mode trips.	The city did not have the funding to pursue this effort.	The city chose to focus its resources on establishing the Bike Share Program.

Energy Initiatives under the Corporate Climate Challenge

Promote Participation in Utility DSM Programs among Area Businesses

As a part of DCAP’s Corporate Climate Challenge, the city developed a small business energy program to encourage business owners to participate in the voluntary DSM program offered by Xcel and understand all of the energy options available to them. Xcel’s DSM program provides rebates for specific energy efficiency improvements and has an annual funding allocation of approximately \$8 million to offer Denver businesses.²¹

Program funds for staff and implementation for the small business energy program comes from the city’s Department of Environmental Health (DEH), supplemented with federal EECBG funds obtained by the city in 2009, an Environmental Protection Agency (EPA) Climate Showcase Community grant also obtained in 2009, and GEO funding. DEH coordinates the small business program, partnering the outreach efforts with Xcel to ensure that local businesses get the most accurate information. City technical staff will serve as technical liaisons to the small business community, coordinating efforts with neighborhood merchant associations, business districts, and the city’s Office of Economic Development, which has success working with local

²¹ Comment from Denver City staff.

small businesses. In addition, DEH's Denver Pollution Prevention Partners program works in tandem with the energy program to leverage each other's resources and relationships.²²

This initiative is still being implemented. However, despite the short paybacks for energy efficiency improvement, the city anticipates that up-front costs will remain a significant barrier for small businesses in the current economic environment. In designing its program, the city created additional incentives on top of those provided by Xcel to reduce the up-front capital barrier. To sustain the program beyond the Recovery Act, the city hopes to leverage its relationship with Xcel and local business districts to fund the small business energy program staff.

Other Corporate Climate Challenge Energy Initiatives Not Led by the City

Several of the recommended programs included in the DCAP's Corporate Climate Challenge were not led by the city. Table 3 lists these programs.

²² For more information on the Denver Pollution Prevention Partners program, see www.denvergov.org/DEH/DenverP2Partners/tabid/434116/Default.aspx.

Table 3. Energy Initiatives Included in the Corporate Climate Challenge Not Led by the City

Action item	Reason action item was not led by the City	Outcome
Expand employee Commuter Benefits.	Bike Denver, a non-profit bicycle advocacy organization, and Downtown Denver Partnership, a non-profit business organization, have taken the lead on promoting employee commuter benefits programs in Denver’s commercial sector.	Greenprint Denver has provided support to these commercial sector efforts. The City of Denver has long had commuter benefits available to city government employees, including discounted bus and light rail passes, flex-time and flex-space schedule options, shower facilities, bike lockers, and discounted membership to the Bike Share Program. ²³
Watts to Water: A large commercial building DSM program offering awards for all Denver metro area buildings of 5,000 square feet or more, recognizing hotel and commercial office building owners who adopt sustainable practices to reduce energy and water use. ²⁴	Greenprint Denver sat on the steering committee, but the <i>Watts to Water</i> program is largely driven by program partners. ²⁵	First year participants represented 28 million square feet of commercial space in 130 buildings. Awards were presented in October 2010 to the best hotel and three office buildings. The program is also designed to link large buildings owners and managers with DSM rebate programs offered by Xcel, which reduce the cost of making efficiency improvements.

Incentivize Energy Conservation

Tiered Electricity Rate Structures for Businesses and Residences

DCAP called for the establishment of a tiered rate structure for electricity and natural gas usage consumption for residences and businesses. It was envisioned that the electricity and natural gas tiered rates would resemble water use rate charges adopted by Denver Water, the local water utility. This city-led effort for tiered rate structures was not implemented due to the fact that Xcel was concurrently working to develop a tiered rate structure. In 2010, the PUC approved Xcel’s tiered rate structure, which applied a higher summer electricity rate to the utility’s residential users who consume in excess of 500 kWh per month (Jaffe, 2010). The city and Xcel plan to continue measuring the summer program to determine whether a year-round structure is possible in the future.

²³ For more information on city employee commuting benefits, see www.denvergov.org/Benefits/RTDValuPass/tabid/433214/Default.aspx.

²⁴ For more on the Watts to Water program and awards, see www.wattstowater.org/.

²⁵ Watts to Water program partners include the Denver Building Owners and Managers Association, ENERGY STAR®, Denver Water, Metro Denver Economic Development Corporation, Xcel, and the Colorado GEO.

Energy Efficiency in New and Existing Buildings

Strengthen Commercial and Residential Building Codes

DCAP calls for strengthening both residential and commercial building codes. Located in a home-rule state, Denver is able to adopt and enforce its own building codes. On December 1, 2009, the city's Development Services Department began public consideration of the 2010 Denver Building Code, which includes updating the energy code to International Energy Conservation Codes (IECC) 2009.²⁶ The city is on target to adopt IECC 2009 with amendments in late January 2011. Opposition to adopting the updated building code has been limited to several non-energy components of the code, not the energy components.²⁷

"Time-of-Sale" Energy Audit and Disclosure Project

Beginning in 2008, the city started a pilot project to assess feasibility of a voluntary time-of-sale energy audit and disclosure project, where home sellers would voluntarily perform an energy audit on the home up for sale, providing home buyers better information on the home's energy use. The city funded the pilot and worked with a local university and Denver Board of Realtors to set up the pilot. The pilot relied on local realtors to refer seller, buyers, and existing home owners to the program, which provided incentives to participants. To receive the energy efficiency incentives, participants were required to disclose the audit results. The initial results of the pilot were limited by the lack of referrals from realtors, making the pilot difficult to evaluate. The city elected not to continue with this effort.

