

Boulder City Council Study Session

Boulder's Long-Term Energy Strategy, Renewable Energy Credits and the Xcel Franchise

**April 13, 2010
7 – 9:00 p.m.**

**1777 Broadway
Municipal Building
City Council Chambers**

Submit Written Comments to City Council
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AGENDA

Following is the proposed agenda for the Study Session. Each section will begin with a 5-10 minute presentation by staff followed by a discussion among Council members.

7:00 - 7:10 p.m.

Introductions, Overview and Questions for Council

- Introduce the Study Session’s format, objectives and key questions for City Council.

7:10 – 7: 20 p.m.

SECTION I: Energy Supply and the CAP

- Discuss where our energy comes from, including demand and supply-side issues as they relate to Boulder’s Climate Action Plan, overall sustainability efforts, and “getting to the goal.”

7:20 -7:45 p.m.

SECTION II: Strategic Direction

- Outline the key elements of a future supply-side strategy to achieve a clean, reliable energy portfolio. This will build upon information presented in the previous segment to identify potential components of a long-term energy strategy.

7:45 – 9:00 p.m.

SECTION III: Near-Term Issues and Actions

- **Renewable Energy Credits**
Request Council input related to city policy for renewable energy credits associated with city hydroelectric facilities, specifically at the Boulder Canyon hydroelectric facility.
- **Xcel Franchise**
Outline how the Franchise relates to the proposed 2020 Energy Strategy, including which “pieces” it will address and which it will not; how we will be able to move ahead on other fronts separate from the Franchise. Present and discuss recommended timeline for consideration of a new franchise agreement with voters.

MEMORANDUM

TO: Mayor and Members of City Council

FROM: Jane S. Brautigam, City Manager
David Gehr, Acting City Attorney
Paul J. Fetherston, Deputy City Manager
David Driskell, Executive Director of Community Planning/Sustainability
Maureen Rait, Executive Director of Public Works
Jonathan Koehn, Regional Sustainability Coordinator
Ned Williams, Director of Public Works for Utilities

DATE: April 13, 2010

SUBJECT: Study Session: Boulder's Long-term Energy Strategy, Renewable Energy Credits, and the Xcel Franchise

I. PURPOSE

The purpose of this Study Session is to:

- Discuss where Boulder's energy comes from along with supply-side issues as they relate to Boulder's Climate Action Plan, overall sustainability efforts, and "getting to the goal."
- Outline and discuss the rationale for developing a "2020 Energy Strategy" for Boulder, including the components that would or could be addressed by the strategy and the process and initial steps toward its development.
- Request City Council input on near-term decisions related to city policy for renewable energy credits (RECs); particularly those associated with city hydroelectric facilities.
- Discuss the role of the franchise agreement with Xcel Energy in relation to Boulder's current energy supply and the proposed 2020 Energy Strategy, providing an opportunity for input regarding the status of negotiations, proposed timeline, and potential outcomes.

II. EXECUTIVE SUMMARY

The objective of this Study Session is to discuss development of a long term energy strategy and illustrate how energy efficiency, renewable energy and alternative power resources can be integrated into the region's existing power system to meet growing energy demands in a way that is cost-effective, reliable, risk reducing, and improves environmental quality. Council feedback is requested on two near-term issues: the use of renewable energy credits (RECs) and the Xcel Franchise.

Staff will request formal council direction on these items at public hearings to be scheduled later this year. The recommended areas of focus and proposed approach for addressing each are presented in specific sections of this memo.

The memo is presented in three sections:

Section 1 is informational. It provides an overview of key issues related to Boulder's efforts to effectively decarbonize our energy supply, including: demand side management; electricity generation, transmission and distribution; specific issues related to Xcel Energy and the Valmont Power Plant; and the distributed energy that is generated at the local level.

Section 2 assesses the components that could be analyzed and included in a long-term energy strategy for Boulder. This includes actions that can take place at the local level, along with those that are currently beyond the control of the city. These will require engagement at the Colorado Public Utilities Commission (CPUC) or specific legislative changes. Staff intends to begin developing the framework for a long-term energy strategy and to engage key stakeholders who have influence over our use of energy.

Section 3 presents information on near-term decisions for council's discussion and feedback. First is the use of renewable energy credits (RECs) in Boulder's local energy portfolio, including both the long term use of RECs and the potential purchase of RECs associated with the Boulder Canyon Hydroelectric Facility. Second, council is asked to provide feedback on the strategy presented by staff as related to the Franchise negotiations with Xcel Energy.

Two questions have been identified for City Council discussion:

- 1. Should the city include the purchase of Renewable Energy Credits for its energy portfolio to assist in reaching the CAP goals? If so, does City Council agree with staff's recommendation to purchase RECs associated with the Boulder Canyon hydroelectric facility and other hydroelectric facilities?*
- 2. Does council have any concerns with the Xcel Franchise strategy outlined in the study session material?*

Section 1:

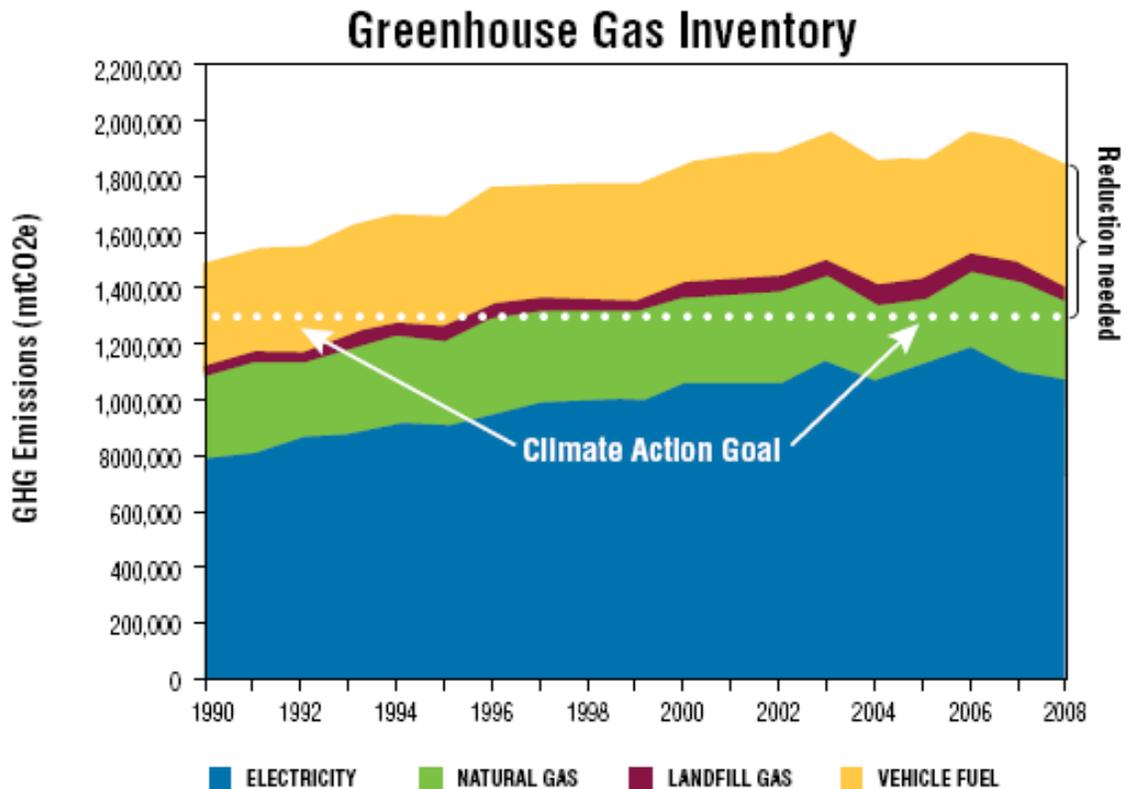
Energy Supply and the Climate Action Plan

SECTION 1: ENERGY SUPPLY AND THE CLIMATE ACTION PLAN

Boulder's Climate Action Plan

Since Boulder's Climate Action Plan went into effect in 2006, important gains have been made. As one of the American cities that rely on coal-fired power plants for their electricity, Boulder is one of the few that has reduced its greenhouse gas emissions. With that said, Boulder still has a considerable way to go. To meet and eventually exceed our goal Boulder must reduce greenhouse gas emissions by more than 400,000 metric tons by the end of 2012, as shown in Figure 1.

Figure 1: Boulder's Greenhouse Gas Inventory



As outlined in the *2009 Community Guide to Boulder's Climate Action Plan*, Boulder's CAP strategy was retooled based on an intensive evaluation and community dialog process. It defines six key strategy areas to address greenhouse gas emissions. Together they provide the structure for the climate action programs. Achieving the right mix of programs is important. No single program will achieve the goal, and the programs should work together as a cohesive, interactive package to get results.

Of the six strategies, two focus on reducing energy use through what are typically referred to as “demand-side” programs. These include reducing energy demand through improved energy efficiency in new buildings (“Build Better”) and the promotion of energy-conserving behavior as well as improved efficiency in existing buildings (“Reduce Use”). Three of the other strategies focus on aspects of greenhouse gas emissions that do not directly relate to our energy supply. These include “Travel Wise,” which focused on reducing transportation emissions through reduced vehicle miles traveled and alternative fuels; “Waste Not,” which implements aggressive waste reduction programs to reduce greenhouse gas emissions from landfills; and “Grow Green,” which focuses on carbon absorption opportunities through tree planting. An update on the current efforts and program results of the CAP is included as **Attachment A**.

One strategy—*Ramp Up Renewables*—deals directly with electricity generation, or the “supply side” of our emissions. This strategy area, the focus for the April 13th Study Session, considers Boulder’s long-term energy future and the steps that can be taken as a city organization and community to decarbonize our energy supply.

This strategy area was not the initial focus of CAP efforts due to the time necessary to achieve meaningful change in the energy supply system and the current focus on achieving near-term emission reductions to meet the city’s adopted Kyoto goal by 2012. However, it is critical to focus on the supply side if Boulder is going to achieve long-term carbon reductions that go beyond the Kyoto goal and ensure a clean energy future.

To understand the key issues related to Boulder’s efforts to decarbonize the energy supply, this section of the memo explores three distinct sectors: demand side management; energy details including generation, transmission and distribution; specific issues related to Xcel Energy and the Valmont Power Plant; and finally, the distributed energy that is generated at the local level.

Energy Supply and Energy Demand

The Electricity Consumer

Boulder consumers expect electricity to be available whenever they plug in an appliance, flip on a light switch or run their business machinery. Satisfying this demand requires an uninterrupted flow of electricity. To meet this requirement, utilities and non-utility electricity producers operate several types of generating units powered by a wide range of fuel sources. These include fossil fuels (coal, natural gas and petroleum) and renewable fuels (solar, water, geothermal, wind, biomass and other renewable energy sources).

In general, Colorado’s electric customers are classified as residential, commercial or industrial. Of the more than 2.3 million electricity customers in Colorado, the largest portion is residential, although the largest portion of electrical demand is from industrial customers. Electricity usage per customer in Colorado is substantially below the national average, primarily due to a relatively mild climate and lower penetration of air conditioning. Further, Colorado average retail prices for electricity are below the national average for each of the three customer groups.

According to Xcel’s 2008 annual report¹ (for the year ended December 31, 2008), total electricity sales in Boulder were 1,308,312 megawatt hours for the year. A breakdown of the sales by sector is shown below:

Total electricity kWh	2008
total Xcel kWh sales (residential):	250,034,156
total Xcel kWh sales (commercial and industrial):	1,053,906,863
total Xcel kWh sales (street lighting):	4,371,600
Total electricity sales (Boulder):	1,308,312,619

More information about Colorado’s energy resources and consumption can be found in **Attachment B**.

Demand-Side Management (DSM) Investments

Utilities traditionally have viewed themselves as being in the business of building and operating power plants, operating transmission and distribution systems, and supplying electricity to customers. Demand-side management (DSM) is a relatively new business approach used by utilities in which they take actions on the demand side of the meter rather than solely on the supply side.

DSM programs run by Xcel are intended to see improved energy efficiency or load shifting as a means of avoiding expensive new power plant construction. Although it might be argued that DSM is not technically a source of generation resources, it has emerged as a viable resource option to meet Colorado’s energy service needs. DSM has been a part of Colorado utility operations since at least the early 1990s. The Colorado legislature clarified DSM’s role in utility resource plans and directed the Colorado Public Utilities Commission (CPUC or PUC) to give the fullest possible consideration to energy efficiency investments in its consideration of generation acquisitions for electric utilities, and to consider utility investments in energy efficiency to be an acceptable use of ratepayers’ moneys.

The Role of DSM in a Clean Energy Future

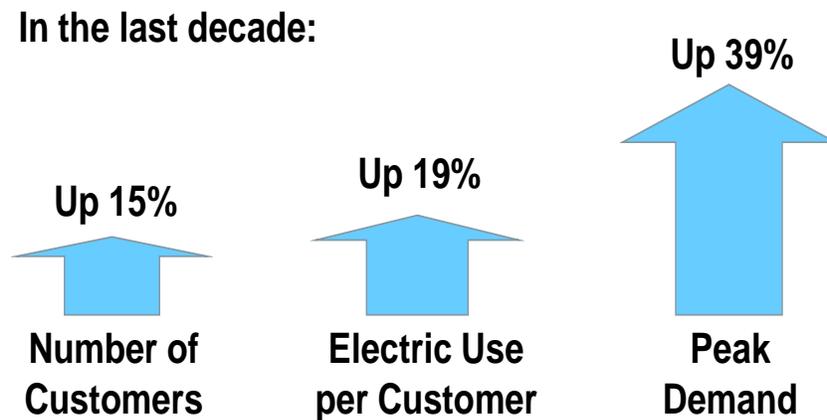
Energy efficiency and conservation play an important role in Boulder’s energy use and emission reduction goals. In simple terms, the community’s task is to reduce conventional energy use in existing homes, businesses and institutions through high-quality energy efficiency retrofits and a greater reliance on distributed renewable energy such as solar (which, like energy efficiency investments, can reduce the demand for energy off the grid by generating energy on-site). It also requires ensuring that any new construction meets high standards of energy performance.

The CAP’s demand-side efforts focus on energy efficiency investments in both new and existing buildings as well as promoting energy-conserving behavior. Lowering energy use through improved energy efficiency and conservation is the easiest, most cost-effective way to reduce greenhouse gas emissions. Demand-side programs also have the potential for implementation in the near-term, thereby helping reach the 2012 CAP goal. Energy efficiency refers to ensuring that existing buildings are well-insulated and well sealed to minimize energy waste and are

¹ 2009 data was not yet available. The 08 report can be found at: <http://thomson.mobular.net/thomson/7/2939/3917/>

heated, cooled, and lighted as efficiently as possible. It also means investing in energy-efficient appliances and fuel-efficient and alternatively-fueled vehicles.

DSM efforts are extremely important in helping to mitigate the need for expansion of carbon-emitting sources of energy generation. Xcel must meet its customers' needs. If its customers are demanding more power, Xcel must provide it. Energy consumers drive the need for increased power generation, as illustrated by the following chart which shows Xcel's Colorado customers demand since 2000:



While the number of customers will grow with population, it is important to note that the use per customer has outpaced the number of new customers. So not only are there more people using energy, but more energy is being used per capita, and, as the increase in peak demand shows, more power is being used during times of the day when energy is the most expensive for the utility to produce or procure.

A critical part of any comprehensive energy strategy will continue to focus on demand-side programs, not just on energy supply. The success of these programs will depend on the full-scale, broad-spectrum participation of individuals, businesses, organizations and all levels of government. While this memo does not speak further to issues of demand management, **Attachment A** provides an update on city initiatives since the council's last discussion regarding CAP efforts for energy efficiency and behavior change.

Understanding Boulder's Energy Supply

Getting Power to the People

The electric utility industry in Colorado is generally divided into three parts: generation, transmission and distribution.

Generation – Generators of electricity use a variety of fuel sources to produce electricity and supply it to the transmission system. Coal is the principal fuel source for electric generation in the US and in Colorado. Currently, 71.5% of Colorado's electricity is produced by coal, 23.4% by natural gas, and 5.6% from renewable sources such as wind and solar.

The current demand² (or "load") depends on how much power consumers are using right now. While the load changes every time someone switches a light on or off, the sum of loads due to a large number of consumers varies slowly. In addition to the supply needed to meet this demand, some "reserve" generating capacity must be kept in case of any unexpected events.

Transmission – Transmission typically consists of large towers that efficiently move high-voltage electricity over long distances from the generation source to population centers where the electricity is to be used. Transmission lines connect to distribution lines at local substations.

A key challenge will continue to be the expansion of high voltage transmission to the areas of Colorado that have significant renewable energy potential. Colorado's existing transmission system has very limited capability to connect our substantial renewable resources to the market. The resolution of these constraints will strengthen and improve Colorado's electrical infrastructure.

As an example, most wind farms in Colorado are located in the northeastern part of the state. This clustering is because that corner of Colorado not only has a good wind resource, but also has available existing transmission lines to bring the wind power to the load centers in Denver and the Front Range.

The main barrier against new transmission is not cost, but the difficulty of permitting and the time it takes to build. Colorado is working to overcome this barrier by planning the transmission needed for wind and other renewable resources. In 2007, in response to Colorado Senate Bill 07-091-**Renewable Resource Generation Development Areas**, a state task force was charged to "develop a map of existing generation and transmission lines and potential renewable resource generation development areas within Colorado that have potential to support competition among renewable energy developers for development of renewable resource generation projects."

The report was submitted to the General Assembly and the Governor, and gives a more detailed explanation of some of the impediments to transmission investments (e.g., financial issues, magnetic fields, noise and facility siting delays). In response to the challenges expressed in the report, a second study called "*Connecting Colorado's Renewable Resources to the Markets in a Carbon-Constrained Electricity Sector*" was created. The Colorado Governor's Office's (GEO) created the 100-page Renewable Energy Development Infrastructure (REDI) Report, which informs many of the questions raised in the first report.

Both reports can be found at <http://www.colorado.gov/energy>. The Executive Summary of the REDI Report is provided in **Attachment C**.

Distribution – The part of the system that actually delivers the electricity to the customer and, thus, the part of the system that people are most familiar with, is the distribution system: the power lines running to the house, the pole in the backyard and the "big green box" in the park or

² Current demand or "load" describe the total demand for electricity. It is the amount of electricity that customers are pulling out of the grid at any given moment.

the alley. This equipment reduces voltages to levels used in homes and businesses. Most electrical outages experienced by customers are caused by problems in the distribution system.

So Who Owns What?