Support Alternative Transportation Strategies

Parking Subsidies for Car-Share Vehicles and High-Fuel Economy or Alternatively Fueled Vehicles

The city offers parking subsidies to non-profit car share organizations, including several metered parking spaces in high-demand / highly visible urban core locations downtown. The city foregoes the meter revenue as a means of programmatic support. In addition, the city passed a new zoning code, which offers reduced parking standards for buildings that offer reserved parking spots for car-sharing vehicles.

Citywide Bike Share Program – Denver Bike Sharing

Following the success of a temporary bike sharing program put in place during the 2008 Democratic National Convention, Mayor Hickenlooper pushed for the establishment of a permanent citywide program. Greenprint provided initial guidance and organization for the effort. Denver Bike Sharing, a non-profit, was then established in 2009 to own and operate the citywide bike sharing program. The program allows users to leave their cars at home, take mass transit into the city, and bike to their destination. While not exclusively an energy saving

²⁶ "The IECC is published by The International Code Council an internationally recognized code development organization. The IECC is a subset of the International Codes, developed by ICC. The IECC is a model energy code that makes allowances for different climate zones. Because it is written in mandatory, enforceable language, state and local jurisdictions can easily adopt the model as their energy code. Before adopting the IECC, state and local governments often make changes to reflect regional building practices, or state specific energy efficiency goals." See the U.S. Department of Energy's Building Energy Codes Program for more building codes information at www.energycodes.gov/why_codes/types.stm.

²⁷ Comment from Greenprint Denver staff.

strategy, the Denver Bike Sharing program falls under the DCAP action item of promoting alternative modes of transportation.²⁸

The bike-sharing system is known as the Denver B-cycle, which is a joint program of the Bike Sharing Program, the owner and operator, and B-cycle, LLC, the designer of the bike-sharing system. Other partners include local businesses that sponsor bikes and bike stations, as well as residents who purchase memberships and single day user fees. The initial funding for the program came in the form of a donation from the Denver 2008 Democratic Convention Host Committee, with additional support coming from EECBG funds. Other funds used for the program are received through other grants, sponsorships, memberships, and transaction fees.²⁹ Greenprint Denver continues to assist the program in pursuing funding opportunities and station sponsorships.

The Denver Bike Sharing program has located over 400 bikes at 50 bike stations near high-traffic sites near transit stops, shopping districts, universities, and neighborhoods close to downtown. Denver Bike Sharing has recorded over 96,000 single rides. The program has seen the purchase of 1,765 annual memberships and 32,396 single-day user fees. Annual memberships haven't been as robust as expected. Many people are taking advantage of the optional low, daily user fees, but annual memberships will be required to make the program financially self-sustaining.

City Government Operations Energy Initiatives

The Greenprint Denver Plan established sustainability goals for city facilities and operations, establishing green building, water conservation, fleet efficiency, and recycling requirements for the city government, and requires the city to favor recycled and energy efficient office supplies and equipment for certain equipment types. DCAP recommends additional energy action items for city facilities.

Demand-Side Management for City Facilities Using Utility Rebates

Greenprint Denver is working with Xcel to develop a customized municipal DSM program, which will allow the city to maximize utility rebates and identify the most cost-effective DSM projects. DCAP directed the city to reduce municipal building energy use through DSM projects, utilizing Xcel's DSM program, which offers rebates for reducing building energy use. Although the city had pursued the DSM rebates offered by Xcel for a number of years, Greenprint Denver started to institutionalize and coordinate the city's DSM projects, hoping to leverage the rebates to fund energy audits of additional municipal buildings. Xcel's cooperation in the DSM program is mandated by the city's franchise agreement. The development of the custom municipal program has required significant collaboration between Xcel, the city, and the project team, whose members include architects, contractors, and mechanical and electrical contractors.

The costs for municipal building retrofits come out of the city's annual capital improvement budget, which considers long-term sustainability and energy efficiency improvements as cost-saving measures. EECBG funds have been incorporated in the program to increase the number of DSM projects. The city is still working with Xcel to develop this program. However, an

²⁸ The Denver Bike Sharing Program may not be exclusively an energy initiative because it is difficult to determine the percentage of participants utilizing the bike program for commuting rather than recreational purposes.

²⁹ Denver Bike Share, see www.denverbikesharing.org/faqs.php.

initial barrier has been getting different city departments to provide the relevant building information necessary to assess projects from across all municipal facilities.

Purchase Green Power for City Buildings and Facilities

DCAP recommended that the city power city facilities with green power purchased through Xcel's Windsource. However, the additional premium for Windsource power was cost-prohibitive in the context of the city's current budgetary constraints. Instead, Greenprint Denver elected to focus on a long-term strategy of reducing energy use in city buildings through the DSM program. In addition, the city opted to host PV solar systems on city facilities and buildings under power purchase agreements (PPAs) with solar developers.

Solar Power Purchase Agreements for City Buildings and Facilities

Denver has completed several solar PPAs for solar systems installed at the airport and other city facilities.³⁰ A PPA is a long-term contract where the city agrees to host a solar PV system on a city facility and purchase the electricity produced by the solar PV system. The solar system is purchased, owned, and maintained by the solar developer, who generates revenue through the power sold to the city, and financial incentives offered by Xcel and the federal government. The city was the main player in proposing, negotiating, and the implementing of solar PPAs.

Solar PPAs have provided the city with access to electricity at grid competitive rates with little up-front cost. However, the city cites several obstacles to implementing solar PPAs. First, the cost of grid electricity is relatively low when compared to electricity produced by a PV system. Second, PPA contract negotiation required city staff time and expense. However, after the completion of the initial PPA, the negotiation process for subsequent PPAs was streamlined.

These barriers were overcome through the support from the private sector and utility partners. Xcel's Solar Rewards program offered critical financial support to the projects. The city relied heavily on the technical support and expertise of the solar development firms involved in each project. The city also received technical support through the U.S. Department of Energy's (DOE's) Solar America Cities program.

Starting in mid-2008, the city began to initiate solar PPAs at several sites, including 3.6 megawatts (MW) at Denver International Airport, 300 kilowatts (kW) at the Colorado Convention Center, 100 kW at the Denver Museum of Nature and Science. By the end of 2011, the city will have used solar PPAs to install a total of 12 MW on city property. A complete list of solar PV projects installed on city facilities using PPAs is shown in Table 4.

³⁰ For more information on PPAs, see www.nrel.gov/docs/fy10osti/46668.pdf.

Table 4. Solar PV Systems Installed on City of Denver Facilities Using Power Purchase Agreements by 2011

Location	Size
Denver International Airport	3.6 MW (7.6 MW by 2011)
Colorado Convention Center	300 kW
Denver Museum of Nature and Science	100 kW
Various Denver Public School buildings	3 MW
Various city buildings	1 MW

Other Programs/Projects at City Government Facilities

The city has implemented several other programs and projects that target energy use of city government or development of energy projects on city property (see Table 5).

Table 5. Other Programs and Projects Targeting City Government Facilities Implemented by the City of Denver

Program/Project	Description
Increasing City Fleet Motor Pool / Car-Share Programs	The city has had a Green Fleets program in-place since the early 1990s, and currently more than 43% of its fleet is alternative fueled vehicles (Greenprint Denver, 2009). Under a DCAP initiative, the city’s fleet department sought to reduce the city’s vehicle fleet by consolidated low-use department vehicles into a small pool of vehicles, which included mostly hybrid vehicles along with several sedans and passenger vans. The fleet department provides access to these centrally located vehicles for use by city employees.
Landfill Gas	In 2008, Xcel commissioned a power plant built on a landfill owned by Denver. The power plant is fueled by landfill gas produced and captured from the landfill and is used to generate electricity. The city leases the land to Xcel, who owns and operates the facility.
Compressed Natural Gas (CNG) Filling Stations	The city is partnering with Encana to build a CNG fueling station at the new campus fleet facility to be constructed in central Denver. Designed to be easily accessible from the interstate, the facility will be accessible to private fleets as well. Encana has been the primary partner in this effort, while commitments from large private fleet operators have been instrumental as well.

Summary and Discussion

The DCAP is a climate-oriented energy plan that establishes the city's first comprehensive strategy for reducing citywide GHG emissions, largely through series of strategies intended to promote more efficient use of energy and increase the consumption of electricity generated from renewable energy sources. Many of the programs and initiatives included in the DCAP have only recently been initiated, so it is too early to determine how effective they will be in meeting the targets established by the DCAP. However, the following observations can be made regarding the design and implementation of DCAP:

- The DCAP functions as a guidance document for the city's energy efforts, largely by making recommendations for establishing *new* energy programs and initiatives for reducing citywide GHG emissions.
- Colorado state policies factor significantly into the energy strategies set by the DCAP. The state RPS and DSM legislation have spurred Xcel to offer various financial incentives to customers. Without these policy interventions at the state level, the city would likely have had fewer options available in reducing GHG emissions and energy consumption at municipal facilities and across the broader community. The state RPS also requires Xcel supply the city an increased percentage of renewable energy, which means that Denver residents and businesses are using cleaner electricity.
- Taking into account that the city does not 1) have control over its own utility or 2) have line-item funding for the implementation of the DCAP, the energy programs and initiatives included in the DCAP focus on leveraging financial and personnel resources offered through the utility, community and business partners, and state and federal agencies.
- While the city has been able to obtain funding from a variety of resources, the implementation of several energy initiatives are dependent on federal grants, particularly Recovery Act funding. The longevity and/or scope of these initiatives are tenuous if federal program dollars are unavailable in the future.
- Denver has found success in leveraging partnerships with non-city entities, which lead and manage key energy initiatives within DCAP, including the Denver Bike Sharing and Residential and Corporate Climate Challenge programs.
- The city has deferred to Xcel and the state on a number programs included in the DCAP, including programs offering free home energy audits, establishing tiered rate structures, and promoting smart meters.
- The city has found the least success in implementing new stand-alone voluntary programs, including the time-of-sale energy audit and disclosure project, and individualized travel marketing program.
- Building on the past success of the city's Green Fleets program, the city has advanced energy programs targeting city government operations, including 1) working with Xcel on the development of a comprehensive strategy for DSM in city facilities and

2) utilizing alternative financing mechanisms to contract for and install 12 MW of solar PV on city property at little up-front cost to the city.