Depending on where they live, Colorado retail customers buy electricity from either an investor-owned utility (like Xcel Energy's Public Service Company of Colorado), a rural electric cooperative (like Intermountain REA), or a municipal utility (like Colorado Springs Utilities).

The category of non-utility generators includes independent power producers, exempt wholesale generators and qualifying facilities (usually cogeneration arrangements). In general, non-utility generators are not subject to state or federal regulation. In one way or another, all of the distribution utilities are regulated in Colorado. The two investor-owned utilities in Colorado (Xcel Energy and Black Hills) are regulated as monopolies by the Public Utilities Commission and serve the majority of the customers in the state. Twenty-nine municipal electric systems in Colorado are regulated by their governing boards.

Additionally, 22 rural electric distribution cooperatives operate in Colorado: 18 purchase their power from Tri-State G&T, and four purchase power from Xcel Energy and WAPA. These distribution cooperatives are regulated by their member boards.

Xcel's Energy Portfolio

Boulder receives power from Colorado's largest investor-owned utility, Xcel Energy. Xcel operates major generating facilities that use a variety of fuel sources including coal, natural gas, nuclear fuel, water (hydro), oil, and refuse. Xcel also has smaller facilities that generate electricity from the wind and sun. In total, their facilities are capable of producing up to 16,000 megawatts (MW) of electricity. One megawatt of power generated by fossil fuels or nuclear fuel provides enough electricity to serve 750 typical homes.³ Xcel generates approximately three-quarters of their power and buys the remainder from other suppliers to meet customers' energy

Smart Grid

Colorado's electricity infrastructure is challenged to readily coordinate and control all the systems that are attached to it. The SmartGridCity project in Boulder has focused on the rebuilding of our local distribution system, combining information technology within the distribution grid to create new opportunities that can significantly improve how electricity is generated, delivered and consumed.

A Smart Grid provides utility companies with near-real-time information to better manage the entire electrical grid as an integrated system, actively sensing and responding to changes in power demand, supply, costs, and emissions—from rooftop solar panels on homes, to remote, unmanned wind farms, to energy-intensive factories.

Representatives from Xcel and City staff are working jointly to explore the five following opportunities presented by the project's complete implementation:

- Accelerate the integration of renewables, energy storage and demand reduction;
- Enable CO₂ emission reductions;
- Maintain and improve grid security;
- Develop a new workforce for economic development; and
- Promote energy conservation through regulatory and consumer pricing incentives.

³ Source: Xcel website; www.xcelenergy.com

needs. The graphic below shows Xcel’s service territory in Colorado and associated generating facilities, while Table 2 on the following page lists the generating facilities and their capacity.

Xcel is regulated by the Colorado PUC with respect to its facilities, rates, accounts, services and issuance of securities, and is regulated by the Federal Energy Regulatory Commission (FERC) with respect to its wholesale electric operations, accounting practices, hydroelectric licensing, wholesale sales for resale and the transmission of electricity in interstate commerce. Like all utilities, Xcel is also subject to significant environmental regulations, with additional environmental regulations under consideration. While Xcel is not currently subject to state or federal limits on greenhouse gas emissions, Congress, federal policy makers as well as state officials are considering climate change legislation and a variety of policies and regulations that would impact Xcel’s future activities. Based on prior state commission practice, it is assumed that Xcel would request to recover the cost of these initiatives through rate increases.

Xcel’s Service Territory in Colorado



Table 2: 2008 Xcel Energy-owned Generating Facilities

Fuel Type	Unit Type	Generating Facilities	Generating Units	Capacity (MW*)
Fossil	Coal	16	32	7,921
	Natural Gas	28	69	5,834
	Oil	4	8	16
Nuclear	Nuclear	2	3	1668
Renewable	Hydro	26	81	511
	Wind	1	5	5
	Refuse-derived fuel	3	6	67
Total		80	204	16,022 MW

*One Megawatt (MW) is one million watts (w), or 1,000 kilowatts (kW).

Xcel's Fuel Sources

Xcel's current fuel source mix, including renewables, is summarized below:

Coal — Xcel's coal stations use low-sulfur western coal purchased primarily under contracts with suppliers in Colorado and Wyoming. During 2007 and 2008, Xcel's existing plants used approximately 10 million and 11 million tons, respectively.

Natural gas — Xcel uses both natural gas and standby oil in combustion turbines and certain boilers. Natural gas supplies for Xcel's power plants are procured under contracts to provide an adequate supply of fuel.

Renewables — Xcel's renewable energy portfolio includes wind, hydro power, solar and biomass that come from their own generating facilities and from purchase power agreements. Table 3 shows Xcel's 2009 Renewable Energy portfolio.

TABLE 3: Xcel Energy's Renewable Energy Production and Purchasing (2009)

	2009 Renewable Energy Portfolio (in MW)					Total
	Wind	Hydro	Solar	Biomass/ RDF/Landfill	Geothermal	
NSP	1,265	277		308		1,850
PSCo	1,258	88	40	3		1,389
SPS	653 ⁴					653
2009 Total	3,176	365	40	311		3,892
Projected by 2020	7,000	380	700	290	20	8,390

⁴ *SPS wind energy totals include 443 MW from long-term contracts and 210 MW of required purchases from qualifying generating facilities.

Valmont Power Plant

Valmont Station is the largest single producer of greenhouse gas emissions in Boulder County. Boulder's baseload electricity use (night time low average) is about equal to the power produced by the Valmont plant.

The city has discussed with Xcel the community's desire to close or convert the coal unit at Xcel's Valmont station. Xcel has taken the position that it cannot commit to a date certain for closing or converting the unit in franchise discussions with the city. However, the city was made aware that Xcel might propose legislation that would deal more broadly with the closure or conversion of utility coal plants. Subsequently, Xcel has worked with state officials on the introduction of House Bill 10-1365 in the 2010 session of the Colorado legislature and stated that, if the bill passes, it might establish firm closure or conversion timing, as well as certain cost recovery procedures, for Valmont.

Additionally, the city and Boulder County have partnered with City and County of Denver, Environmental Defense Fund, Western Resource Advocates and the University of Colorado to develop the Local Government and Environmental Group Coalition Planning for Responsible Electric Portfolio and Advancement of Renewable Energy (PREPARE) Coalition. The coalition's aims to review the array of opportunities for reducing emissions by retiring and/or using renewable fuels and power sources. It is sponsoring a study to assess system-wide and site-specific options for renewable energy, including biomass, biogas, co-firing biomass with coal, and/or using concentrated solar power or solar photovoltaic systems to generate electricity or to preheat boiler water.

Valmont Plant by the numbers:

Valmont Station has two Xcel Energy operating units. Unit V5 is a coal-fired, steam-electric generating unit that can also use natural gas as fuel. Unit V6 is a combustion turbine that uses natural gas or fuel oil as fuel. Southwest Generation also owns and operates two 40 MW combustion turbines that are located on site.

Power Production Capabilities: 229 megawatts (MW): V5 – 186 MW and V6 – 43 MW.

- 133,300 pounds — Estimated carbon dioxide emissions during that hour
- 6,871 gallons — Total amount of gasoline an average car would have to burn to emit the same amount of carbon dioxide
- 536,000 tons — Amount of coal burned at the plant in 2007
- 2,000,000 gallons — Volume of water consumed each day
- 44 pounds — Amount of mercury released into the air in 2007
- 58 — Number of full-time employees
- 550 — Number of acres
- \$5 million — Approximate sales and use tax paid by the plant each year

Plant History: Construction of Valmont Station began in 1921. Unit one went into service in 1924. Valmont was the largest power station west of the Missouri River after Unit 4 was brought into service in 1942, and it remained the company's largest Colorado generating station for several decades with a total capacity of 122.5 MW. These four units stopped generating power in 1986. Unit 5 (V5) went into service in 1964 and can burn either coal or natural gas. The unit uses three surrounding lakes for circulating cooling water. Unit 6 (V6) began generating electricity in 1973.

The results of the study will be used to advocate the retirement, repowering and/or replacement of the coal-fired units at Cherokee (Units 1-4 representing approximately 715 MW) and Valmont (Unit 5 representing approximately 186 MW) as an important and necessary step to reduce Colorado's and the local communities' contribution to global climate change. The full scope of work is included as **Attachment D**.

The study is intended to be completed by May 1. It will help provide well-researched, high quality and compelling information into the discussion with Xcel as it relates to the Integrated Resource Plan in 2011, and the PUC hearings on the Clean Air-Clean Jobs effort (HB 10-1365).

Decarbonizing Boulder's Energy Supply

Statewide Efforts

Colorado has tremendous renewable resource potential. The state is number eleven in the nation for wind potential and fourth for solar potential. According to one report, Colorado is also fourth among Western states for geothermal development site potential, and has sizeable, relatively untapped hydroelectric and biomass resources.

However, there are great challenges to connect Colorado's renewable resources to the markets. Several issues have historically hindered large-scale development of Colorado renewable energy resources. These include, but are not limited to:

1. Cost differentials between traditional resources and renewable energy;
2. Uncertainty in projecting fuel costs over decades into the future;
3. Correlating transmission development with renewable energy investments to avoid transmission congestion and/or excess capacity that then cannot be paid for;
4. Potential costs to integrate operational characteristics of some renewables;
5. Incentives regarding the utilities' "make versus buy" decision; and
6. Timelines associated with purchase power contracts.

Over the past few years several policies and incentives aimed at achieving favorable economic and environmental benefits have been created to remove or reduce these obstacles to renewable energy development for large scale projects.

Generation of electricity from renewable sources has increased rapidly in Colorado in the past few years and is expected to increase further. Colorado became the first US state to create a renewable portfolio standard (RPS) by ballot initiative when voters approved Amendment 37 in November 2004, which required that 10 percent of retail sales by Colorado's largest utilities be from renewable resources by 2015. In March 2007, HB 1281 increased the RPS and extended the renewable-energy requirement to electric cooperatives, among other changes. In February of this year, HB10-1001 was introduced and effectively boosts the RPS percentages to achieve 30% renewable generation by 2020 and requires a portion of the RPS to be met through a subset of renewable generation called "distributed generation," representing on-site generation of electricity that does not require additional transmission facilities to connect to the grid. More information on the State RPS can be found in **Attachment B**.

As more renewable electricity becomes available on the system, it will result in more diverse energy sources. Just like in a stock market portfolio, a diversified portfolio of energy sources leads to a less variable and more stable grid. Diversified energy sources not only means power from a variety of sources, but also geographic diversity. HB1001 has a 3% set-aside for Distributed Generation.

By definition, Distributed Generation will primarily incentivize on-site solar installations, but it also opens the field to small-scale biomass, hydropower in water municipal water and sewage systems, and biogas electricity from anaerobic digestion. There was some opposition to this set-aside from interests that worry that building any renewable generation other than “big wind” would cost too much; but the set-aside was approved in part as an investment in diversification. Many of these diverse resources are more expensive than large wind, but they are critical in establishing new industries and technologies which can then compete with as well as complement traditional energy sources, contributing to a diverse and more robust electricity grid. For example, while both solar and wind power are variable (they sometimes generate large amounts of electricity, and sometimes do not), they complement each other: wind in Colorado tends to peak at night in the winter, while sun is most abundant during the day in the summer.

Finally, Colorado has added a large amount of new natural gas-fired electricity generation capacity in the past 14 years. Whereas gas-fired generation has some advantages over other fuel sources (e.g., lower capital costs, shorter construction lead times, greater efficiency and fewer emission concerns), sharp gas price increases and unstable price volatility in recent years have been of significant concern.

Legislative Efforts

The City Council approved a legislative agenda for 2010. Council supported an agenda that included addressing climate change by improving energy efficiency, increased use of renewable energy, reducing greenhouse gas emissions and dependence on fossil fuels, and developing climate change adaptation strategies.

As part of its state legislative priorities, council directed lobbying efforts toward legislation that will allow residents and businesses to own a shared interest in off-site solar electric generation facilities, time-of-day electricity price signals, and further requirements for electric utilities to buy electricity from renewable energy sources at rates that are economically viable for the creation of such sources. Based on this direction, the city is actively supporting the following energy-related bills:

1. HB10-1342-Community Solar Gardens
2. SB10-100- Cross-boundary Energy Improvement Districts
3. HB10-1001 Electric Utility Renewable Energy Standards
4. HB10-1182- Clean Energy Development Authority Financing Limits
5. SB10-096- related to transparency in gas and electric utility bills
6. SB10-180- Smart Grid Task Force

A short summary of each can be found in **Attachment E**.

Of particular importance this legislative Session is the *Colorado Clean Air-Clean Jobs Act* mentioned earlier. Governor Bill Ritter, Xcel Energy and a coalition of lawmakers, energy companies and environmentalists have developed legislation intended to cut air pollution, create jobs, and increase the use of cleaner energy sources. The proposed Colorado Clean Air-Clean Jobs Act would require Xcel Energy to sharply reduce pollutants by retiring, retrofitting or repowering Front Range coal-fired power plants by the end of 2017 and replacing them with facilities fueled by natural gas and other lower- or non-emitting energy sources.

Under the proposal, Xcel would work with the Colorado Department of Public Health and Environment to submit plans by Aug. 15, 2010 to the state Public Utilities Commission to reduce nitrogen oxide emissions at coal plants by up to 80 percent over the next eight years, likely sooner.

Implementation of this plan is expected to impact 900 megawatts of coal-fired capacity at metro-area power plants, giving primary consideration to replacing or repowering those plants with natural gas and other lower-emitting resources. Staff will monitor the proposed legislation and work with Xcel to best understand how the city can support this legislation moving forward, as it represents a significant opportunity to accelerate the decarbonization of carbon-intensive energy sources.

Public Utilities Commission

The city has long been a participant in proceedings before the PUC. However, during the past year, as it became increasingly evident that the city was unlikely to achieve a number of its climate action objectives via the city's franchise negotiations with Xcel, the decision was made to increase involvement in PUC dockets. As a result, the city has been and will be involved in the following PUC dockets:

1. Xcel's May 2009 Application for Electric Rate Increase, including the Environmental Tariff and Street Lighting and Traffic Signal Lighting
2. Security and Privacy Concerns of Smart Grid
3. SmartGridCity Pricing Pilot
4. Smart Grid and Advanced Metering Technology Investigation
5. Future Pilot Projects Related to Street Lighting and Traffic Signal Lighting

A short summary of each can be found in **Attachment F**.

Local Efforts

While the city does not have a goal to achieve specific emission reductions as a result of local solar installations, **Table 4** illustrates Boulder's commitment to continued growth in this area. According to the city's permitting data, there has been 6,412 kilowatts (DC kW) worth of solar PV systems installed or approved for installation within Boulder since 2007, including 1,113 kW at four municipal sites.

TABLE 4: Boulder’s Solar Installations (2007 to 2010)

Year	kW	kWh	GHG reduction mtCO₂e**
2007	1,148	1,653,120	1,526
2008	1,993	2,869,920	2,649
2009	2,924*	4,210,560	3,887
2010 (Jan)	122	175,680	162
(Feb)	225	324,000	299
Total:	6,412	9,233,280	8,523

** This does not include the City organization installations in 2009: 1,113 kW (George Reynolds Library, Park Central, Municipal Building and 75th Street WWTP)*

These solar installations are subsidized by Xcel’s Solar Rewards Program, which provides an upfront rebate payment for customers who install grid-connected photovoltaic (PV) systems (sized at up to 120% of their average annual load). Customers also receive a separate payment for the renewable-energy credits (RECs) produced by their system. These investments from Xcel allow them to count these installations toward achieving the RPS and also help to contain and reduce consumer demand. By “shaving” the peak demand, Xcel can theoretically avoid having to invest in additional power generation. This, in part, also justifies Xcel’s investment in the Smart Grid project for the utility’s investors.

SB 51 of 2009 made various changes to Colorado’s net metering rules⁵ and Colorado’s renewable energy standard law as it pertains to customer-sited solar systems. These amendments necessitated changes in Xcel’s Solar Rewards program, effective Sept. 1, 2009. In late October 2009, Xcel announced further changes to the program. Xcel established a system for reducing REC payments over time as distinct megawatt (MW) goals are reached. This may impact the financial incentive to potential site-based solar installations, though the degree of impact is hard to ascertain at this time.

RECs are discussed in greater detail in **Section 3** of this memo.

WindSource

Many Boulder residents and businesses subscribe to Xcel’s WindSource Program. WindSource is a way to purchase clean, wind-generated electricity for a small monthly charge. It also now includes investment in solar, biomass and hydro-electric power. It is an optional utility service that allows consumers to support a greater level of utility investment in wind power through their monthly utility bill. The revenue then is credited back to the existing Renewable Energy Standard account to allow for bulk purchases of more renewable energy generation.

⁵ For electric customers who generate their own electricity, net metering refers to the flow of electricity both to and from the customer – typically through a single, bi-directional meter. With net metering, during times when a customer’s generation exceeds the customer’s use, electricity from the customer flows back to the grid, offsetting electricity consumed by the customer at a different time. In effect, the customer uses excess generation to offset electricity that the customer otherwise would have to purchase at the utility’s full retail rate.

WindSource currently costs \$2.16 per 100 kWh block more than the base electric rates. Consumers can opt to purchase any number of 100 kWh blocks up to their full electric usage monthly. An average residential customer using 675 kWh per month and signing up for 100 percent WindSource sees an average increase of around \$15 on their monthly bill. It is anticipated that the price for WindSource will increase to \$3.00 per 100 kWh block by 2012.

Residents of Boulder who sign up for WindSource receive a credit toward the Climate Action Plan tax. The WindSource Rate is updated annually as part of Xcel’s Renewable Energy Standard Compliance filing, pending approval from the PUC. The 2009 rate was reduced to reflect a credit based on the old WindSource program. The 2010 rate does not contain this credit, resulting in a large rate increase from 2009. For residential and small business customers, there’s a minimum one-year purchase requirement (three years for large business customers).

In 2008⁶, Boulder residents purchased close to 36 million kWh of WindSource, representing 2.7 percent of the community’s electricity use.

TABLE 5: 2008 WindSource Subscriptions in Boulder

WindSource Subscriptions	kWh purchased
Total WindSource residential:	21,583,276
Total WindSource commercial:	13,129,256
Total WindSource industrial:	1,000,800
Total WindSource:	35,713,332 (2.7% of community load)

The city will continue to promote WindSource subscriptions through the Boulder County Wind Challenge and identify new opportunities to encourage participation in the program, however the purchase of WindSource or other RECs is a decision made by consumers on an annual (or incremental) basis, and that decision does not carry forward reliably from year to year (e.g., the subscriber moves out of town, or decides not to renew). Depending on the city’s progress toward the goal in 2012, a major push to increase purchases could occur that year to help meet the community’s greenhouse gas goal.