The city is currently working on revising the DCAP. The revised plan will refocus the city's efforts on the more successful aspects of the original plan and is expected to be published in mid-2011.³¹

³¹ Comments from City and County of Denver staff

Austin

Background

The capital of Texas, Austin, is a city of nearly 800,000 people that serves as the cultural and economic center of a metropolitan area with a population of 1.8 million (U.S. Census Bureau, 2010). Often listed as one of the fastest growing cities in the United States, Austin has an economy largely based on information technology companies, state government, and the city's cultural environment. The city is also home to the University of Texas, which heavily influences the economic, social, and political nature of the city. The city has shown a long commitment to environmental issues and has established an array of programs designed to promote waste reduction, water conservation, stormwater management, support of community gardening, endangered species protection, and car sharing.³²

Austin Energy

Like a number of other large cities in the United States, Austin owns and operates its own municipal utility—Austin Energy.³³ Austin Energy is the nation's ninth largest community-owned electric utility, serving 388,000 customers and a population of more than 900,000 within the city of Austin, Travis County, and a small portion of Williamson County. As a publicly owned power company and a city department, Austin Energy returns profits to the community annually. The utility transfers about \$100 million each year to the city's general fund, which helps fund city services such as fire, police, emergency medical services, parks, and libraries. The utility has provided \$1.5 billion in profits to the community since 1976 (Austin Energy, 2010).

Local Energy Policy History

Austin Energy has for three decades been a leader in deploying energy efficiency programs. In the 1980s, Austin City Council directed Austin Energy to design and implement energy conservation programs as a less costly alternative to constructing a new power plant (Austin Energy Green Building, 2009). Beginning in 1982, Austin Energy established a comprehensive DSM program to reduce electricity use among its customers. The utility also developed a comprehensive sustainable building design program in the late 1980s that has been credited with beginning the green building movement in the United States. The same program later became the foundation of the DOE's zero-energy homes program (Prindle, Eldridge, Eckhardt, & Frederick, 2007).

Austin Energy has placed a heavy emphasis on DSM programs, developing two programs. The Power Saver Program provides residential and commercial energy management services to the utility's customers, offering technical assistance, energy audits, and financial incentives for efficiency improvements. The utility also runs a Green Building Program, which provides plan-review and technical assistance services to building industry professionals for sustainable design guidance. All new city buildings and major renovations, as well as commercial properties in the downtown business district and housing projects that receive city tax dollars, are required by city law to meet Leadership in Energy Efficient Design (LEED) standards.

³² For more, see the City of Austin's environmental portal at www.ci.austin.tx.us/environmental.

³³ Other large cities with publicly owned utilities included Los Angeles, San Antonio, Seattle, Sacramento, Jacksonville, Memphis, Nashville, Omaha, and Orlando.

Austin Energy has also had a strong commitment to supplying renewable power to its customers. Austin Energy's first wind power program was installed as a joint project with Lower Colorado River Authority in 1995 near Pecos, Texas, and biogas plants have been capturing methane from local landfills to provide energy to the utility's grid for over ten years (Osborne, 2003). In 1999, the Austin City Council passed a resolution establishing an RPS, requiring Austin Energy to obtain 5% of its energy from renewable sources by December 31, 2004, and 20% by 2020. The RPS was listed as a primary objective of Austin Energy's 2003 Strategic Plan, which also included the establishment of the utility's initial PV solar initiatives and aggressive DSM targets (Austin Energy, 2003).

Austin Energy offers a green power option to customers called GreenChoice. First established in 1999, GreenChoice has grown into the nation's leading utility green pricing program, with sales of nearly 765 GWh in 2009 (Bird & Sumner, 2009).

Austin's Climate Protection Plan Development, Authority, and Structure

After signing the U.S. Mayors Climate Protection Agreement in 2005, Austin's Mayor Will Wynn tasked individuals at Austin Energy to develop a comprehensive plan to address energy and GHG emissions across the Austin community. The mayor presented the result, the Austin Climate Protection Plan (ACPP), to Austin City Council, who passed a resolution adopting the Plan in February 2007.

The ACPP built upon the city's existing portfolio of energy and environmental programs, serving as a "thread weaving the city's environmental and energy programs together." (Austin Climate Protection Program, 2009) To implement the resolution, the Austin Climate Protection Program was created within Austin Energy in October 2007. Six climate protection staff members were hired to develop annual GHG inventories for all city departments and a community inventory every third year. Along with coordinating the inventories, the staff collaborates with Austin Energy divisions, city departments, state and regional entities, and nongovernmental organizations to achieve emission reductions.

The ACPP is made up of five sub-plans, including a municipal plan, utility plan, homes and buildings plan, community plan, and go-neutral plan (Austin Climate Protection Program, 2009). This report will focus on the major energy action items listed in the municipal, utility, and homes and buildings plans (shown in Table 6). The community and "go-neutral" plans largely outline action items to develop tools and outreach mechanisms, such as the *coolaustin.org* website and an Austin specific carbon calculator, to assist the Austin community in reducing GHG emissions.³⁴

³⁴ For the Austin specific carbons calculator, see www.ci.austin.tx.us/acpp/co2_footprint.htm.

Table 6. Major Energy Action Items Included in the Austin Climate Protection Plan

Municipal Plan	<ul style="list-style-type: none"> • Power all city facilities with renewable energy by 2012. • Make entire city vehicle fleet carbon-neutral by 2020 through the use of electric power, nonpetroleum fuels, and mitigation measures.
Utility Plan	<ul style="list-style-type: none"> • Achieve 700 MW of energy savings, equivalent to an average-sized power plant, through increased energy efficiency and conservation by 2020. • Meet 30% of all energy needs with renewable resources, including 100 MW of solar power, by 2020 • Establish a carbon dioxide emissions cap and reduction plan for existing utility emissions. • Achieve carbon neutrality for any new electricity generation through GHG reduction technologies, carbon capture and storage, and mitigation measures. • Accelerate the Solar Rooftop Program.
Homes and Buildings Plan	<ul style="list-style-type: none"> • Update building codes to make all new single-family homes capable of meeting 100% of their energy needs with on-site generation of renewable energy by 2015. • Enhance building codes to increase energy efficiency in all other new buildings by 75% by 2015. • Require disclosure of historic energy use and cost-effective energy efficiency improvements upon the sale of all buildings.

State Support

As a municipal utility, Austin Energy is not required to comply with the Texas RPS. However, Austin Energy receives support from and coordinates with the State Energy Conservation Office, Texas’s state energy office.

Through the State Energy Conservation Office, Austin has received significant support through the LoanSTAR Program, which offers low-interest loans to all public entities, including state, public school, colleges, university, and non-profit hospital facilities for energy cost reduction measures. Since the program was established in 1989, Austin has received \$10 million in LoanSTAR loans to improve energy efficiency in city facilities. Across the state, LoanStar has funded loans totaling over \$240 million.

Austin has received additional support from the Texas State Legislature, which enacted Texas Senate Bill 12 requiring state facilities to meet energy efficiency targets. Though nonbinding for

city governments, the legislation serves as guidance for many cities attempting to advance energy efficiency improvements in city departments.

Utility Energy Initiatives

The ACPP calls for Austin Energy to meet 30% of all energy needs through the use of renewable resources by 2020, including at least 100 MW of solar power.³⁵ Austin Energy developed a Resource, Generation, and Climate Protection Plan to meet the ACPP’s Utility Plan objectives, setting a cap on CO₂ emissions at 20% below 2005 emissions, increasing the renewables to 35%, the DSM goal to 800 MW, and the solar installation goal to 200 MW (Austin Energy, 2010).

Increase Austin Energy’s Renewable Generation Resources

At the end of 2009, Austin Energy had a portfolio of generation resources consisting of 10% renewable energy, as shown in Table 7. Austin Energy’s Resource Plan describes how the utility plans to dramatically increase renewable generation (Austin Energy, 2010).

Table 7. Austin Energy’s Generation Resources: Current Versus ACPP Goal (MW)

Year	Coal/Nuclear	Natural Gas	Biomass	Wind	Solar	Renewable Energy %
2009	1,029	1,444	12	439	1	10%
2020	1,029	1,744	162	1,001	201	35%

Wind

Austin Energy’s current wind generation portfolio includes contracts to purchase all energy produced by 439 MW of wind turbines located at six west Texas wind farms over various contract periods. The utility intends to replace 200 MW of expiring wind contracts and add an additional 550 MW of new wind generation by 2020. In acquiring new wind generation, Austin Energy is studying the option of ownership in wind farms instead of purchasing electricity from wind farm owners (Austin Energy, 2010).

Biomass

In 2008, Austin Energy signed a 20-year contract to purchase all energy produced by a 100-MW, wood-chip-fueled biomass plant to be built in east Texas. The utility plans on adding an additional 50 MW before 2020. The biomass plant will be built near Nacogdoches, Texas, and will be the largest of its type in the nation. The facility will burn wood waste from logging and mill activity as well as urban wood waste from clearing, tree trimming and pallets. All fuel sources for the plant must meet Texas Renewable Energy Credit standards and Texas Forestry Best Management Practices. The plant is projected to go on-line by the spring of 2012 (Austin Energy, 2008).

The cost of the biomass power will be recovered by Austin Energy through the fuel charge or through the utility’s green power program, GreenChoice. Recovering costs through the fuel

³⁵ The ACPP directs that Austin Energy look to DSM programs as the first option. This report will discuss the DSM program status under the community-focused initiatives section.

charge is projected to result in up to a \$1.50 decrease to a projected \$2.50 increase in the electric bill of the average residential customer beginning in 2012, depending on the cost of other fuels, particularly natural gas (Austin Energy, 2008).

To gain an additional 50 MW of biomass by 2020, Austin Energy is investigating small facility options, as well as the possibility of biomass co-firing at one of the utility's two coal plants in Fayette County, Texas.