⁶ 2009 WindSource data was not yet available from Xcel Energy

Section 2:
Strategic Direction

SECTION 2. DEVELOPING AN ENERGY STRATEGY FOR BOULDER

A secure and reliable supply of energy is essential for our state and local economies and for our communities. The challenge for Boulder is to safeguard our supply while reducing the emission of greenhouse gases. There is growing recognition that the current use of energy is unsustainable. Our communities are moving to the end of the fossil fuel era and must be prepared for the challenges and opportunities of a new era of clean energy generation.

This will not be an easy task. The Boulder community needs and uses energy, but few really consider how important it is or the ramifications of our consumption patterns. This section of the study session memo presents the beginnings of a framework to develop a long-term energy strategy for Boulder as well as the outline for a process to engage key stakeholders.

Issues and Opportunities

As described in Section 1, renewable energy sources make up a small portion of Colorado's existing power supply, but considerable potential for expansion exists. Current strategies that will increase this percentage focus on creating a market for renewable resources (incentivizing private investment and market delivery) and requiring development of those resources (legislating private as well as public investment in renewables and low-carbon energy sources).

The city is currently active in both strategy areas, encouraging residents, businesses, and municipal facilities to support the creation of a market for renewable energy through investments in WindSource, and lobbying the state legislature and PUC to require increasing levels of renewable energy on the statewide grid. The city is also partnering with our state representatives to advance new legislation aimed at promoting renewable energy options at the local level.

To develop a long-term energy strategy, there will be a number of key issues that need to be considered, as well as some promising opportunities. Some of these include:

- *What's an appropriate timeline?* We want to change our energy supply to reduce greenhouse gas emissions *now*. But how fast can we realistically achieve our objectives? Should our planning horizon be 10 years, 20 years, 50 years, or next year?
- *What will be our energy needs in the future?* Extensive modeling will be needed to understand Boulder's future energy needs, including projected peak demand. These will require a number of assumptions about economic, consumer, growth and technology trends.
- *How might technologies change over time?* We will be doing a plan based on our best information about current and projected energy generation and transmission/distribution technologies as well as energy efficiency and site-based generation technologies. Those will certainly change over time, possibly even during the course of developing the plan.
- *How will regulations change over time?* Current regulations limit many of the options we might want to pursue in "greening" our local energy supply. Part of the plan will need to focus on legislative strategies for changing those regulations. But what if we're unsuccessful in making those changes?

- *How are we going to get it done?* What are the obstacles we might face and how are we going to overcome them? Are we going to pursue the legislative path, the incentives/market path, or a new path altogether?
- *What's the cost we're willing to bear? Or will we save money?* What costs are we willing to bear to achieve our goals sooner rather than later, or to achieve them at all? Who should decide? How might the balance between higher energy costs and reduced energy demand play out? When could we actually achieve a reduction in energy investment and operating costs?
- *What economic opportunities could be realized?* Developing leading edge strategies to achieve our decarbonization goals and investing locally in energy production rather than sending that money elsewhere can help stimulate local economic activity and make Boulder a model for the “clean energy economy.”

This list of issues and opportunities is not comprehensive, but is representative of the types of questions that will need to be given careful consideration as the energy strategy effort moves forward.

Goals for an Energy Strategy

As Governor Ritter has aptly stated, “energy is critical to the public good,” and advancing the public good by ensuring reliable electricity sources is the underlying principle of the strategy proposal. However, the strategy will need to approach that charge by focusing on how we can ensure that reliable energy supply without damaging the environment and threatening our future.

Taken together with the CAP and other existing plans, an energy strategy for Boulder must be developed as an integrated set of policies and programs that will:

- **Reduce our per-capita demand for energy through improved energy efficiency and behavior change**
- **Create new distributed energy generation facilities that are cost efficient, reliable and make use of renewable resources**
- **Significantly reduce greenhouse gas emissions**

Given current science and forecasts regarding climate change, reducing greenhouse gas emissions is critical to protecting our long-term public health and safety, one of the core roles of government. Further, the strategy should advance the goals of supporting economic development, improving overall environmental quality, and promoting resource diversity.

The strategy should strive to grow Boulder’s 21st century economy through targeted energy investments and support for local development of new technologies, fostering job growth in the areas of design, construction, operation and maintenance.

As described toward the end of this section, a “Decarbonization Tech Team” has been meeting regularly since February 2010, similar to the tech teams that have been meeting on other areas of focus for the Boulder Climate Action Plan. In March 2010, this group of community experts developed the following goal statement for their work on developing a long-term energy strategy for Boulder:

Our goal is to assist the Boulder community in meeting and exceeding its climate goal (Kyoto goal of 7% below 1990 emission levels by 2012) by focusing on switching from fossil fuel energy to more clean renewable energy. We will focus on strategies for "greening our electrons" and other technologies and will work with other tech teams to reach and exceed our emissions reduction goals and to serve as a model to other cities and communities. The decarbonization numeric goals suggested by the Tech Team are: 30% reduction in the carbon intensity of our energy supply by 2012, and 80% to 100% by 2020.

Building on Existing Plans and Efforts

As the city's energy strategy is developed, it will need to build upon and blend with existing policy documents and strategic planning efforts, including:

- ***Boulder Valley Comprehensive Plan***

Boulder's success to date in reducing carbon emissions rests on a foundation of sound land use and transportation planning. Since 1977, the Boulder Valley Comprehensive Plan (BVCP), a joint City/County plan, has promoted a compact development pattern and prevented sprawl through an urban growth boundary, open space program, and policies that protect the rural character of lands in the county and encourage infill and redevelopment inside the city limits.

Boulder has guided investment in compact and mixed-use development, affordable housing, and an integrated multi-modal transportation system that makes access to home, work, and play destinations convenient by transit, bike, and walking. These land use planning efforts integrated with progressive transportation planning have resulted in much higher use of alternative modes of transportation and are a large part of local progress to date in reducing emissions. The BVCP is fundamental to long-term success in achieving the 2012 and any longer term goal.

As the 2010 Major Update to the BVCP gets underway, an important work effort will be to consider how the plan should be updated to reflect the city's adopted climate action goals and policies, so that it can continue to serve as the central guiding document for city decision making related to development and infrastructure investment.

- ***Boulder Climate Action Plan***

Boulder's CAP emphasizes the need for decarbonizing or repowering the energy supply over time, switching from carbon-intensive coal-powered electrical generation to greater reliance on no-or low-carbon alternative generation sources, including wind and solar. The city's Local Environmental Action staff is working closely with Boulder residents and businesses to reduce energy use, promote small-scale renewable energy sources on individual properties, and encourage wind power purchasing through Xcel. The energy strategy will enable the city to work more closely with regional partners to achieve the broader goal of decarbonizing our regional energy supply.

- ***Boulder County Sustainable Energy Plan***

To address local impacts and help coordinate efforts related to climate change, the Boulder County Consortium of Cities convened the Energy Strategy Task Force. One of the chief aims of the Task Force is to provide “a framework for local and regional action on energy sustainability.”

The Sustainable Energy Plan (SEP) seeks to provide such a framework. The SEP includes 35 recommended actions that will lead to meaningful progress toward a sustainable energy future. These actions will not only reduce our county’s impact on global climate change, they also result in significant cost savings through increased energy efficiency. The SEP will serve as a guiding document for development of a more detailed implementation strategy for Boulder’s energy plan.

- ***City of Boulder Operations***

Even though city operations represent only 1.5 percent of Boulder’s entire greenhouse gas inventory, it’s important for the city to take the lead and provide a positive example for reducing emissions. To that end, City of Boulder operations are on the path to meet the Kyoto Protocol reductions and have already exceeded those goals in fleet operations. City staff is evaluating the feasibility and costs of a 2018 energy independence goal for city operations, and look forward to establishing high and achievable goals beyond Kyoto. Efforts toward development of a community-wide energy strategy can learn from the city’s efforts, and *vice-versa*. A report on the city operations emissions is included as **Attachment G**.

- ***University of Colorado at Boulder***

In June 2009 CU-Boulder released its Conceptual Plan for Carbon Neutrality. The plan creates strong synergies between the City’s Climate Action Plan and the future activities on Campus to reduce greenhouse gas emissions. Additionally, CU is in the process of completing its Ten-Year Master Facilities Plan update that looks specifically at future efforts to address sustainability not only on campus but in the community at large.

- ***Boulder Climate Adaptation/Resiliency Plan***

To effectively address the challenges that a changing climate will bring, climate adaptation and mitigation (i.e., reducing local greenhouse gas emissions) must complement each other and efforts within and across sectors must be coordinated. Boulder’s ability to manage its climate risks through adaptation depends on a number of critical factors including its baseline and projected economic resources, technologies, infrastructure, institutional support and effective governance, public awareness, access to the best available scientific information, sustainably managed natural resources, and equity in access to those resources.

Boulder’s Climate Adaptation/Resiliency Plan will summarize the best known science on climate change impacts in the state to assess vulnerability and outline possible responses that can be implemented within the city and across the region to promote resiliency.

- ***State, National and International Learning Networks***

In the years since Boulder first explicitly began to address climate change, efforts at the regional, state and national levels have taken shape. These provide new opportunities—and

imperative—for shared learning and coordination that can leverage local initiatives and resources. Cities and counties nationwide are connecting through venues such as the US Conference of Mayors, ICLEI (Local Governments for Sustainability), the Applied Solutions Network, and informal peer networking among cities.

A Framework for Strategy Development

In Section 1 of this memo, the difference between supply and demand was described, primarily to clarify that the majority of CAP efforts are focused on demand, or strategies that are currently under our control. The *2009 Community Guide to Boulder's Climate Action Plan* notes that the projected emission reductions attributed to CAP programs total 96 percent rather than 100 percent of the goal; and that “the remaining four percent, or more, could be achieved by a number of factors that are too uncertain at this time to quantify in terms of greenhouse gas reductions.” These could include: federal and state legislative changes, such as the Colorado Renewable Energy Standard; the outcome of franchise negotiations with Xcel Energy; and PUC actions that will help to “decarbonize” the power we receive.

Although the city does not have direct control over many of these factors, it is active in lobbying for change. Federal action on energy policy, vehicle efficiency and climate change is expected. Potential changes are likely to create additional emission reductions in Boulder, although their impact may not be realized by 2012. Work at the federal level will be closely monitored in order to contribute the city's support where appropriate and also to determine how actions will affect Boulder's ability to meet its emissions goal.

There are a number of strategies that could help achieve Boulder's efforts to decarbonize its energy sources. Some of these can be accomplished with Xcel, some without, and some will need regulatory and statutory changes to accomplish. One way of considering these strategies is to place them into the following three categories:

- 1. Strategies possible on our own under existing regulations;***
- 2. Strategies possible if legislative changes to the rules were enacted; and***
- 3. Strategies that involve Xcel, both in and outside of our franchise agreement***

The examples below are not intended to be comprehensive; rather they are examples of strategies that have been gaining attention in recent months and which illustrate the components that might be considered and analyzed as part of the energy strategy's development.

What we can do on our own under existing regulations

There are a variety of strategies that the city might pursue on its own. Two such options are briefly described below:

Municipalization

Municipalization refers to the purchase—either through voluntary sale or through a condemnation process—of a public utility's facilities. In the case of electric service, those facilities would include Xcel's distribution lines and possibly some portion of the generating facilities needed to supply the city with electricity. It could also include street lighting facilities.

Creation of a municipal-owned utility has been a topic of previous discussion in Boulder. In 2005, as the city approached the end of its 20-year franchise agreement with Xcel, City Council decided it would be prudent to study whether municipalization of the electric utility made sense and the firm of R.W. Beck was hired to undertake a feasibility study. However, at its March 18, 2008 meeting, council suspended that study and directed staff to focus on the implementation of SmartGridCity and franchise negotiations with Xcel. Council's direction to staff was to simultaneously negotiate agreements with Xcel that would advance our CAP goals. Consequently, the effort to explore and pursue municipalization was halted.

Boulder could explore again the option of municipalization—a path that is open to it and other communities under existing regulations. However, it is a lengthy process, especially if the existing utility chooses to fight it, and it can take considerable time to obtain the required approvals from state and federal agencies. Las Cruces, New Mexico (population 95,000), for example, started its municipalization efforts in 1991. It abandoned those efforts eight years later, in 1999. Additional information about municipalization is included in **Section 3** of this memo.

Maximize Local Site-based Renewables

The city could ramp up its efforts in working with residents and businesses to promote distributed power generation on individual properties within the city. As highlighted on page 19, those efforts have created over 6.4 megawatts of solar power generation within the city in the past 3 years. This is only a small percentage of Boulder's power demand, but a more aggressive effort could achieve more significant results.

What we could do if legislative changes were enacted

Many strategies that would allow Boulder to control its energy sources and implement a rapid “decarbonization” strategy would require legislative changes. Although the city does not have direct control over many of these factors, it is active in lobbying for change. Following are two examples that fit in this category.

Retail Wheeling and Community Choice Aggregation

“Retail wheeling” refers to the movement of electricity, owned by a power supplier and sold to a retail consumer, over transmission and distribution lines owned by neither one. A fee is charged by the owners of the lines for letting others use them. This transaction is called retail wheeling and a wheeling charge is levied for both transmission and distribution line “rental.” Retail wheeling is not legal in Colorado.

Community choice aggregation (CCA) is a program that is enabled by retail wheeling. Because wheeling is not legal in Colorado, CCA's cannot exist in Colorado. It is a system adopted in a number of other states which allows cities and counties to aggregate the buying power of individual customers within a defined jurisdiction in order to secure alternative energy supply contracts.

A CCA would involve the City of Boulder partnering with other cities to form a joint powers authority to purchase electricity. CCA enables participating cities to choose the community's provider and source of electricity, including bulk purchases of renewable energy for residents

and businesses. CCA involves the city in the purchase, sale, and possible generation of the energy commodity. Xcel would deliver the electricity to residents using their transmission and delivery systems (i.e., the utility poles and wires).

CCA has potential benefits, including the increased use of renewable energy sources for electricity generation and local control of energy policy and electricity rates. CCA also has risks, such as costs to the city (particularly during start-up) and potentially higher electricity rates.

Pursuing a CCA strategy would first require significant work at the state level to allow for retail wheeling. However, staff believes that removing the artificial walls between sellers and buyers at all levels of the power marketplace is essential if customers and the industry are to fully benefit.

Feed-in Tariffs

Feed-in tariffs (FITs) help encourage investment in small-scale renewable energy generation. When a consumer invests in solar panels on a home and produces more energy than is needed to meet his or her needs, the excess power is fed onto the grid and the utility pays a Feed-in Tariff for that power. Because the power is from a clean energy source (typically solar or wind), the utility pays a premium rate for that energy. Feed-in tariffs are used by governments as an incentive for consumers to adopt newer, cleaner, renewable energy sources. In North America the concept is known by FITs as well as many other names: Electricity Feed Laws, Feed-in Laws, Advanced Renewable Tariffs (ARTs), Renewable Tariffs, and more recently Renewable Energy Payments.

Strategies that involve Xcel, both in and outside of the Franchise

Electricity in Boulder is currently supplied by Xcel Energy. Xcel's right to use Boulder's public rights-of-way and easements to deliver its services to its customers is established in the city's Franchise Agreement with Xcel. That agreement is currently in negotiation for renewal as it is set to expire later this year.

Section 3 of this memo provides an update on the negotiations with Xcel regarding the Franchise agreement, and outlines a number of issues that have been discussed as part of those negotiations, some of which are recommended to move forward as part of the Franchise, and others that may be better pursued through other venues, such as with the PUC or through legislative action at the state level.

Development of a long-term energy strategy will need to give careful consideration to which parts of that strategy should be pursued in partnership with Xcel, and how those various forms of partnership might be addressed both within and outside of the Franchise agreement.

Moving the Process Forward

The *2009 Community Guide to Boulder's Climate Action Plan* outlines a retooled CAP strategy for achieving emission reductions. Members of the CAP Advisory Group were involved in developing the strategy along with many other community members including representatives from the Boulder Climate Action Network (Boulder CAN). Beginning last fall, "CAP Tech

Teams” have provided a mechanism for ongoing citizen engagement in CAP strategy and program development.

The Decarbonization Tech Team has been meeting regularly since February 2010, sharing their professional and technical expertise to help formulate strategies and integrated programs to reduce the community's carbon footprint in light of Boulder's commitment to the Kyoto Protocol as well as its longer term commitment to carbon neutrality.

In March 2010, the group developed a draft goal statement, which is presented on page 24 of this memo.

It is expected that this group will play a central role in helping to further develop a framework for a long-term energy strategy for the city, and help staff devise an effective process for community engagement and dialog about the trade-offs between potential options and a preferred set of strategies for eventual presentation to council.

It is staff's goal to develop a work program and process for the proposed Energy Strategy in the third quarter of 2010. The work program will be developed with the Decarbonization Tech Team and reviewed by the Environmental Advisory Board before being presented to council. It is anticipated that the work on the Energy Strategy will commence in the fourth quarter of 2010 and continue through 2011.

Section 3:
Input on Near-Term Decisions

III. INPUT ON NEAR-TERM DECISIONS

A. Renewable Energy Credits

Those looking to mitigate their carbon footprint increasingly use Renewable Energy Credits (RECs). RECs represent energy generated from a clean, renewable source, such as wind, solar, hydro, or certain types of renewable biomass. Since these renewable energy resources generate little to no carbon as they produce energy, they represent an indirect emission reduction, whereby a “clean” energy source “offsets” the demand for “dirty” fossil-fueled energy.

The question of RECs for City Council is not based on what they are, but how they are used. To discuss the question of how RECs should be used locally, it is important to note that all grid-tied renewable-based electricity generators produce two distinct products: physical electricity and RECs.

The figure below shows how RECs and electricity from clean generation take different pathways to the point of end use. RECs represent the right to claim the attributes and benefits of the renewable generation source.