Solar

In March 2009, Austin Energy signed a 25-year PPA to purchase all power produced by a 30-MW solar farm to be built on city-owned property 20 miles outside of the city. At the time of its signing, the 30-MW plant was the largest solar PV system in the United States and will produce enough electricity to power around 5,000 homes. Austin Energy will pay approximately \$10 million per year for the power (Austin Energy, 2009). The city intends to sign PPAs for similar utility-scale PV projects to help meet its 2020 goal of 200 MW.

Other Utility Plan Action Items

The ACPP has also established additional goals for Austin Energy, including 1) establishing a CO₂ cap and developing and implementing a CO₂ reduction plan for existing utility emissions and 2) achieving carbon neutrality on any new generation units using carbon-based fuels through the utilization of lowest-emission technologies. Both of these action items were integrated into Austin Energy's Resource Plan. In 2010, Austin's City Council adopted the resource plan but delayed implementation until Austin Energy developed affordability measures, which would track the "competitiveness of Austin Energy electric rates among all consumer classes against rates in other large Texas cities." (Austin Energy, 2010) The city council requested the affordability checks on future rate increases after commercial and industrial customers voiced concern.

In addition, Austin Energy is pursuing its first rate case since the mid-1990s in an effort to adjust electricity rates to incentivize energy efficiency and recover the costs of implementing the resource and generation plan. Austin Energy electricity rates are among the lowest in Texas and have not increased since 1994 (Austin Energy, 2010). The rate adjustment will need the approval of the city council, and it can be appealed to the Texas Public Utilities Commission, by customers that are in the service territory but not in the city limits of Austin.³⁶

Community-Wide Energy Initiatives

Continue Current Demand-Side Management Programs

Advancing current DSM programs is a central action item of the ACPP's Utility Plan, as well as the Home and Building Plan (see Table 6). Austin has had a long-term commitment to DSM initiatives. Energy conservation programs were first established in 1982; and in the early 1990s, Austin Energy Green Building (AEGB) program was the first comprehensive program in the United States designed to encourage sustainable building in residential, commercial and municipal construction. Over the years, AEGB, Energy Efficiency Service, and Austin Energy

³⁶ Comment from Austin Climate Protection Program staff

have achieved enough energy savings through DSM measures to avoid the need to build a 600-MW coal plant (Austin Climate Protection Program, 2009).

Under the ACPP, the DSM programs are to achieve an additional 700 MW of new savings by 2020, which is equivalent to a 15% reduction in energy use and production. To meet this aggressive goal, the ACPP directs Austin Energy to promote existing DSM programs (shown in Table 8).

Table 8. Major DSM Programs Offered by Austin Energy

Residential	<ul style="list-style-type: none"> • Rebates for high-efficiency central and window air-conditioning units • Rebates and loans for energy-saving home improvements, such as insulation, duct sealing, energy-efficient windows, solar shades, and air sealing, based on recommendations made by a trained home performance contractor • Free weatherization services to qualified low-income, elderly, and physically/mentally disabled • Voluntary load management programmable thermostat and water heater timer programs
Multifamily Residential	<ul style="list-style-type: none"> • Free walk-through energy audits • Duct diagnostic and sealing program • Assistance to developers, builders, and owners of new construction multifamily properties
Commercial	<ul style="list-style-type: none"> • No-cost energy audits • Rebates for investments in new, energy efficient equipment (small businesses receive an additional 20% bonus rebate) • Rebate and incentives for lighting retrofits, thermal energy storage, chillers, building commissioning, windows, ceiling/roof improvements, and custom technologies • Voluntary load management programmable thermostat program • Technical assistance

Austin Energy's Distributed Energy Services Division (DES) is responsible for the design, implementation, and monitoring of the DSM programs. Austin Energy utilizes various forms of outreach, including allowing certified contractors to market the program and the rebates offered

by the utility. In Fiscal Year (FY) 2008 and FY 2009, DSM programs achieved reductions of required power plant peak capacity of 64.1 MW and 52.4 MW, respectively.

Funding for the DSM programs comes in large part from revenue earned by Austin Energy. The majority of the DSM programs cost the utility less than the cost to produce an equal amount of the energy saved.³⁷ DES has also used federal funds for various aspects of the DSM effort, including Recovery Act funds.

Energy Building Codes Upgrades

The City of Austin is pursuing energy building code upgrades for residential, multi-family, and commercial properties. The ACPP established a goal of making all new single-family homes “zero-net energy capable” by 2015, and provided energy efficiency targets for other buildings within Austin’s city limits. The ACPP also has requirements for enhancing Austin Energy’s Green Building program.

The ACPP calls for updating residential building codes to make all new single-family homes capable of meeting 100% of their energy needs with on-site generation of renewable energy by 2015. The ACPP defines a “zero-net energy home” as a single-family home that is 65% 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. The ACPP also calls for enhancing building codes to increase energy efficiency in new multifamily and commercial buildings by 75% by 2015. The city intends to achieve these goals through progressively adopting more stringent versions of the IECC. To date, the city has adopted IECC 2006 with local amendments in 2007 and IECC 2009 with local amendments in 2010. These upgrades to the energy code will reduce energy consumed by new homes by 31% (Austin Climate Protection Program, 2010).

Require Disclosure of Historic Energy Use and Cost-Effective Energy Efficiency Improvements upon the Sale of All Buildings

The city council passed the Energy Conservation Audit and Disclosure (ECAD) ordinance in 2008 (Austin Energy, 2010). ECAD went into effect mid 2009 and requires mandatory energy audits at the time of sale for single-family homes. Homes less than 10 years old and homes with recent energy efficiency improvements are exempt. Under ECAD, an energy-use rating must be determined for commercial and multifamily residential buildings using the EPA Energy Portfolio by mid-2011. ECAD provides information on a building energy use to prospective tenants and buyers, with the hope that it will encourage energy efficiency improvements. All subsequent energy improvements are voluntary.

From June 2009 to October 2009, the city saw 2,751 home audits submitted for home sales in compliance with ECAD. Of those sold, 230 homes went on to participate in Austin Energy’s residential grant and loan program to make energy improvements. Over the same time period, 45 commercial building ratings were submitted through the ECAD program since its adoption (Austin Climate Protection Program, 2010).

³⁷ Comment from Austin Climate Protection Program staff

Accelerate Solar Rooftop Program

Austin Energy offers solar PV rebates and commercial incentives to encourage customers to install solar PV energy systems. Homeowners receive a rebate based on the installed capacity. Commercial customers receive a performance-based incentive, dictated by the amount of power generated by the system.

Austin's Solar Rebate Program is an existing initiative that began in 2003. Over the years, the incentives have been adjusted to maximize the impact of the funds allocated to the program. The performance-based incentive for commercial was created in 2009, allowing Austin Energy to spread the rebate over a number of years rather than rebating the full amount at once.

As of March 2010, Austin Energy supported more than 1,050 customer-owned solar PV energy systems and 70 commercial projects. Together with the solar installed on municipal sites, Austin has PV systems with a total of more than 4 MW of generation capacity (Austin Climate Protection Program, 2010).³⁸ The program has a \$4 million budget for FY 2011, which does not represent an increase over the FY 2010 budget.

City Government Operations Energy Initiatives

Power All City Facilities with Renewable Energy

By 2012, ACPP plan calls for all city facilities to use renewable energy through the GreenChoice program, the green power program offered by Austin Energy. By the end of 2009, 53% of city facilities use GreenChoice energy, accounting for approximately 19% of the city's total energy use (Austin Climate Protection Program, 2010). Many of the city's large energy users are not using GreenChoice power, including Austin Water, Austin-Bergstrom International Airport, and Austin Energy. Moving these large city accounts to GreenChoice is under consideration, but cost remains a significant barrier.³⁹ However, the ACPP anticipates that remaining city accounts will move to GreenChoice by 2012 (Austin Climate Protection Program, 2010).

On-Site Solar at All New and Existing City Facilities

The ACPP calls for solar installations on all new and existing city facilities where feasible. As of 2009, city installations totaled 157 kW. The city has not chosen to use third-party PPA financing to install solar on city facilities. Instead, the city has opted to directly purchase solar equipment and install PV systems during capital improvement projects. The city hopes that economies of scale associated with purchasing large quantities of system components will keep PV system costs low, even in the absence of federal subsidies.⁴⁰ In addition, by managing the installation of the PV systems, the city hopes to build solar know-how amongst Austin Energy staff, benefiting the city in the long term.

Make the Entire City Fleet of Vehicles Carbon Neutral

The city's Fleet Services department has been shifting the fleet to alternatively fueled vehicles—flex-fuel, B20, propane vehicles, electric hybrids, and others. The ACPP directed the city to

³⁸ City projects include 24 municipal projects, 28 school installations, and 6 libraries.

³⁹ Moving the remaining departments to GreenChoice is likely to cost the city an additional \$6.2 million annually (Toohey, 2010).

⁴⁰ State and local governments are not eligible to receive federal tax subsidies for renewable energy projects as they are not taxable entities.

complete an audit of alternative fuel vehicles, which was completed in 2010 (City of Austin, 2010). The city is currently developing a long-range plan for electric vehicles, which includes locating charging stations throughout the city. The city hopes to deploy a range of alternative vehicle technologies, but understands that carbon offsets will be necessary for the city fleet to achieve carbon neutrality.

Develop Departmental Climate Protection Plans

The ACPP requires that all city departments develop and implement departmental climate protection plans that would include policies, procedures, targets, benchmarks and reporting for maximizing achievable reductions of energy consumption, vehicle fuel use, water use, and recycling.⁴¹ The program staff works with representatives from all city departments to develop the plans, identify departmental CO₂ reduction goals, track progress, and address barriers for implementation. The goals and the monthly consumption data will be loaded into an online reporting system that will provide city department directors with energy and water use each month per building and fleet fuel use.