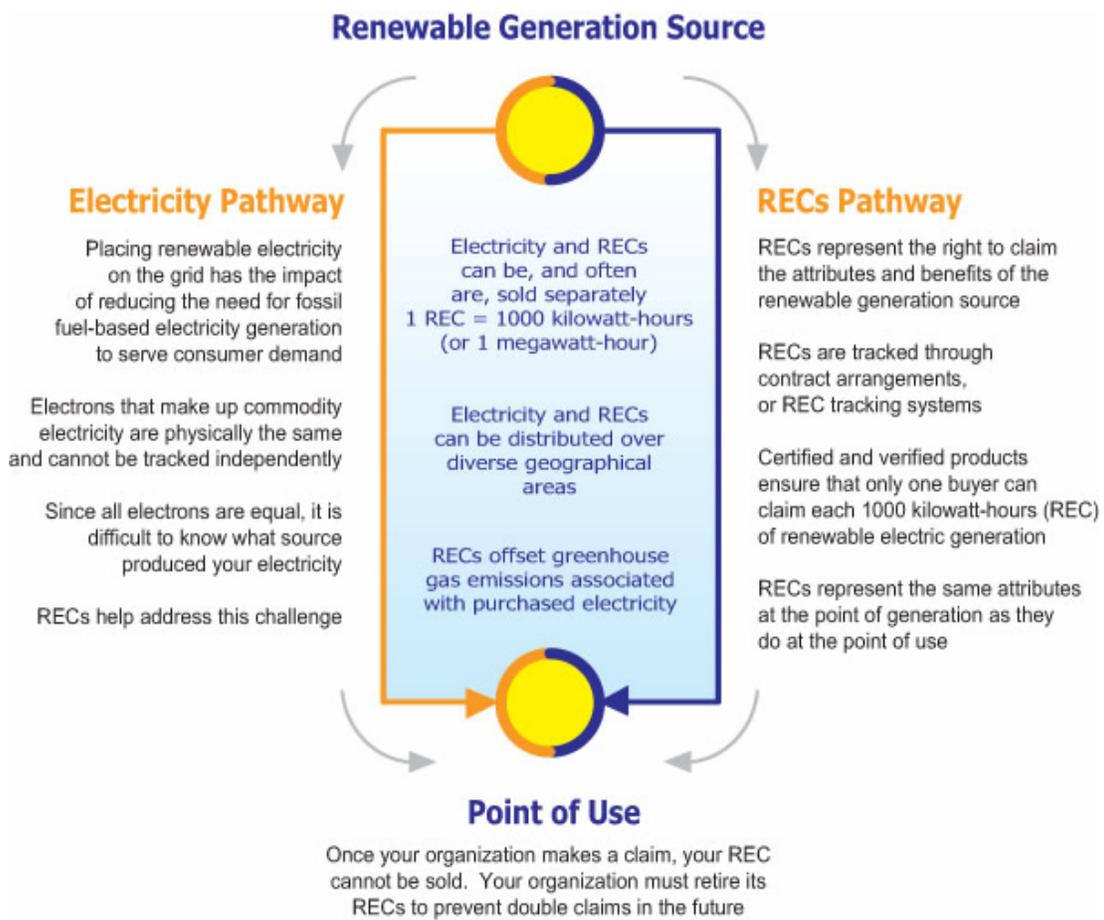


Figure 3: Renewable Energy Generation and RECs (From EPA Renewable Energy Credits report 2008)

At the point of generation, both product components can be sold together or separately, as a bundled or unbundled product. In either case, the renewable generator feeds the physical electricity onto the electricity grid, where it mixes with electricity from other generation sources. Since electrons from all generation sources are indistinguishable, it is difficult to track the physical electrons from a specific point of generation to a specific point of use.

As renewable generators produce electricity, they create one REC for every 1000 kilowatt-hours (or 1 megawatt-hour) of electricity placed on the grid. If the physical electricity and the associated RECs are sold to separate buyers, the electricity is no longer considered “renewable” or “green.” The REC product is what conveys the attributes and benefits of the renewable electricity, not the electricity itself.

RECs serve the role of laying claim to and accounting for the associated attributes of renewable-based generation. The REC and the associated underlying physical electricity take separate pathways to the point of end use. As renewable generators produce electricity, they have a positive impact, reducing the need for fossil fuel-based generation sources to meet consumer demand. RECs embody these positive environmental impacts and convey these benefits to the REC owner. Any REC owned (either through purchase or retainage) by the City of Boulder would be “retired” annually to count against our emission reduction goals.

What is the difference between a carbon offset and a REC?

A carbon offset represents the reduction of one-ton of carbon dioxide emissions. A REC guarantees that one megawatt-hour of renewable electricity has been generated and delivered to the grid. A carbon offset is generally applicable to any project that reduces greenhouse gas emissions (such as planting trees) while RECs can only come from renewable energy generation and delivery. In addition, RECs should only be applied to grid-connected electricity use, while carbon offsets can be used to balance any source of greenhouse gas emissions.

RECs and the Boulder Hydroelectric Facilities

The city has incorporated eight hydroelectric facilities into the municipal water system. These small hydro facilities convert the water pressure developed within Boulder’s water transmission pipelines when municipal water is delivered into the city from the mountains high above Boulder. The hydro facilities have a combined rated capacity of 20.1 megawatts and generate about 43 million kilowatt-hours of electricity per year. The electricity is sold to Xcel under six contracts and provides revenue for the city water utility of about \$1.9 million per year. The hydro facilities provide renewable energy with environmental benefits due to offsetting the need to burn coal for electricity production. More information on the history of the hydro facilities can be found in **Attachment H**.

Currently, Boulder owns 50% of the RECs associated with these contracts and Xcel owns the other 50% based on a 2007 REC settlement with Xcel that occurred after implementation of Amendment 37. Amendment 37 was enacted as the first voter initiative in the United States to establish minimum renewable energy portfolio requirements. The measure empowered the Public Utilities Commission (PUC) to promulgate regulations to implement the Amendment requirements. Staff actively participated in the regulatory process to support renewable energy generation, but objected to proposed regulations that would assign 100% of the RECs from

existing renewable source contracts, such as from the city's hydro contracts with Xcel Energy, to the purchaser. The city's position was that the RECs were a new and valuable form of property that the PUC had neither the authority nor constitutional power to take from the city and give to Xcel Energy.

In 2006, the city filed suit challenging the Amendment 37 implementation regulations approved by the PUC. Council approved the lawsuit because those regulations granted Xcel Energy 100% of the RECs associated with the city's hydroelectric generation projects. By assigning the RECs emanating from Boulder's hydropower to Xcel Energy, the PUC regulations had the dual negative effects of depriving Boulder of a valuable asset and reducing Xcel Energy's need to develop new renewable resources.

Staff negotiated a settlement in 2007 in which Xcel Energy and the city would share all the hydroelectric RECs on an equal, "50-50" basis during the remaining period of the existing contracts. The hydroelectric RECs at issue come from six separate contracts (or power purchase agreements), one of which expired (and was extended to Aug. 31, 2010) and five of which can be either renewed or renegotiated during 2015 to 2017. Altogether staff estimates that the six contracts will produce about 272,000 MWh (Megawatt-hours) of energy between 2010 and their renewal dates, translating to 272,000 RECs. The 2007 settlement was a straightforward 50-50 split of the RECs with Xcel Energy. Staff believed that the settlement was advantageous given the costs and risks of litigation.

The city is now negotiating a new twenty-year Power Purchase Agreement (PPA) with Xcel for sale of electricity from one of the hydro facilities; the Boulder Canyon Hydro (BCH). The existing PPA for BCH expired on Aug. 31, 2009, but has been extended to Aug. 31, 2010 to allow negotiation of a new PPA to be completed. The negotiations are expected to result in a new PPA to be presented to council for consideration in the second quarter of 2010. The remaining five hydro contracts can be renewed on their existing terms or the city can negotiate new terms when the renewal dates come up in 2015 to 2017. If the contracts are renegotiated, the allocation of RECs could be reconsidered, but the city may be paid significantly less for generation of electricity than under the current, very favorable, power sales contracts.

Chart 4 shows that in 2009, all of the hydro facilities generated 43,714 MWh of electricity. The total associated greenhouse gas offset by the generation is 34,227 tons, or **12%** of the 2012 CAP goal. Due to previous council direction to staff, RECs have not been included in the portfolio of programs and efforts that are funded by CAP dollars.

Chart 4: Generation from City of Boulder Hydro Facilities

Facility	2009 Generation (MWh)	2009 RECs Assigned to City
Betasso/ Lakewood/ Silver Lake	26,927	13,463
Boulder Canyon	11,829	5914
Kohler	708	354
Maxwell	542	270
Orodell	700	350
Sunshine	3,007	1504
Total	43,713	21,855

Under the PUC rules, any RECs associated with power purchases by an electric utility will belong to the utility unless other provisions are specifically made in the contract. Therefore, the new city/Xcel PPA for BCH is currently being negotiated in a form that will allow Xcel to own 100% of the RECs associated with the facility. However, if council indicates support of including RECs in the city's energy portfolio to help meet CAP goals, staff can pursue re-negotiation of the PPA to allow the city to purchase the RECs associated with BCH.

Xcel has indicated they are unwilling to continue the current contract status of 50% city/ 50% Xcel ownership of the RECs at BCH. Xcel has indicated that they will pay the city \$40 per megawatt-hour (MWH) generated at BCH if Xcel owns the RECs and \$35 per MWH if the city owns the RECs. Therefore, purchase of the RECs by the city will reduce the amount of revenue the city receives from Xcel for the electricity generated at BCH, as shown in Table 6 on the following page.

The loss in revenue equates to a cost to the city of \$6.38 per metric ton of greenhouse gas offsets. Purchase of the RECs from the other hydro facilities will be more expensive because the city currently earns an average of more than \$50 per MWH under those contracts, which were entered into in the 1980s. If these other contracts are renegotiated with city ownership of the RECs, instead of exercising the option to renew under the existing terms, they are likely to be reduced to \$35 per MWH and produce much less revenue.

Table 6: City Annual Power Revenues for Boulder Canyon Hydro Based on REC Ownership

Year Type	Expected Annual BCH Generation (MWH)	Equivalent Metric Tons CO ₂ e*	100% Xcel REC Ownership		100% City REC Ownership		
			Annual Power Sales Revenue	Percent of 2012 CAP Goal	Annual Power Sales Revenue	Annual REC Ownership Cost	Percent of 2012 CAP Goal
Average	9,000	7,722	\$360,000	0	\$315,000	\$45,000	1.9%
Minimum	3,500	3,003	\$140,000	0	\$122,500	\$17,500	0.7%
Maximum	11,600	9,953	\$464,000	0	\$406,000	\$58,000	2.4%

Electricity Indirect CO₂ equivalent emission factor:

1 MWh = 0.858 mtCO₂ – see below

GHG	Emission Factor (lbs/MWh)	Emission Factor (MT/MWh)	Emission Factor (MT/kWh)	GWP	Emission Factor (MT CO ₂ e)
CO ₂	1,883.08	0.854152	0.000854152	1	0.00085415
CH ₄	0.023	0.000010	0.000000010	21	0.00000022
N ₂ O	0.029	0.000013	0.000000013	310	0.00000404
Total Emission Factor					0.00085841

From E-Grid for Rocky Mountain Region - <http://cfpub.epa.gov/egridweb/ghg.cfm>

As mentioned previously, CAP funds have not been allocated for REC purchase. However, the cost of offsetting greenhouse gases or “bang for the buck” for use of CAP funds to purchase RECs generated by the BCH facility (\$6.38 per metric ton of CO₂) is highly competitive with many of the 2010 CAP programs as shown in the table on page 36 (see column titled Average Annual CAP \$ per ton) from the *2009 Community Guide to Boulder’s Climate Action Plan*.

2010 Programs	Average Annual CAP Fund Budget***	Estimated Greenhouse Gas Reduction In 2012 (tons CO ₂ e)	Average Annual CAP \$ per Ton	Average Annual Estimated Private Investment	Estimated Lifetime Energy Cost Savings	Total Cost Per Ton (over life of the measure)
1. Reduce Use						
ClimateSmart at Work						
Commercial “Two Techs and a Truck”	\$807,600	87,800	\$28	\$17,500,000	\$46,358,000	\$(319)
10 For Change	\$61,000	17,000	\$11	\$1,042,000	\$3,213,000	\$(124)
Commercial ClimateSmart Loan Program and Other Financing	\$5,000	4,400	\$3	*	*	*
Energy Code for Existing Commercial Buildings (CECO)	\$10,000	24,000	\$1	\$0	*	*
City Organization Energy Strategy Team	\$5,000	3,800	\$4	\$850,000	\$800,000	\$(132)
Regional Sustainability	\$0	*	***	**	**	*
ClimateSmart at Home						
Residential “Two Techs and a Truck”	\$571,400	58,600	\$29	\$16,500,000	\$26,400,000	\$(159)
Smart Grid	\$7,000	23,000	\$1	\$0	*	\$1
Residential ClimateSmart Loan Program and Other Financing	\$9,000	8,400	\$3	*	*	*
Energy Code for Existing Residential Buildings (RECO)	\$5,000	42,000	\$0.4	\$0	*	*
Total Reduce Use	\$1,481,000	269,000				
<i>Percent of Goal Met</i>		65%				
2. Build Better						
New/Remodel Commercial Building Energy Code	\$0	5,000	**	*	*	*
New/Remodel Residential Building Energy Code	\$0	4,400	**	*	*	*
Total Build Better	\$0	9,400	**	*	*	*
<i>Percent of Goal Met</i>		2%				
3. Ramp Up Renewables						
Windsor and Renewable Energy Credits Promotion	\$9,500	46,000	\$0.2	\$780,000	**	\$17
ClimateSmart Solar Grants and Sales Tax Rebates	\$12,500	900	\$56	\$610,000	\$580,000	\$47
Xcel Energy Franchise Renewal	\$0	*	**	**	**	*
Public Utilities Commission and State Legislature	\$0	*	**	**	**	*
Community-wide Solar Installations	\$1,400	17,000	\$0.1	\$7,164,000	\$2,688,000	\$263
City Hydroelectric and Cogeneration	\$0	22,000	**	**	*	*
City Organization - Renewables	\$4,600	1,200	\$15	**	*	*
Total Ramp Up Renewables	\$28,000	87,000				
<i>Percent of Goal Met</i>		21%				
4. Travel Wise						
GO Boulder	\$100,000	24,000	\$4	*	*	*
City Organization - 90% Alternative Fuel Vehicles and Plug-In Hybrid Electric Vehicles	\$0	1,000	**	**	**	\$424
Total Travel Wise	\$100,000	25,000				
<i>Percent of Goal Met</i>		6%				
5. Waste Not						
Waste Reduction	\$0	6,400	**	**	**	*
<i>Percent of Goal Met</i>		2%				
6. Grow Green						
Urban Forestry	\$0	*	**	**	**	**
TOTAL	\$1,609,000	396,800				
<i>Percent of Goal Met</i>		96%				
* Not Estimated ** Not Applicable ***Does not include American Recovery and Reinvestment Act funding listed in table in Section Four.						

In summary, it is not possible to continue the city’s current ownership of 50% of the RECs associated with BCH due to the expiration of the current PPA and the need to negotiate a new contract. However, purchasing ownership of the RECs for BCH as part of the negotiation for a new PPA will likely cost less than purchasing RECs from other sources *if* the city decides to

begin using RECs to meet its CAP goals. Staff recommends that, if council supports including RECs in the city's energy portfolio, the city should negotiate with Xcel to secure full city ownership of the RECs for BCH as part of a new PPA. In addition, staff recommends that consideration be given to purchasing full ownership of RECs associated with the other hydro facilities or other energy facilities at such time as any new PPAs are negotiated, if power sales revenues are not significantly reduced by reopening the contracts.

Question 1

Should the city include the purchase of Renewable Energy Credits for its energy portfolio to assist in reaching the CAP goals? If so, does City Council agree with staff's recommendation to purchase RECs associated with the Boulder Canyon hydroelectric facility and other hydroelectric facilities?

B. XCEL FRANCHISE

As mentioned in Section 2, the city's relationship with its energy provider, Xcel Energy, will be a critical component of a long-term energy strategy that looks at opportunities to decarbonize the regional energy supply. For several decades, the relationship with Xcel has been governed in part by the terms of successive franchise agreements between the parties. A franchise is a special right or privilege granted by a government to an individual or corporation—such a right as does not ordinarily belong to citizens in general. In the case of its franchise with Xcel, the city has granted the utility the right to use streets, alleys, rights-of-way and other public property for the purpose of providing utility service. **The city's current franchise agreement with Xcel will expire in August 2010.**

The city will pursue its energy objectives through a variety of means; only one of those is the franchise negotiating process. The franchise negotiating process has provided a good opportunity to clarify energy-related objectives with Xcel. The city's franchise negotiating team continues its efforts—both within and outside of the franchise process—to pursue strategies that are consistent with the community's energy goals.

More than five years ago, with the end of the current 20-year franchise agreement with Xcel drawing near, City Council decided it would be prudent to study whether municipalization of the electric utility made sense and commissioned a preliminary feasibility study. However, at its March 18, 2008 meeting, council suspended that study and directed staff to focus on implementation with Xcel of the then recently announced SmartGridCity project, and at the same time to examine ways in which the city could use negotiations for a new franchise with Xcel as a means of furthering its decarbonization goals.

Negotiations began in 2008 and continued somewhat sporadically thereafter until early 2009, when an effort was made to define the city's objectives more clearly, and to focus the negotiations with Xcel accordingly. In May 2009, after extensive consultation with the utility, staff outlined several side agreements for negotiation with Xcel. These side agreements dealt with a number of the CAP goals.

The agreement between the city and Xcel at that time was that the side agreements would be negotiated concurrently with the terms of a new franchise agreement, but would not actually be made part of it. One reason for this was that the vehicle of separate side agreements would help insulate Xcel from pressure to address the issues raised by the side agreements in the franchise agreements it might negotiate with other cities. It was also understood that many of the side agreements would ultimately have to be approved by the PUC.

Although staff initially believed that results could be achieved via the side agreements, staff's view of the possibility of success began to change as time went by, becoming considerably less optimistic. Accordingly, on some side agreement issues, staff began to concentrate less on achieving bilateral side agreement understandings with Xcel and more on achieving the same or similar results by taking the initiatives to PUC proceedings and through the support of various legislative changes in the state legislature. Several of these initiatives either have borne fruit or appear likely to bear fruit in the near future.

Status Update and Components of the Franchise

Staff believes that the potential to achieve further direct benefit through side agreements via the franchise discussions with Xcel has been exhausted. A decision point is at hand. Renewing the franchise with Xcel (absent side agreements) is not the only option, but if this option is selected, it will be necessary to present the question of renewing the franchise to the voters at the November 2010 election. To meet this timeline, council must begin the required and formal process of franchise ratification in June or, at the latest, July 2010.