Summary and Discussion

Building on a long commitment to energy issues by the city and Austin Energy, the ACPP, a climate-oriented energy plan, establishes very ambitious utility, community, and city goals for reducing GHG emissions. The Austin Climate Protection Program has made significant progress moving towards these aggressive targets. The following observations can be made regarding the design and implementation of ACPP:

- In addition to establishing aggressive energy goals for the city, the ACPP serves as an organizational and tracking structure for the array of *existing* energy programs and initiatives offered by Austin Energy.
- ACPP initiatives depend on internal funding authorized by the city council, making the plan less susceptible to variations in federal and state financial support. In order to reach the ACPP goals, this financial commitment will need to continue.
- Some of the most ambitious action items of the ACPP have seen resistance from various sectors of the business community alarmed by the prospect of rising electricity rates. Concerned with keeping the city a competitive location to do business, the Austin City Council has given indications that achieving Austin Energy's generation and emissions targets will be limited by the community's tolerance of energy cost increases.
- Austin Energy has demonstrated that local DSM programs can have a high impact in reducing energy demand. The ACPP sets very ambitious targets for the DSM program, without making significant changes to the rebates, loan, and technical assistance programs offered to residents and businesses. Moving forward, Austin Energy will be challenged to achieve significant additional savings through the existing voluntary programs.
- The city has shown some hesitation in paying the premium cost for supplying its own facilities with GreenChoice power.

⁴¹ Completed department plans can be accessed at www.ci.austin.tx.us/acpp/department_plans.htm.

Achieving ACPP targets included in the Municipal Plan significantly depends on the Austin Climate Protection Program's ability to coordinate an array of energy initiatives across divisions of Austin Energy and other city departments. Although making progress towards the ACPP targets, the program does not have the authority over city departments to mandate compliance. The city has recently acknowledged this deficiency and created a new position within the city manager's office. It is anticipated that this sustainability officer will have greater authority in moving city departments to work towards meeting the ACPP goals and targets.

However, whether the program will be able to meet its aggressive energy and climate goals for the utility, community, and city will ultimately be determined by the commitment of the city's citizens and businesses. Austin Energy has developed detailed plans for supplying the city and citizens with more renewable energy and reducing energy demand through DSM programs. To reach the targets using these plans, the city will likely require additional financial commitments from residents and businesses.

Conclusion

This report provides an overview of the climate-oriented energy plans developed, adopted, and implemented by Denver and Austin. The intention of this report is to examine the implementation process and status of energy initiatives in climate-oriented energy plans of cities with divergent characteristics. The experiences of Denver and Austin can inform other local governments seeking to adopt new or adapt existing energy plans. The following are some general lessons from their experiences.

- **Importance of state support:** A city without an MOU can develop and deploy local energy programs, but will likely have more options and a greater impact if supportive state-level energy policies are in place. An aggressive state RPS will aid a city in advancing its energy/climate goals by requiring the local utility to supply city residents and businesses with cleaner energy generated from renewable resources. City energy programs also benefit from the establishment of state DSM requirements for utilities.
- **Financial commitment from the city:** City funding for staff and energy initiatives provides organizational and administrative stability for the implementation of a citywide energy plan. A city with an MOU is well positioned to implement local energy efficiency programs and increase renewable energy supplied to citizens, but will likely need to make a substantial political and financial commitment in dedicating utility revenues for energy program and initiatives. Cities with an MOU can also justify the use of utility-generated revenues on energy efficiency and renewable energy programs and initiatives as a less expensive alternative to building additional power plants.
- **Leveraging partnerships with non-city entities:** Cities, particularly cities that don't make a significant city budget allocation towards the implementation of energy programs (either from the general fund or utility revenues), should look to leveraging financial and other resources from non-city partners. These partners can include federal, state, and other surrounding local governments, as well as local utilities, businesses, universities, and community organizations. Partnerships can provide a substantial boost to the impact of and participation in outreach initiatives included in energy plans.
- **Reliance on federal program funding:** Initiatives and programs of energy plans that rely heavily on funding from federal programs will likely be more difficult to sustain and maintain as federal energy program commitments fluctuate. Cities should look to develop energy programs dependent on multiple funding sources, striving to develop energy initiatives that will be viable even if federal dollars are unavailable.
- **Benefits to targeting government operations:** Most cities have the opportunity to advance programs targeting energy use in government operations – including building efficiency improvements, green fleets, and installing renewable energy on government facilities. Cities have greater control over government facilities energy use and can directly benefit from the cost savings from energy efficiency improvements. Cities can integrate energy efficiency improvements into capital

improvement programs, utilizing existing funds available for building retrofits, equipment replacement, and maintenance.

In designing and adopting citywide energy plans, many cities have set ambitious goals and targets for more efficient energy use and increased renewable energy consumption. Initiatives and programs under these plans will likely have varying degrees of success, with some initiatives proving to be unfeasible for one reason or another. As cities decide what energy initiatives to include in a broad strategy, they should fully consider strategies for overcoming the financial, political, and bureaucratic barriers to successful implementation for a particular program. If the energy plan includes the establishment of a more aggressive target for an existing program, the city would be well served to identify the barriers to and solutions for increasing the program's impact.

With limited staffing and financial resources available, cities may want to structure an energy plan around a core set of initiatives that have a high likelihood of being successfully implemented. Including aggressive, trend-setting action items in energy plans can be encouraged, as long as the probability of successful implementation is acknowledged. Incorporating this mix of strategies will allow for policy experimentation, while still increasing the likelihood that the city will achieve early successes, an outcome necessary for building and maintaining community and political support for the city's ongoing and future energy efforts.

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