Under Colorado law, with or without a franchise agreement with the city, Xcel has both the right and the obligation to continue to provide natural gas and electricity service to customers in Boulder. The primary benefit to the city of having a franchise agreement is that it provides the certainty of a contractual right to collect the three percent franchise fee in exchange for Xcel's use of area streets. This fee is collected from Xcel customers by Xcel and flows to the city's general fund. A franchise agreement provides similar certainty with respect to the collection from the utility of so-called undergrounding fees. Other components of the franchise agreement include but are not limited to:

- A requirement that Xcel coordinate its activities in city streets, and to meet twice per year to exchange short- and long-term work plans to coordinate construction activities in order to manage impacts. It also requires Xcel to restore streets, property, rights-of-way, etc., when Xcel completes its work.
- A requirement that Xcel pay to relocate its facilities if such relocation is required by a public project. It also details the timing of responsibilities related to such relocation, and that all facilities installed to serve new development shall be underground.
- Provisions which state that the city does not have to advance funds for the installation of lines to new city facilities, and that Xcel is required to perform adjustments to their facilities, including raising or lowering manhole covers, to accommodate street maintenance, repair and paving operations, at no cost.

- Granting the right to use Xcel electric distribution poles and street lighting and traffic signal lighting poles for police, fire, emergency, public safety or traffic control purposes, or for any other purpose consistent with the police powers.
- A requirement that Xcel continue to work with U.S. Fish and Wildlife Service to develop and implement avian protection plans. Also, each year, Xcel is required by the franchise agreement to provide the city with a written report describing its progress in carbon reduction and other environmental efforts.
- A requirement that Xcel maintain and continuously develop contracting and community outreach programs that enhance opportunities for and increase the participation of minority- and women-owned business enterprises.

Without the certain contractual right to the franchise fee provided by the franchise agreement, the city would have to devise alternative means of raising the general fund revenues currently provided through the franchise fee and used for general fund purposes. Although such alternatives may be possible (some are further discussed below), in the current uncertain fiscal climate staff is recommending that the franchise with Xcel be renewed, and that the city continue to work through other avenues—with and without Xcel—to achieve its objectives related to decarbonization and to secure an alternative energy future.

Staff believes that renewing the franchise does not preclude the city from revitalizing its earlier study of municipalization, if that is desired, or from pursuing alternatives short of municipalization like “muni-lite” or “community choice aggregation” that, if feasible, may create as much energy independence as municipalization at greatly reduced cost and risk. Moreover, renewing the franchise does not preclude the city from pursuing other legislative and PUC-focused efforts that advance CAP goals.

Alternatives to a Franchise Fee

On April 2, 2010, staff met with members of the city’s Decarbonization Tech Team to discuss staff’s recommendation to pursue the renewal of the franchise this year. Many in the group had reservations about renewing the franchise. The group expressed opposition to approving a new “standard” franchise agreement with Xcel as they believe it would limit the city’s options for pursuing decarbonization goals, whether with Xcel or on its own. They indicated that the city needed to either be more forceful with Xcel in demanding a non-standard franchise agreement that would incorporate significant actions toward decarbonization, or opt out of any franchise agreement in order to pursue the community’s energy goals with other partners or on its own.

Occupation Tax on Xcel In Lieu of a Franchise Fee

Recognizing the concern about losing the franchise income during a time of fiscal uncertainty, an alternative tax could be imposed on the utility. This could take the form of an “occupation tax” that would essentially charge the utility for the use of Boulder’s public rights-of-way, similar in intent to the franchise fee. Boulder voters have previously approved a similar concept, and the city of Westminster has a similar provision in place (although it’s not currently being used). In addition to putting the franchise before voters, staff recommends that council consider putting an occupation tax provision (or variation) on the ballot as well. If the franchise agreement were to

fail, or for some other reason the franchise agreement were to become void, this alternative tax provision would ensure continuation of Xcel's payment for use of the public rights-of-way (a payment that is "passed through" from utility rate payers to the city by Xcel).

Self-Imposed Alternative Tax In Lieu of a Franchise Fee

Members of the Decarbonization Tech Team have voiced their concern that an occupation tax approach (or variation) in lieu of a franchise fee (and franchise agreement) would still rely on Xcel to be the city's energy partner, the assumption being that Xcel would continue to provide energy services to customers and pay the tax in return for use of the public rights-of-way.

Members of the group expressed the desire to explore another taxing vehicle that would by-pass Xcel entirely, maintaining a similar income stream for the city's general fund but replacing the franchise fee with another form of self-imposed tax. They believe that city residents would rather tax themselves at an equivalent rate to what they already pay via the franchise fee if it means they can pursue a greener energy future.

Both of these ideas, or variations of them, will require further research and analysis. Certainly, any new revenue collection measure—whether a license fee or a tax—must first be examined for consistency with the state constitution, Colorado statutes, and relevant case law on fees and taxes. Either measure would need to be drafted to take effect at the time the city found itself unable to collect the Xcel franchise fee. If voters opted to renew the Xcel franchise, the new tax could be enacted at the same time, but kept in reserve until such time as, for example, the city opted out of the new franchise, or such time as the franchise fee, for whatever reasons, became unavailable.

Staff is recommending that the occupation tax be considered for inclusion in any ballot measure put before voters in November 2010, and that discussion continue in order to understand and evaluate other in-lieu alternative tax ideas in advance of formal council action related to the franchise in June or July of this year.

The Option of Municipalization

Municipalization is the act or process by which a city comes to own and operate its own utility system. A municipality is expressly authorized by statute to erect and own electric and natural gas systems, provided its voters approve and it legally finances the enterprise. See Colo. Rev. Stat., § 31-15-707(1).

Theoretically, a city served by a utility franchisee could "municipalize" without condemning and purchasing the incumbent franchisee utility's assets. That is, the city could over-build the utility franchisee's plant with a new plant of its own. The city would have its own infrastructure in addition to that owned by the franchisee.

However, it is almost impossible to operate electric and natural gas utility systems as we currently know them without substantial physical utility property; and for a municipality to develop and construct such property from scratch—rather than purchase the incumbent utility franchisee's existing distribution plant—is probably not feasible economically. This could change if technology renders obsolete the expensive infrastructure (mains, conduit, electric

wires, poles, feeders, substations, transformers, etc.), that make up the current typical utility's natural gas and electricity distribution systems.

Municipalization is a long, costly, and typically contentious process. Before starting down a municipalization path, Boulder will need to take the time and spend the money to better understand all of the costs and risks, as well as the benefits, of a municipalization strategy, and more fully expose the option of municipalization, once more information is in hand, to public discussion and debate. Although studies commissioned by the city from R.W. Beck in 2005 and 2007 rendered rough baseline ideas of the economic, political, and technical challenges of a municipalization strategy, further research and analysis would be necessary to inform a robust public municipalization debate, not to mention a prudent policy decision.

Staff believes that gathering the relevant data needed to make informed technical judgments, and to allow public debate on the question of municipalization once the data is in hand, would by necessity be a multi-year project. If a municipalization path is something City Council wishes to consider, entering a new franchise agreement with Xcel today may not be inconsistent. The City of Boulder can use the first 10-years of the new franchise agreement to assess and refine its options, and take the initial actions necessary to prepare for municipalization.

Other Paths to Decarbonization

There are options short of municipalization that could give Boulder greater control over its energy future and ability to implement its decarbonization objectives. Boulder community members have spoken publicly of two of these options, often referred to as "community choice aggregation" and "municipal lite." The essence of each is creating the legal capability for the city to make direct purchases for its citizens of electric power from renewable sources that the city chooses, not that Xcel dictates. Both presuppose significant changes in state law that are likely to be opposed by Xcel and other utilities and interests.

Despite the likely opposition, effecting fundamental changes in state law to allow Boulder to achieve energy independence is in the realm of possibility, and the city may choose to devote resources to this effort. The legislative effort will most likely be a multi-year endeavor, but also less expensive, complex, and time-consuming than municipalization.

Accordingly, if the city believes there is merit in pursuing "community choice aggregation" and "muni-lite" strategies and wishes to devote time and resources to further study of their feasibility, pursuit of those strategies may still be compatible with entering into a new 20-year franchise with Xcel that has an "off ramp" after 10-years.

Evaluating Boulder's Options

Boulder has been consistent in communicating and pursuing its decarbonization objectives in the Xcel negotiations and the many other arenas in which we engage with Xcel, state policy makers and the PUC.

In the near future, the city will face the choice of:

- Putting forth a Franchise Agreement for consideration by voters to renew our community’s relationship with Xcel for a 20-year term with “opt out” opportunities at 10- and 15 -years. This would provide for continuation of the Franchise Fee, the undergrounding (1%) fee, and the other benefits outlined above.
- Putting forth an occupation tax for consideration by voters that would impose a tax on Xcel in lieu of a franchise fee to create a mechanism by which an amount equivalent to the franchise fee would be collected. Such a tax on Xcel would only take effect if the franchise fee was uncollectible for some reason.
- Putting forth a self-imposed alternative tax that would be paid by Boulder power customers (the exact mechanism to be defined) at an equivalent rate to what they already pay via the franchise fee, but by-passing Xcel entirely as the collector of that tax.
- Allowing the Franchise Agreement with Xcel to lapse, or push for an extension to allow more time for negotiation.

If the franchise agreement lapses, it may jeopardize the franchise benefits outlined above, but would terminate the city’s contractual relationship while the city seeks to bring about legal changes necessary for obtaining alternative provider relationships. Under its PUC-granted “certificate of public convenience and necessity” Xcel would have both the right and obligation to serve residents, independent of any city charter franchise requirement for the use of the public rights-of-way. This right and obligation to serve endures so long as the city has not lawfully displaced Xcel as the citywide provider of natural gas and electric service (i.e., municipalized), or lawfully displaced Xcel and lawfully authorized another non-municipal provider to serve.

If the franchise agreement is extended, for a one to two year period, it would allow time for development of the energy strategy outlined in Section 2 of this memo, and greater clarity as to what would need to be included in a new franchise agreement in order to achieve the community’s goal of rapid decarbonization. There is, however, disagreement on whether an extension could be achieved.

There are three key factors (in addition to other less central factors) that Boulder needs to consider in evaluating its options:

- *Revenue.* There are benefits to entering into a franchise agreement with Xcel. Perhaps the greatest benefit is ensuring the continued stream of revenue from the franchise fee (at this time approximately \$3.6 million per year) and the 1% undergrounding fund. With a franchise agreement, the city has an independent contractual commitment from Xcel to pay the franchise fee and to contribute to the undergrounding fund. Without a franchise agreement, there is no guarantee of receiving a franchise fee or having the benefit of the undergrounding fund. The “in lieu” tax described above may provide a viable alternative to these fees, but that idea needs to be more fully vetted. It would also need to be approved by voters.

- *Time.* The time element can be seen as an advantage or a disadvantage. The state law that authorizes municipalities to enter into franchise agreements also provides that municipalities are not authorized to purchase or condemn public utilities within 20-years after granting the franchise, except at the 10th and 15th anniversaries of the franchise agreement. Colo. Rev. Stat., § 31-15-707(1) (a) (iv). Consequently, if a new franchise agreement is approved, the city would be able to terminate the agreement without approval by Xcel in 2020 or 2025 and, of course, at the expiration of the franchise agreement in 2030.

While it is true that approving a new franchise agreement would mean that the city is prohibited from municipalizing the electric utility for at least 10-years, that 10-year “waiting period” may prove to be to the city’s advantage. During the first 10-years of a new franchise agreement, Boulder would have the opportunity to have a fuller debate on the merits of municipalization, and to prepare for municipalization if that is agreed upon, or to pursue other actions short of municipalization that could provide greater energy independence.

- *Ability to Decarbonize.* The alternatives to signing a franchise agreement are under discussion because of the community’s profound concern that Boulder will not be able to green the energy supply far enough or fast enough if there isn’t greater control over energy supply options. Boulder has adopted a climate action goal and is committed to achieving that goal. As outlined in Section 2 of this document, it is clear that the currently adopted Kyoto goal is only the first step toward making a meaningful contribution to the reduction of greenhouse gas emissions that responds responsibly to the public health and safety impacts of climate change. The effort toward developing a long-term energy strategy for Boulder, described in Section 2 of this memo, is because of this commitment.

At the beginning of the negotiation process with Xcel about the franchise agreement, many may have believed that the city could achieve substantially all of its long-term energy goals through the negotiation of a new franchise agreement. For the reasons discussed above, staff does not believe that to be feasible or realistic, but there are other mechanisms that allow Boulder to decarbonize its energy supply for the short- and long-term and staff has pursued a number of alternative avenues to achieve Boulder’s decarbonization goals with positive results. The questions that need to be asked and answered are:

How far can Boulder get as a community toward decarbonization goals either within or outside of a Franchise agreement with Xcel?

and

How should Boulder value the trade-offs between the potential benefits and risks of having and not having a Franchise Agreement, and how do those trade-offs relate to the achievement of the community’s decarbonization goals?

Staff Recommendation and Next Steps

It is staff’s recommendation to pursue the first two options outlined above: putting forth a Franchise Agreement for consideration by voters as well as an alternative occupation tax that would provide a mechanism for collecting an equivalent of the franchise fee should the franchise not be approved by voters, and that could be held in reserve should the franchise be approved. The second option requires further exploration and development.

Staff further recommends continued dialog with community representatives to understand and evaluate the alternatives and trade-offs described in this memo, including further evaluation of the alternative “self-imposed” in-lieu tax proposal. While this process may not lead to agreement, it will, at a minimum, help clarify perspectives and provide useful information to inform a broader dialog as the issue goes forth to voters.

Next steps in this process will be for staff to continue meeting with the Decarbonization Tech Team on the two questions outlined above, and to prepare information and a final staff recommendation for presentation to City Council in June 2010. Updates will be provided to council in the interim under “matters” at regularly scheduled council meetings.

Staff will also provide an update at the April 13 study session on further conversation with the Decarbonization Tech Team on April 8, which helped clarify some of the points outlined in this memo as well as the course of action being proposed by that group.

Question 2

Does City Council have any concerns with the Xcel Franchise strategy outlined in the study session material?

Approved By:

Jane S. Brautigam,
City Manager

ATTACHMENTS:

- A:** Update on Climate Action Plan efforts
- B:** Additional Colorado Energy & Air Facts
- C:** REDI Executive Summary
- D:** Valmont Repowering Scope of Work
- E:** Current Energy Legislation
- F:** Current City of Boulder PUC Dockets
- G:** Update on City Facilities Emissions
- H:** Background on Boulder Hydro Facilities

Attachment A

Update on Climate Action Plan efforts

New Climate Action Plan strategy

The City's [Climate Action Plan \(CAP\) Community Guide](#) was updated in September 2009. It includes program plans that carry out the CAP strategy accepted by City Council in June 2009. The essence of the new CAP strategy is to provide one-stop-shop, convenient programs that build on existing community efforts already underway and that leverage the city's resources to provide for all Boulder businesses and residents:

- Access to information,
- Access to services, and
- Access to financing and capital.

The residential door-to-door program has been referred to as "Two Techs and a Truck," a name that seems to have gained quite a bit of national recognition, prompting many print, television and electronic media to profile the city's efforts. In addition, several graduate schools and professional research organizations have been inspired to contact the city, aiming to establish long term research studies that relate to behavior change and energy efficiency upgrades that result in measurable greenhouse gas reductions.

The business programs will be a bit more varied, as the door-to-door components of *two techs and a truck* is not appropriate for most businesses in Boulder. However, the business programs currently under design maintain the commitment to providing convenient one-stop-shop services and financing tools to facilitate energy efficiency upgrades.

The new CAP strategy also aims to fully utilize emerging social mobilization strategies that will:

- Build on existing social and business networks and community leaders (in trade associations, schools, faith or affinity organizations and neighborhoods);
- Offer rewards to individuals and groups that meet or exceed challenges and contests;
- Maximize the use of social media (Twitter, Face book, iPhone apps etc.) as appropriate to raise awareness and to provide tools to help make community initiatives fun and convenient;
- Begin to shift the social norms around energy use; and ultimately
- Result in measurable greenhouse gas reductions.

Staff is planning to release an RFP for a firm to design the city's CAP Social Mobilization strategy. The RFP will contain an optional section for implementation of the social mobilization strategy.

Reorganization of the city's environmental group

During the months of September through December, 2009, the city restructured the Office of Environmental Affairs to focus on delivering energy and waste reduction programs to residents and businesses, creating the Local Environmental Action Division (LEAD) within the Community Planning and Sustainability department. Leading up to and as part of the reorganization, two vacancies were created. On March 19, the city made formal job offers to two candidates. The two new positions are: a Residential Sustainability Specialist to manage the

social mobilization efforts for all of the city's energy and waste reduction programs and a Business Sustainability Specialist who will help flesh out the programs and financial packages that will be offered to businesses and property owners.

Community involvement

Also as part of the new CAP strategy, the city established six CAP Technical teams to develop the new programs and to host a semi-annual Community Climate Action Summit as a way to ensure coordination among community partners and to help community climate action leaders to elicit maximum awareness and participation in their programs. The first Community Climate Action Summit will be held on **Friday April 16 from 9 am to 4:30 pm, at the Millennium Harvest House**. Council is scheduled to receive a Weekly Information memo regarding the Community Climate Action Summit in its April 8 packet. The CAP Technical teams are as follows:

- Transportation Tech Team
- Decarbonization Tech Team
- Finance Tech Team
- Social Mobilization Team
- Residential Tech Team
- Commercial Tech Team

Over 60 community members have been actively participating in the various technical team meetings that have been held over the past 6 months. There have also been approximately 25 additional community members that have volunteered to be on the Host Committee or to play an active role in reporting out on their successes and challenges at the April Community Climate Action Summit.

Access to information

Staff has been working with Boulder County, the Colorado Governor's Energy office, the Department of Energy, Xcel Energy and the Center for Resource Conservation to gather together all the information relating to rebates and incentives that are available and will become available in the coming months for property improvements for energy efficiency, waste reduction opportunities, transportation alternatives and water conservation.

All of this information will be packaged separately for residents and businesses, and further categorized into specific business sectors and service tiers to provide an on-site "concierge" service that will target behavior change, offer technical assistance (e.g., physically fill out rebate forms for property owners; create customized travel toolkits and on-demand travel information; help residents access their Xcel Energy Smart Grid Web portal to see their own energy use, etc.) and provide information if property owners would like to make more substantive changes (beyond the basic services described, below).

Access to services

Residential

The *Two Techs and a Truck* program is currently being designed by a consultant group comprised of The Cadmus Group, Inc., First Tracks Consulting and Energy Logic. This design is being created to design and deliver a comprehensive energy efficiency retrofit program that will remove the common barriers associated with implementing energy efficiency. In this design,

certified contractors will show up at a property with the materials and skills needed to make instant energy efficiency improvements and will follow-up as necessary to schedule further retrofits until the property is improved to the designated level of the program as well as providing information and assistance for those property owners desiring deeper retrofits.

The concept of the program includes the ability to take advantage economies of scale through pre-negotiated bulk purchasing discounts for materials and services. Additionally, the program will consolidate work and promote the services through neighborhoods and existing social networks. The program will also package rebates, incentives, and financing for residents to leverage external funding and resources.

Commercial

For commercial building owners, the three-tiered strategy shown in the following diagram has been developed in consort with Boulder County and the commercial technical team. The purpose of this strategy is to provide a framework for city and county staff and contractors to determine the workflow for an individual customer, allowing packages of services to be tailored to individual property types and ownership models. To the property owner, the delivery will be seamless, and will include three optional levels of service focusing on:

1. Behavior change (primarily for tenants)
2. Building equipment tune-ups (for tenants or owners; tailored to the business type e.g., refrigeration and lighting for supermarkets and restaurants, lighting and HVAC for office buildings, etc.)
3. Equipment Change-outs (for property owners).

The city is working with Nexant Consulting to identify the most cost effective building tune-up services that should comprise “Tier 2” and to make recommendations on how the city investment should be focused in all the tiers, given the available budget (averaging approximately \$850 per business).

DRAFT - Commercial Efficiency Program - 2010 Pilot

<p><u>Energy Efficiency Education</u> Provide education and create social mobilization. Target: Retail & Office Services: Utility bill review, freebies (cfls, smart strips, etc.), check programmable thermostats and occupancy sensors, refer businesses to tune-up or assessment program(s). Partners: Chamber of commerce, business networks</p>	<p style="text-align: center;"><u>Tune-up</u> (Formerly called “Two Techs & a Truck”) Quick and easy energy improvements Small Building Tune-up Target: Retail & Office Services: HVAC diagnostics and maintenance Partners: HVAC service contractors Refrigeration Tune-up Target: Restaurants, convenience stores, liquor stores Services: Refrigeration maintenance, minor repairs Partners: Refrigeration service contractors Compressor Tune-up Target: Auto body and repair Services: Compressor leak check and repair Partners: Compressor maintenance contractors</p>	<p><u>Assessment and Upgrade</u> Focused or general energy assessments, with technical assistance to complete projects and get rebates Small Business Lighting Target: Retail & Office Services: Lighting assessment Partners: Contractor referral Rebate and matching funds Refrigeration Target: Restaurants, convenience, liquor stores Services: Case lighting & EC motors Partners: Contractor referral Rebate and matching funds HVAC Upgrade Target: Retail & Office Services: General assessment Partners: Contractor referral Rebate and matching funds</p>
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Access to financing and capital

Boulder County's Climate Smart loan program still remains the primary alternative financing tool for property owners to invest in energy efficiency and renewable energy upgrades. However, the city's Energy Efficiency and Conservation Block Grant (EECBG) and matching funds from the Governor's Energy Office are slated to be used for limited-availability rebates and matching funds for property owners that make efficiency upgrades. The city's CAP financing technical team is also beginning to work with Boulder County and local investors to develop a smaller loan program that would not be tied to the bonding cycles and would be able to provide loans for investments less than \$3,000 (the lower limit for Climate Smart Loans). Community partners are also helping the city look at other potential funding tools such as:

- Government grants
- Traditional bank loans
- Bank required community investment funds
- Bank "green" loans
- Federal or local loan guarantees
- Green investor groups and private venture capitalists
- ESCOs (energy service companies)
- Demand side management rebates and incentives

The city is also waiting to hear from the Dept of Energy regarding a \$75 million grant application for Colorado that could provide up to \$21 million to Boulder County residents and businesses for micro-loans and rebates for energy efficiency.

Legislative changes

Smart Regs

As council is aware, staff has been working with the community and stakeholder groups to develop updates to the housing code that incorporate energy efficiency requirements for residential rental properties in Boulder. Proposed changes to the housing and rental licensing codes, including energy efficiency requirements, are scheduled for City Council consideration at the May 4, 2010 City Council meeting.

Existing commercial buildings

The city has also hired Navigant Consulting to research energy efficiency measures which could be required over time to upgrade the energy efficiency of existing commercial buildings in Boulder. This consultant study will identify options and recommendations for regulatory requirements. As part of this, Navigant will analyze prescriptive measures, performance-based standards, energy audit requirements, energy use disclosure requirements and "green lease" requirements. The analysis will also determine which commercial property types present the best opportunity for energy efficiency regulations based on greenhouse gas impact, ability to make energy efficiency improvements and ease of enforcement. In addition, Navigant will identify and analyze some possible regulatory "trigger points" and associated financial and environmental impacts of these:

- a. Time of sale
- b. Time of lease
- c. Established future deadline
- d. Connection to an existing city business license program
- e. Building permit issuance

- f. New licensing program for businesses (i.e. a rental/lease/license program)

Staff will report to council on the progress of this effort during the fourth quarter 2010.

Greenhouse gas reduction results

The results of the CAP programs that continued through 2009 will be reported to council in June along with a status update on the new CAP strategy. The actual results of the new initiatives including *Two Techs and a Truck* and all new business energy and waste reduction programs will be included in an annual update to the Climate Action Plan Community Guide, which will be complete third quarter of 2010. At the second Community Climate Action Summit in October, the city and other community partners will have an opportunity to gather feedback on all the new initiatives after their launch and trial periods. At this time, the projections from the 2009 Climate Action Plan Community Guide remain staff's best estimate at GHG reduction potential of these new programs and new strategies. A summary of these programs and projected GHG emissions reductions are contained in the chart below.

Appendix A – Program Summary

2010 Programs	Average Annual CAP Fund Budget***	Estimated Greenhouse Gas Reduction in 2012 (tons CO ₂ e)	Average Annual CAP \$ per Ton	Average Annual Estimated Private Investment	Estimated Lifetime Energy Cost Savings	Total Cost Per Ton (over life of the measure)
1. Reduce Use						
ClimateSmart at Work						
Commercial "Two Techs and a Truck"	\$807,600	87,800	\$28	\$17,500,000	\$46,358,000	\$(319)
10 For Change	\$61,000	17,000	\$11	\$1,042,000	\$3,213,000	\$(124)
Commercial ClimateSmart Loan Program and Other Financing	\$5,000	4,400	\$3	*	*	*
Energy Code for Existing Commercial Buildings (CECO)	\$10,000	24,000	\$1	\$0	*	*
City Organization Energy Strategy Team	\$5,000	3,800	\$4	\$850,000	\$800,000	\$(132)
Regional Sustainability	\$0	*	***	**	**	*
ClimateSmart at Home						
Residential "Two Techs and a Truck"	\$571,400	58,600	\$29	\$16,500,000	\$26,400,000	\$(159)
Smart Grid	\$7,000	23,000	\$1	\$0	*	\$1
Residential ClimateSmart Loan Program and Other Financing	\$9,000	8,400	\$3	*	*	*
Energy Code for Existing Residential Buildings (RECO)	\$5,000	42,000	\$0.4	\$0	*	*
Total Reduce Use	\$1,481,000	269,000				
<i>Percent of Goal Met</i>		65%				
2. Build Better						
New/Remodel Commercial Building Energy Code	\$0	5,000	**	*	*	*
New/Remodel Residential Building Energy Code	\$0	4,400	**	*	*	*
Total Build Better	\$0	9,400	**	*	*	*
<i>Percent of Goal Met</i>		2%				
3. Ramp Up Renewables						
Windsourse and Renewable Energy Credits Promotion	\$9,500	46,000	\$0.2	\$780,000	**	\$17
ClimateSmart Solar Grants and Sales Tax Rebates	\$12,500	900	\$56	\$610,000	\$580,000	\$47
Xcel Energy Franchise Renewal	\$0	*	**	**	**	*
Public Utilities Commission and State Legislature	\$0	*	**	**	**	*
Community-wide Solar Installations	\$1,400	17,000	\$0.1	\$7,164,000	\$2,688,000	\$263
City Hydroelectric and Cogeneration	\$0	22,000	**	**	*	*
City Organization - Renewables	\$4,600	1,200	\$1.5	**	*	*
Total Ramp Up Renewables	\$28,000	87,000				
<i>Percent of Goal Met</i>		21%				
4. Travel Wise						
GO Boulder	\$100,000	24,000	\$4	*	*	*
City Organization - 90% Alternative Fuel Vehicles and Plug-in Hybrid Electric Vehicles	\$0	1,000	**	**	**	\$424
Total Travel Wise	\$100,000	25,000				
<i>Percent of Goal Met</i>		6%				
5. Waste Not						
Waste Reduction	\$0	6,400	**	**	**	*
<i>Percent of Goal Met</i>		2%				
6. Grow Green						
Urban Forestry	\$0	*	**	**	**	**
TOTAL	\$1,609,000	396,800				
<i>Percent of Goal Met</i>		96%				

* Not Estimated ** Not Applicable ***Does not include American Recovery and Reinvestment Act funding listed in table in Section Four.

Attachment B

Additional Colorado Energy & Air Facts

Resources and Consumption

Colorado has substantial conventional fossil fuel and renewable energy resources. The State contains several fossil fuel-rich basins, including the Sand Walsh, Piceance, Paradox, and San Juan basins in the west, and the Denver and Raton basins in the east. Ten of the Nation's 100 largest natural gas fields and three of its 100 largest oil fields are found in Colorado. Substantial deposits of bituminous, sub bituminous, and lignite coal are also found in the State.

Colorado's high Rocky Mountain ridges offer wind power potential, and geologic activity in the mountain areas provides potential for geothermal power development. Major rivers flowing from the Rocky Mountains offer hydroelectric power resources. Corn grown in the flat eastern part of the State offers potential resources for ethanol production. The Colorado economy is not energy intensive. The transportation and industrial sectors are the leading energy-consuming sectors in the State.

Petroleum

Colorado oil production typically accounts for around 1 percent of the U.S. total. Most production takes place in the Denver and Piceance basins. Crude oil output serves Colorado's two refineries in Commerce City north of Denver. Several petroleum product pipelines from Wyoming, Texas, and Oklahoma help supply the Colorado market. The Denver/Boulder and Ft. Collins areas use oxygenated motor gasoline; the rest of the State uses conventional motor gasoline. Although the Denver metropolitan area was the first area in the Nation to require the use of motor gasoline blended with ethanol to reduce carbon monoxide emissions, the State is relatively new to large-scale ethanol production. Colorado produces ethanol mostly from corn at small facilities in the northeastern part of the State. Colorado's smallest ethanol production plant is co-located with the Coors brewery in Golden and uses waste beer to produce ethanol for fuel consumption. Using waste beer to produce ethanol lowers the emissions of volatile organic compounds from the Coors brewery significantly.

Although its proven crude oil reserves account for only about 1 percent of the U.S. total, Colorado has enormous deposits of oil shale rock, known as marlstone, which can be converted into crude oil through destructive distillation. The Green River Formation, a group of basins in Colorado, Wyoming, and Utah, holds the largest known oil shale deposits in the world. Colorado's oil shale deposits, concentrated in the Piceance Basin in the western part of the State, hold an estimated 1 trillion barrels of oil — as much oil as the entire world's proven oil reserves. Although this natural resource holds tremendous promise, oil shale development remains speculative and faces several major obstacles involving technological feasibility, economic viability, resource ownership, and environmental considerations. While

pilot oil shale projects have been undertaken in the area, there are no plans for the construction of commercial oil shale production facilities in Colorado.

Natural Gas

Colorado is a top natural gas-producing State. Conventional and unconventional output from several Colorado basins typically accounts for more than 5 percent of U.S. natural gas production. Coal bed methane (unconventional natural gas produced from coal seams) accounts for over forty percent of Colorado's natural gas production, and almost thirty percent of all coal bed methane produced in the United States. Coal bed methane production is active in the San Juan and Raton Basins, and further development is possible in northwest Colorado's Piceance Basin, which holds the second-largest proved reserves in the Nation.

Natural gas consumption by the electric power sector has been increasing since 2003, with a dramatic increase in 2007 putting the sector second only to the residential as the leading natural gas-consuming sector in Colorado. About three-fourths of Colorado households use natural gas as their primary energy source for home heating, one of the highest shares in the Nation.

Colorado uses only about two-fifths of its natural gas production. The remainder is transported to markets in the West and Midwest. Colorado is part of the transportation corridor for shipping gas from the Rocky Mountain supply region to the Midwest and West markets. Colorado's natural gas production is growing, and construction of a new pipeline was recently completed to help move the rapidly increasing output to the Midwest. The new system, known as the Rockies Express Pipeline, originates in the Piceance Basin and extends from Colorado to Audrain County, Missouri with completion of an extension to Clarington, Ohio completed and placed into full service in November 2009.

In the past, we have been the beneficiaries of having an abundance of natural gas in the Rocky Mountain region resulting in lower costs than the national average. With the completion of the pipeline system, our costs will be higher and be more in-line with nation-wide prices.

Coal, Electricity, and Renewables

Coal- and natural gas-fired power plants dominate electricity generation in Colorado. Coal-fired plants account for over seven-tenths of the State's generation and natural gas-fired plants account for close to one-fourth. Colorado produces coal from both underground and surface mines, primarily in its western basins, and large quantities of coal are shipped into and out of the State by rail. Colorado uses about one-fourth of its coal output and transports the remainder to markets throughout the United States. Colorado also brings in coal, primarily from Wyoming, to supplement local production.

Hydroelectric and wind power facilities account for most of the State's renewable electricity generation. However, much of Colorado's substantial renewable energy potential remains to be developed, and the State currently ranks relatively low in

renewable energy generation. In August 2009, a proposal was made for a biomass plant to be located in Vail that would use the thousands of trees that were recently killed by pine beetles to create a new sustainable source of energy. The proposed plant would reduce carbon emissions and forest fires in addition to creating a reliable source of energy that is likely to last at least ten years. A feasibility study is planned to look at environmental issues and the ability to obtain a sustainable supply of trees. In March 2007, a new renewable portfolio standard was adopted by Colorado that requires large investor-owned utilities to produce 20 percent of their energy from renewable sources by 2020.

Less than one-fifth of Colorado households use electricity as their main energy source for home heating.

- The deployment of solar energy continues to grow rapidly in Colorado, now ranked 3rd nationally for distributed solar photovoltaic capacity and 6th for its solar resource.
- In 2009, Colorado ranked 8th in installed wind capacity and 11th in wind resources.
- Colorado has the second-largest reserves of natural gas and is the seventh-largest producer of natural gas, with more than 41,000 active oil and gas wells.
- Colorado's population is expected to double to 10 million people over the next 40 years.
- Electricity prices in Colorado are increasing. These price changes reflect in part the increased cost of fuels used to generate electricity.
- Even as home and business owners reduce their consumption, through efficiency and conservation measures, Colorado still will need an estimated 2-4 gigawatts of additional electricity by 2020 to keep pace with population growth and other demands. Colorado currently consumes 11 GW of electricity during peak summertime load periods.
- Natural gas can play a key role as a cleaner-burning source of baseload electricity generation, which also will support increased use of wind and solar as a major source of power.
- Reducing regional haze is a national visibility goal in the federal Clean Air Act meant to restore vistas in certain wilderness areas and national parks to natural levels.
- Regional haze comes from numerous sources, including in-state power plants, and it impairs visibility in Colorado's wilderness areas and national parks.

Colorado Utilities

In addition to the three types of electric utilities described in the memo that sell electricity directly to retail customers, other entities only generate, transmit and sell power at the wholesale level to other utilities, but they don't sell directly to retail customers. In Colorado, these include consumer-owned generation and transmission associations, municipal power agencies, the Western Area Power Administration (WAPA) and non-utility generators.

- Tri-State Generation and Transmission Association (Tri-State G&T) is the only consumer-owned generation and transmission association operating in Colorado. It is a wholesale power supplier owned by 44 rural electric cooperatives in four states.
- Two municipal power agencies in Colorado, the Platte River Power Authority and the Arkansas River Power Authority, provide generation and transmission services to their respective municipal utility members. They are governed by boards of directors appointed by the member municipalities.
- WAPA is one of four federal power marketing agencies that sell power and transmission services to a wide variety of wholesale customers. WAPA serves in 15 western states over a 1.3-million-square-mile area, including municipal utilities and rural electric cooperatives in Colorado. WAPA is not subject to the jurisdiction of either state or federal regulators.

Historical Colorado RPS

Colorado became the first U.S. state to create a renewable portfolio standard (RPS) by ballot initiative when voters approved Amendment 37 in November 2004. The original version of Colorado's RPS required utilities serving 40,000 or more customers to generate or purchase enough renewable energy to supply 10% of their retail electric sales. The original RPS also implemented a rebate program for customers of the state's two investor-owned utilities, Xcel Energy and Black Hills Energy (formerly Aquila). The rebate program is still in effect.

In March 2007, HB 1281 increased the RPS and extended the renewable-energy requirement to electric cooperatives, among other changes. Eligible renewable-energy resources include solar-electric energy, wind energy, geothermal-electric energy, biomass facilities that burn nontoxic plants, landfill gas, animal waste, hydropower, recycled energy,* and fuel cells using hydrogen derived from eligible renewables.

Colorado's RPS requires each investor-owned utility to provide specific percentages of renewable energy and/or recycled energy according to the following schedule:

- * 3% of its retail electricity sales in Colorado for the year 2007;
- * 5% of its retail electricity sales in Colorado for the years 2008-2010;
- * 10% of its retail electricity sales in Colorado for the years 2011-2014;
- * 15% of its retail electricity sales in Colorado for the years 2015-2019; and
- * 20% of its retail electricity sales in Colorado for the year 2020 and for each

following year.

For investor-owned utilities, at least 4% of the standard must be generated by solar-electric technologies. At least one-half of the solar requirement must be generated by solar-electric systems located on-site at customers' facilities. Eligible electricity generated in Colorado is favored; each kilowatt-hour (kWh) of eligible electricity generated in-state receives 125% credit for RPS-compliance purposes. The Colorado Public Utility Commission (PUC) has issued rules to implement the RPS. The PUC's rules generally apply to investor-owned utilities.

In addition, Colorado's RPS requires all electric cooperatives and each municipal utility serving more than 40,000 customers to provide specific percentages of renewable energy and/or recycled energy according to the following schedule:

- * 1% of its retail electricity sales in Colorado for the years 2008-2010;
- * 3% of its retail electricity sales in Colorado for the years 2011-2014;
- * 6% of its retail electricity sales in Colorado for the years 2015-2019; and
- * 10% of its retail electricity sales in Colorado for the year 2020 and each following year.

In the service territory of electric cooperatives and eligible municipal utilities, electricity generated at a "community-based project" -- a project not greater than 30 megawatts (MW) in capacity that is located in Colorado and owned by individual residents of a community or by nonprofits, cooperatives, local government entities or tribal councils -- receives 150% credit for RPS-compliance purposes. There is no solar requirement for electric cooperatives and eligible municipal utilities, but solar electricity generated by a facility that begins operation before July 1, 2015, receives 300% credit for RPS-compliance purposes. (Solar electricity generated by a facility that begins operation on or after July 1, 2015, receives 100% credit.) System owners may not take advantage of both the community-based project multiplier and the solar multiplier.

Tradable renewable energy credits (RECs) may be used to satisfy the standard. Utilities that do not generate the required amount of electricity from eligible renewables may purchase RECs from utilities that exceed the requirement.

Determining the grid emissions factor

To calculate carbon dioxide emissions associated with electricity consumption, the amount of electricity used (either known from utility bills, or calculated using one of the options above) is multiplied by the electricity grid emissions factor for the state of Colorado. Electricity grid emissions intensity is calculated by determining the amount of pounds of carbon dioxide that is emitted as a result of generating one kilowatt hour of electricity. This figure depends on the types of resources, e.g. coal, natural gas, wind, hydro, etc. that are used to generate the electricity consumed in Colorado. The Colorado-specific emission factor used in this calculator is based on the US Environmental Protection Agency's Emissions & Generation Resource

Integrated Database (eGRID).ⁱⁱ The factor for Colorado is 1986 pounds of CO₂ per kWh.

Total electricity consumed (kWh's) multiplied by the emissions factor determines the amount of pounds of carbon dioxide that are attributable to the organization as a result of electricity consumption.

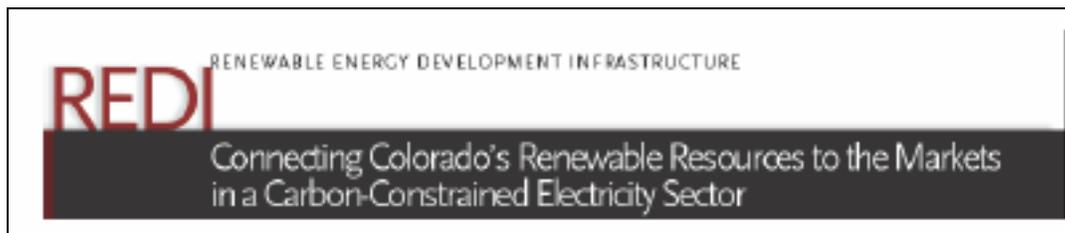
To calculate the amount of pounds of carbon dioxide from natural gas consumption attributable to the organization, the calculator multiplies the number of therms used annually by 12.0593,^{iv} the amount of pounds of CO₂ that is emitted from burning one therm of natural gas.

Electricity Indirect CO₂ equivalent emission factor: 1 MWh = 0.858 mtCO₂ – see below

GHG	Emission Factor (lbs/MWh)	Emission Factor (MT/MWh)	Emission Factor (MT/kWh)	GWP	Emission Factor (MT CO ₂ e)
CO ₂	1,883.08	0.854152	0.000854152	1	0.00085415
CH ₄	0.023	0.000010	0.000000010	21	0.00000022
N ₂ O	0.029	0.000013	0.000000013	310	0.00000404
				Total Emission Factor	0.00085841

From E-Grid for Rocky Mountain Region - <http://cfpub.epa.gov/egridweb/ghg.cfm>

Attachment C



Executive Summary

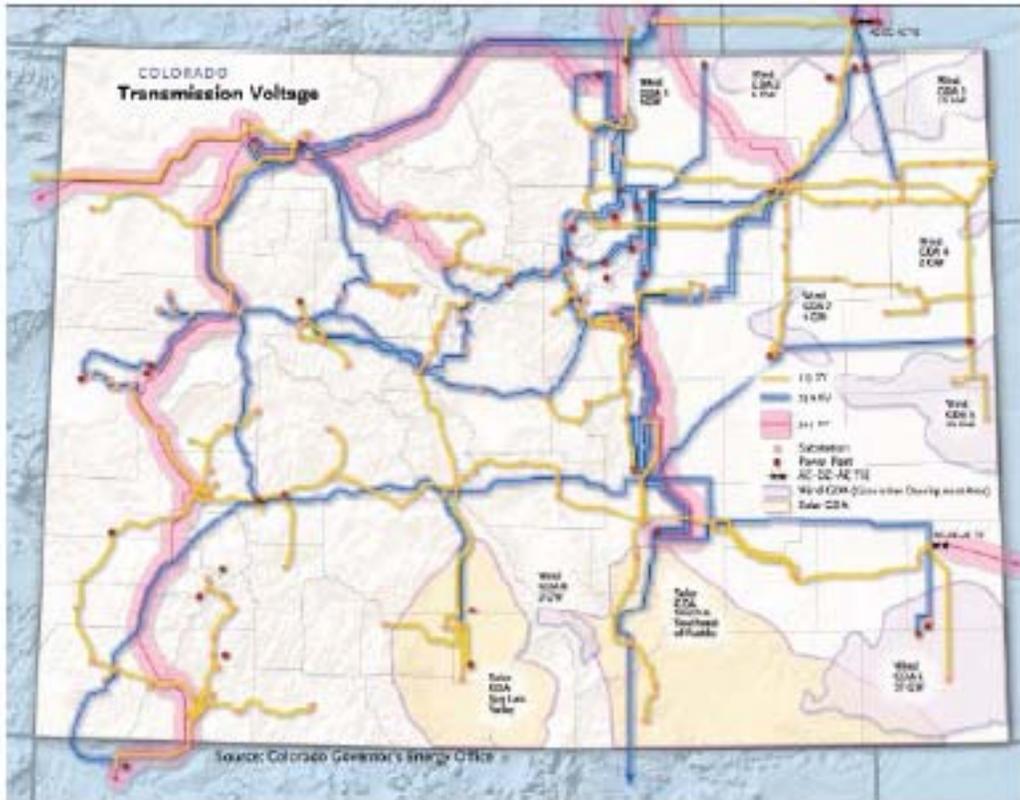
Colorado's electricity sector is moving into an era where it must address a relatively new challenge — carbon dioxide (CO₂) emission reduction. And in so doing, the sector must continue to emphasize system reliability, the need for infrastructure upgrades, and strategic planning to minimize the economic and environmental costs into the future. These, and other, interrelated challenges are the subject of the Colorado Governor's Energy Office's (GEO) 100-page Renewable Energy Development Infrastructure (REDI) Report.

Colorado is fortunate to have some of the most abundant utility-scale renewable resource generation development areas (GDAs) in the nation. To bring that power to the market requires high-voltage transmission infrastructure. Developing Colorado's resources as a means to achieve climate change and economic development opportunity offers an unprecedented opportunity for the state to lead the nation and take full advantage of the New Energy Economy. Leadership in Colorado's electricity sector that successfully addresses the inter-related challenges, including pursuing a CO₂ reduction strategy, will create new jobs, will revitalize many of our rural economies, and will help ensure long-term cost stability for electric customers.

The REDI report examines how Colorado's electricity sector can reduce its CO₂ emissions by 20 percent by 2020 from its 2005 levels — referred to as the "20x20 goal." The report focuses particularly on this question: how can Colorado most effectively address the challenge of building new high-voltage transmission lines to deliver utility-scale renewable power from Colorado's rich renewable resource GDAs to the markets? The electricity sector nationally, and in Colorado, is increasing its recognition of and commitment to the need to meet CO₂ reduction goals. As Colorado's electricity sector addresses the 20x20 goal, industry and regulators will also address electric demand growth, water constraints, and the urgent need to upgrade an aging and undersized transmission infrastructure. The report focuses primarily on high-voltage transmission and supply-side electric power options, but it does so within the context of how an appropriate blend of demand-side and supply-side measures can most cost-effectively meet the 20x20 goal.

The map that follows shows Colorado's existing high-voltage transmission infrastructure, defined as 115 kilovolts (kV) and above. Colorado does not have transmission lines with voltages above 345 kV. The map also shows the renewable resource GDAs identified in the *Connecting Colorado's Renewable Resources to the Markets*, also known as the

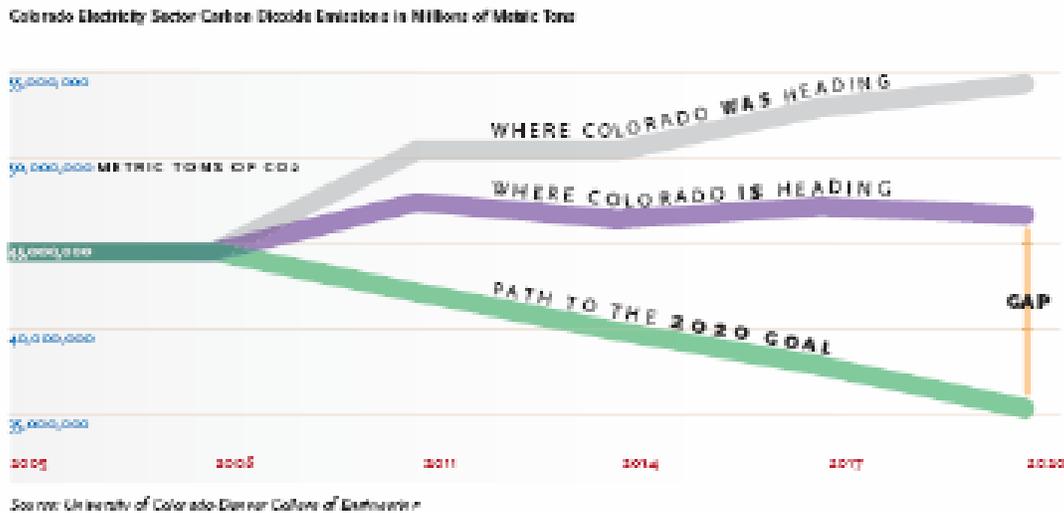
SB07-91 Report, where the state’s highest concentrations of high-quality wind and solar resources exist. Lines rated at 115 kV are only capable of delivering very modest blocks of power. Higher voltages lines, such as 230, 345, and 500kV lines are far more effective at delivering Colorado’s rich renewable resources to the markets. Most of the high-voltage transmission lines in or near the GDAs already are constrained, with little spare transfer capability to accommodate new renewable power development. High-voltage transmission delivering renewable power to the markets will greatly facilitate Colorado’s opportunities to reduce CO2 emissions while expanding the state’s economic development.



The REDI Report uses three Colorado electricity sector CO2 emission scenarios to examine how Colorado might achieve the 20x20 goal. The REDI Project’s technical consultant, at the University of Colorado at Denver’s (UCD) College of Engineering, developed the quantification of these goals. To conduct the analysis, it was necessary to construct plausible scenarios for the future of Colorado’s electricity sector. These scenarios do not constitute formal policy goals, nor are they specific policy recommendations. The analysis of how Colorado’s electricity sector can meet the 20x20 goal is summarized in the REDI Report’s appendix. A full description of the modeling and assumptions is available in the UCD technical report on the REDI page on the Electric Utilities page of the GEO website (www.colorado.gov/energy).

The top line of the following graph indicates the trajectory of CO2 emissions based on the direction of Colorado’s electricity sector before the legislature passed demand-side

and renewable energy goals in the past few years. The middle line shows where the Colorado electricity sector is now heading, taking into account current laws and regulatory rules that prescribe renewable energy and energy efficiency outcomes. The bottom line shows the trajectory of CO2 emissions that Colorado's electricity sector would need to meet to reach the 20x20 goal.



As indicated, Colorado faces a CO2 emissions gap between where the electricity sector's existing policies will reach by 2020, as compared to the 20x20 goal. The REDI Report addresses how Colorado's electricity sector could close this gap and concludes that, if the sector is to meet the 20x20 goal, the following steps should be taken:

- Greatly increase investment in demand-side resources (energy efficiency, demand-side management, demand response, and conservation).
- Greatly increase investment in renewable energy development, particularly utility-scale wind and solar generation.
- Accelerate construction of high-voltage electric power transmission to deliver renewable energy from Colorado's renewable resource generation development areas to the state's major load centers.
- Strategically use natural gas-fired power generation to provide needed new power to the grid and to integrate naturally variable renewable resources.
- Consider decreasing the utilization factor of coal-fired generation and/or consider early retirement of the oldest and least efficient coal-fired units.

Meeting these challenges points to the need not only for continual improvements within the electric power industry, but also to the need for modifications to regulatory and policy

structures. Colorado could benefit from even stronger interstate coordination among the multiple players who plan new generation and transmission. The power system currently operates under a smaller balancing authority area than might be desirable for the most advantageous integration of wind and solar power. The current smaller separate balancing authority areas may have the effect of increasing the cost of delivering renewable power to Colorado customers. Without a single regional balancing authority area, Colorado may risk increased costs of transmitting power beyond what such prices might be under more coordinated transmission pricing systems.

Finally, delays associated with siting and permitting of transmission lines will hamper Colorado's utility-scale renewable energy development unless modifications are made to the process. Although Colorado's electricity sector has made notable strides in recent years in the direction of meeting the 20x20 goal, further steps in that direction are offered by the report. If the sector successfully meets the 20x20 goal, the report indicates that the state's economic development will be bolstered by deployment of clean energy infrastructure, with new jobs stemming from investments in renewable energy manufacturing.

The report suggests that Colorado stakeholders examine:

- The benefits, feasibility and possible procedures for developing a state and regional long-range transmission plan. The objectives of the plan would include traditional electric reliability needs, cost stability, and incorporation of the most cost-effective options to reduce CO₂ emissions.
- The costs and benefits of a regional balancing authority area of which Colorado would be a part. Colorado should strengthen its engagement with neighboring states in relation to governance and operation of the transmission system over a multi-state area.
- The most effective means to secure robust participation from a diverse set of stakeholders to ensure that Colorado's lands, wildlife, scenic, and other natural resources are adequately considered. Stakeholders should also consider whether it is warranted to seek additional guidance regarding the avoidance of sensitive areas.
- Whether a process should be initiated to determine the costs and benefits of a statewide transmission siting authority, to include county commissioners and other key stakeholders.

Attachment D

Valmont Repowering Study: Scope of Work

Status and Timeframe:

As the result of an informal bidding process that ended July 31, 2009, First Tracks Consulting Service and Iron Mountain Consulting (“the Contractors”) submitted a proposal to Boulder County Public Health (“BCPH”) on November 2, 2009, entitled, “Proposal to Boulder County: The Valmont Power Plant Opportunity” (“Contractors’ Proposal”). This proposal was selected by Boulder County Public Health (“BCPH”) on December 8, 2009, for the Contractors to perform the tasks that were identified in the scope of work (SOW; see below), per the contractors’ proposal.

Task 1: Frame Analysis

Work with the Boulder County team to frame the analysis, defining the planning attributes that will be important in measuring outcomes, as well as the range of generation alternatives for the Valmont site to be considered in the analysis.

Key deliverables for this task include:

- An advance packet providing background materials to help the County identify key planning attributes and possible generation alternatives.
- A planning session to brainstorm, prioritize, and finalize the planning attributes and generation alternatives that will frame the analysis.
- A final list of planning attributes that will be evaluated in the analysis.
- A final list of generation alternatives to evaluate in the analysis.

Task 2: Characterize Valmont Alternatives

For each generation alternative, the Contractors will develop a profile outlining the key operating, financial, environmental, and related attributes that will affect its attractiveness as a replacement option.

Key deliverables for this task include:

- Detailed profiles for each generation alternative.
- Background research on the existing Valmont Unit 5.
- Background research on biomass issues.

Task 3: Develop Analysis Framework

In this task, the Contractors will develop an analysis framework for comparing the lifecycle costs and emissions of the alternatives defined in Task 2, ensuring that each alternative is evaluated on an equivalent basis.

Key deliverables for this task include:

- A spreadsheet model for calculating lifecycle emissions and costs for each alternative.
- Estimates for global inputs, such as fuel prices and replacement power costs.

Task 4: Analyze and Prioritize Valmont Alternatives

In this task, the Contractors will use the analysis framework developed in Task 3, along with the input data developed in Task 2 to evaluate each of the alternatives for Valmont repowering.

Key deliverables for this task include:

- Preliminary analysis and results.
- Presentation of preliminary results to County staff.
- Final analysis and results.

Task 5: Document Analysis and Findings

In this task, the Contractors will document the approach, assumptions, results, and recommendations of the project. The Contractors will complete a draft report for review by County staff, and County staff feedback will be incorporated into the final report. The final report will include an executive summary that provides an overview of the approach and highlights key findings.

Key deliverables for this task include:

- Draft report.
- Final report.

Task 6: Conduct Meetings and Manage Project

In this task, the Contractors will facilitate the meetings necessary to bring build a cohesive team of consultants and staff, monitor project progress, and present results. The Contractors envision an initial meeting to kick off the project, interim meetings to monitor progress and present findings, and a final meeting to present final results and review comments on the draft report

Optional Task 7: Review Results with Key Stakeholders

In this task, the Contractors will help the County present study findings to members of the public. ***Note:** Optional Task 7 is not being included in this Contract; however, as funding becomes available, it may be added as an addendum to this Contract.

Key deliverables for this task include:

- The Contractors will develop a presentation that outlines the analysis approach and key results.
- The Contractors will hold two public meetings, each approximately two hours in duration, to present the study findings to interested members of the public.

PROJECT TIMELINE

- Tasks 1-6 will be completed by May 2010.
- This Contract may be extended to include Optional Task 7 by June 2010, dependent on availability of funding.

Attachment E

HB10-1001: Electric Utility Renewable Energy Standard

Existing law creates a renewable energy portfolio standard (RPS) under which certain electric utilities are required to generate an increasing percentage of their electricity from renewable sources, in a series of increments from 3% in 2007 to 20% in 2020 and thereafter. This Bill boosts these RPS percentages to achieve 30% renewable generation by 2020 and requires a portion of the RPS to be met through a subset of renewable generation, “distributed generation,” which does not require additional transmission facilities to connect to the grid.

HB10-1342: Community Solar Gardens

Current law requires investor owned electric utilities to generate an increasing amount of Colorado’s energy from renewable sources. It also places an emphasis on distributed solar generation, and toward that goal, requires such utilities to offer a standard rebate for the cost of installation, and to purchase the renewable energy credits from customer-sited solar generation facilities. The customer’s solar generation offsets the customer’s electricity consumption (net metering). In order to expand opportunities for distributed solar generation, HB10-1342 would allow 10 or more subscribers to own interests in a localized community solar garden—a solar generation facility that can be located on or off the property of the subscribers to the solar garden.

The legislation would allow these joint solar garden owners to receive similar benefits as roof-top solar owners, including payments for Renewable Energy Credits comparable to the rebates and/or REC payments roof-top solar owners receive, such as:

- A credit on their utility bill for power they have generated (net metering), and;
- Payment for annual generation they deliver in excess of their own annual use.

In order to maintain their community-based characteristic, and to address other concerns, community solar gardens have the following limitations:

- Limited in size to 500 Kilowatts or 2 Megawatts, depending on whether they opt to receive a utility standard offer or are bid through a utility bidding process;
- Subscriber’s premises must be located within the same city or county as the community solar garden; and
- A subscription interest cannot be sized to exceed 120 percent of the average annual consumption of electricity at the subscriber’s premises.

Investor-owned utilities, in turn, are required to purchase up to 6 Megawatts of energy and the associated renewable energy credits from these gardens during each of the first two compliance plan years with at least 3 Megawatts being from community solar gardens less than 500 Kilowatts in size. For the third compliance year and thereafter, the Public Utilities Commission will determine what types of community solar gardens appear to be most successful, how to encourage their future development, and how much electricity utilities must buy from solar gardens of different sizes, as well as in the aggregate.

HB10-1342 will not apply to cooperative electric associations and municipal utilities, both are exempted; or require new increases to consumer energy rates.

SB10-100: Greater Financing Flexibility for Local Districts Organized for Purposes Related to Energy

Boulder County's ClimateSmart Loan Program is Colorado's first energy local improvement district (LID). In November 2008, voters authorized the issuance of bonds to provide financing for energy-related home and business improvements in the county. All local governments in the county are participating in the energy LID. In November 2009, voters in Pitkin, Eagle, and Gunnison counties granted similar authorization. Energy LIDs are a powerful tool for providing residential and commercial property owners the financing necessary to make the energy efficiency and renewable energy improvements that will save them money on their energy bills, expand Colorado's local economies, and advance state energy goals.

SB 100 will create economies of scale for energy LIDs, leading to reduced administrative fixed costs, reduced marketing and community education costs, increased credit-worthiness of county-issued bonds, and lower interest rates for program participants. Without the changes proposed in SB 100 and the economies of scale the Bill will enable, it will be extremely difficult for Colorado's smaller counties to implement energy LIDs, denying their home and business owners access to the benefits this tool provides.

SB 100 will expand business opportunities, create jobs in Colorado's rural and resort regions, and spread the benefits of clean energy across the state. HB 08-1350 authorized local governments to initiate energy LIDs to encourage and finance energy efficiency and renewable energy improvements in existing buildings. The local government provides a loan to the property owner to finance the improvements. This loan is then repaid through a special assessment on the property owner's property tax bill. Energy LIDs are voluntary, opt-in local improvement districts. SB10-100 would change state statutes to:

- Permit energy LIDs to cross county lines. Current law prohibits all local improvement districts, including energy LIDs, from crossing county boundaries. SB 100 will permit energy LIDs to cross county boundaries and include properties in multiple counties, whether contiguous or non-contiguous, if the county commissions of the affected counties agree.
- Exempt county energy LIDs from certain special assessment district administrative and debt authorization requirements that are not applicable to opt-in local improvement districts.
- Expand the definition of the renewable energy improvements eligible for energy LID financing to include improvements located off-site at qualified community locations in addition to those installed directly on a residential or commercial building.

SB10-180: Smart Grid Task Force

This Bill creates a nine-member Colorado Smart Grid task force to gather information and report to the general assembly and the PUC on issues related to the implementation of a smart energy grid in Colorado. The task force's initial report is due by January 20, 2011, and the task force is directed to meet periodically to update the information in the report. The Bill provides for funding of the task force's activities through gifts, grants, and donations and contains a five-year sunset provision.

HB10-1182: Clean Energy Development Authority Financing Limits

The Bill expands the types of loans and financing agreements the Colorado clean energy development authority may make to facilitate electric power interconnection projects.

SB10-096- Transparency in Gas and Electric Utility Bills

The Bill declares that utility customers have a right to transparency in their utility bills and therefore requires investor-owned gas and electric utilities to include in customer bills or bill inserts, at least four times per year, information about:

- For electric utilities, the types of fuels used to generate electricity, the percentage of the utility's electricity attributable to each, the load profile for each, and the total cost of generating electricity per kilowatt-hour for each fuel type; and
- For gas and electric utilities, all ancillary costs associated with providing gas or electricity to the customer, including the costs of underground natural gas storage, natural gas pipeline expansions, and new electric transmission infrastructure.

The Bill specifies that the costs of revising the format of the current utility bills in order to provide the additional information may be recovered through rates.

HB 1365 – Emission Control Plans

House Bill 10-1365 was recently introduced in the Colorado General Assembly. It anticipates possible changes to the federal Clean Air Act requirements to reduce emissions from coal-fired electric generating units. The bill, as currently written, would require all utilities that own or operate coal-fired units to submit an emission reduction plan to the PUC by August 15, 2010, for emissions from those units covering the lesser of 900 megawatts or 50% of the utility's coal-fired electric generating units in Colorado. The plans must give primary consideration to replacing or re-powering coal-fired electric generators with natural gas and to also consider other low-emitting resources, including energy efficiency. The PUC, which would have approval authority, would approve, deny, or modify the plans by December 15, 2010. Plans would be required to be implemented by December 31, 2017. Xcel has stated that if the bill passes, it might establish firm closure or conversion timing, as well as certain cost recovery procedures, for the closure or conversion of Valmont power plant.

Attachment F

CURRENT PUC DOCKETS IN WHICH THE CITY IS INVOLVED

1. Xcel's May 2009 Application for Electric Rate Increase

In May 2009, Xcel filed an application with the PUC to raise Xcel's electric rates and to modify certain other provisions of its tariff.⁷ Because of the number and types of changes proposed by Xcel, this was one of the largest, most complex rate increase cases that has been filed with the PUC. The docket was split into two phases. The first phase of the case concerned the *amount* of the overall increase in revenue to Xcel. The second phase concerned: (a) how that increase would be divided among the various classes or service; and (b) changes to the regulation of service.

Street Lighting and Traffic Signal Lighting

The city has been working toward having more control over the street lights installed in Boulder. This is important for two reasons. First, the city is interested in exploring the use of energy-efficient street lighting in an effort to reduce its energy usage and, second, the city would like to have more control over its maintenance costs. Presently Xcel maintains the city's lights and charges the city handsomely for this maintenance. In fact, staff has explored the possibility of purchasing the street lights and financing that purchase with the energy-savings from using more efficient lights.

2. Security and Privacy Concerns of Smart Grid

The smart grid privacy investigatory docket was opened by the PUC on August 12, 2009. Last summer, the PUC drafted a 50-page white paper concerning the potential uses of information that might be available from smart grid technology and the concerns that that raised for the protection of consumer information. The PUC opened this docket to learn more about the issues and to consider whether it was time to revise their regulations that protect electric utility customer information.

3. SmartGridCity Pricing Pilot

On November 2, 2009, Xcel filed an application for a pilot project that will permit Xcel to offer three different rate structures to 2,000 customers in Boulder that have smart meters. The pilot is proposed to last two years. Xcel requested approval of the pricing pilot so that it can determine how to implement the technologies and pricing structures in a manner that best supports positive customer response. Xcel hopes that the information it obtains from customer reaction to these three rate structures (for example, having to pay higher prices during certain "peak periods") will confirm or disprove assumptions Xcel has made in developing those rates. Using this information, Xcel intends to develop a new rate structure for smart grid customers to help reduce overall consumption and

⁷ A tariff is the list of rates charged to various classes of customers – like residential, commercial and street lighting – along with regulations related to the provision of electric service. A tariff is proposed by a utility and, after it is approved by the PUC, becomes the equivalent of a regulation of the PUC.

decrease the need for additional generation facilities. “Specifically, Public Service will learn whether the rates will reduce residential peak demand and energy consumption, reduce potential carbon footprint and defer capital spending for distribution and transmission.”

4. Smart Grid and Advanced Metering Technology Investigation

The smart grid investigatory docket was opened by the PUC on February 24, 2010 to “...to explore the issues related to performance of SmartGridCity as a pilot project, and to address such issues as the lessons learned, technical specifications and how SmartGridCity might progress from a pilot to system-wide implementation.” This docket is not limited to just SmartGridCity, but will address the general concepts of smart grid and advanced metering and lessons learned in areas outside the Xcel service territory (including Fort Collins and Colorado Springs) including:

- a. Lessons learned from all smart metering implementation activities in Colorado to date;
- b. Options for and impediments to full smart grid system deployment;
- c. The relationship between smart grid technologies and existing communications infrastructure;
- d. Cyber security concerns raised by smart grid technology;
- e. The effect of smart grid technologies on various regulatory policy objectives, such as:
 - o Increase customer participation in demand side management and demand response programs;
 - o The integration of distributed generation, including plug-in electric vehicles, into the grid; and
 - o Dynamic pricing rate designs;
- f. How the interplay between human behavior and smart meter technology affects desired objects;
- g. Educational strategies that improve the positive impact of smart meter technology upon consumer behavior;
- h. Utility cost recovery of future smart grid investments; and
- i. Grid/load management and generation resource impacts.

5. Future Pilot Projects Related to Street Lighting and Traffic Signal Lighting

In the electric rate increase case discussed above, the city proposed pilot projects related to remote metering of street and traffic signal lights, each possibly related to SmartGridCity. Given the interest the PUC has shown in remote metering, either of these

may become a pilot project in the near future. The PUC may also order pilot projects related to the customer-owned and -maintained, non-metered, energy-only street lighting proposal. Again, we won't know the full details of the PUC's decision in that case until a final, written order is issued by the PUC.

Appendix G

Update on City Operations

In January 2010, the Energy/Renewable Subcommittee which is as part of the intradepartmental Energy Strategy Team had *The Brendle Group* develop an energy strategy analysis tool to assist City staff with creating an energy independence plan for City operations. Baseline emissions were calculated from 2008 for electrical, natural gas and fuel consumption in all City facilities, including street lighting. Current strategies were also evaluated for projected CO2 reductions and costs. Results are summarized below:

City Operations GHG Emissions – 2008 Baseline

Description	Electricity (kWh/yr)	Natural Gas (therms/yr)	Fuel (gal/yr)	Projected CO2 (metric tons)	Cost/MMBtu & Return on Investment
Baseline Energy	31,338,062	950,223	295,088		
(metric tons)	27,363	5,047	2,626	33,710	
Solar PV					
- 3, 10 kW systems				(33)	
- 1 MW system at WWTP				(1,288)	
Existing Hydro Production*	(30,100,000)			(14,765)	
Planned Strategies					
- Energy Performance Contract	(1,894,408)	(58,301)		(1,936)	\$158 / 9.5%
- Solar PV at 20 facilities	(3,520,000)			(3,022)	\$641 / 6.2 %
- Solar Thermal at Rec Centers		(8,760)		(47)	\$409 / 1.8 %
- Energy Education and Policy	(525,129)	(16,161)		(537)	\$32 / n/a
- Fleet Operations			(59,000)	(532)	tbd
- Subtotal				(6,074)	

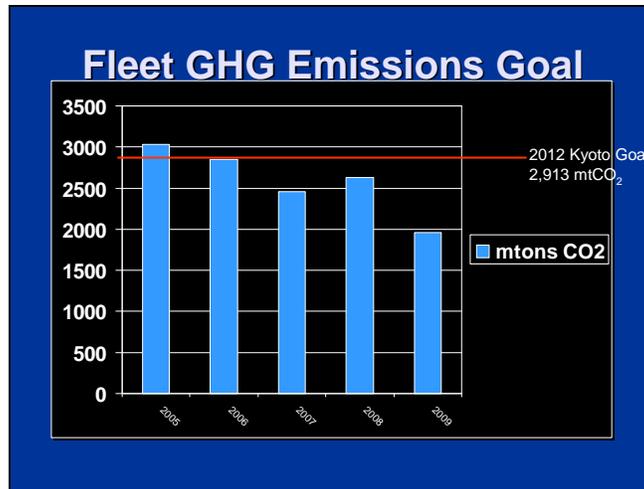
*Hydro production shown is 70% of actual total hydro being produced that can be counted towards City operations, of which half the RECs are owned by Xcel.

Of the planned strategies, our energy performance contract also provides solar PV and solar thermal systems. With our energy performance contractor, McKinstry, we have so far secured \$400,000 in EECBG grants, \$1,500,000 in Qualified Energy Conservation Bonds, \$1,400,000 in Xcel solar PV rebates, lighting rebates and REC payments, and \$50,000 from the Colorado Carbon Fund to help finance an energy performance contract to make our facilities more energy efficient, install renewables and conserve water. The first adjustment-to-base (ATB) for 2010 will have ATBs for Council's consideration to accept the grants and approve appropriations for lease-financing the energy performance contracts that are expected to total \$12,000,000 of work over three phases.

Under Xcel's 20-year solar rebate program, the city was able to get REC payments at \$80 per megawatt hour plus rebates totaling \$733,000 for four systems totaling 326 kilowatts. Based on the calculated emissions offset of the solar PV systems, this translates to approximately \$190 per metric ton (mton) of CO2. Current market rates are averaging \$9 per mton with a range of \$0.50 to \$50 per mton. Without this rebate program, the return on investment for solar would be 30+ years versus the 20 years at the \$80 per megawatt hour rate REC payment plus rebate.

The Climate Trust is also buying the RECs from the solar thermal hot water systems that will be installed at EBCC and SBRC. They will pay the city a total of \$50,000 (\$10,000 a year for 5 years) out of the Colorado Carbon Fund for an annual emissions offset of 150 mtons of CO₂. This translates to \$65 per mton, not quite as good as the Xcel program, but better than the going rate, and the city will own those RECs after 5 years. These funds allow us to have a return on investment of 15 years on this \$500,000 system versus 17 years.

In fleet operations, overall goals are to switch to renewable energy, increase energy efficiency and reduce vehicle miles traveled (VMT). The City met the Kyoto Protocol goal in 2006 and continues to reduce its overall emissions and dependency on foreign oil.



In 2009, the EST increased the City's goal of purchasing alternatively fuel vehicles (AFV) from 65 percent to 90 percent. We met this goal in 2009 with 27 of 30 new vehicles purchased being an AFV - hybrid, ethanol or biodiesel fueled. So far in 2010, 100 percent or 28 of 28 new vehicles are an AFV. For VMT, the EST reduced the City's overall annual VMT by 2.8 percent or 89,769 miles from the 1996 baseline of 3,187,908 miles. In 2009, the City's actual VMT was 2,716,664 miles or 15 percent below the new goal limit and 4 percent less than 2008. The EST is reluctant to further decrease our VMT at this time due to the number of service calls and emergency responses which continue to increase along with our population and service area.

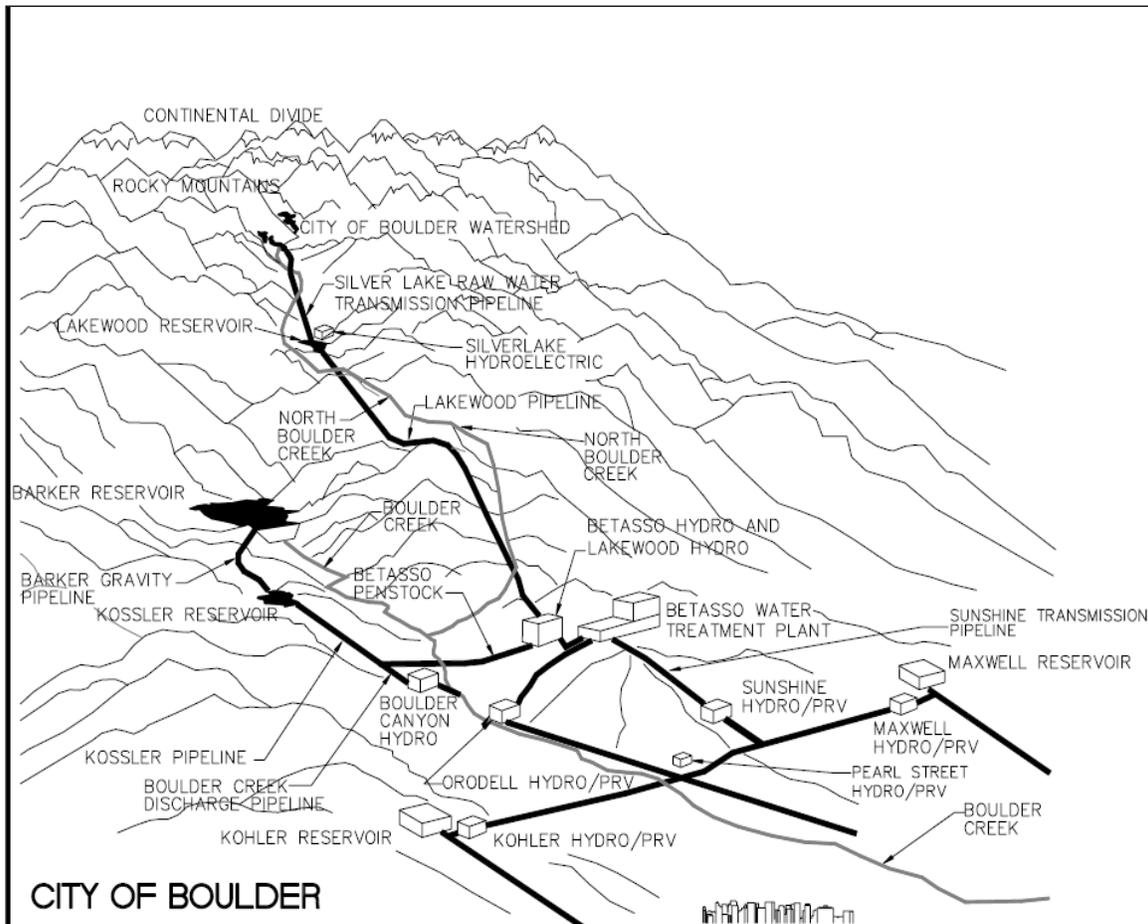
For 2010, the first-ever Fleet Strategic Business Plan will be developed which will identify our current goals and initiatives such as vehicle electrification and car sharing. The plan will link with the strategic goals in the Transportation sector of the City's Climate Action Plan and continue to lead with innovation and investments in the fast developing alternatives to foreign oil.

The Fleet Strategic Business Plan will be guided by the Energy Strategy Action Plan for City Operations which also under development in 2010 as part of the ETS's workplan.

Attachment H

Background on Boulder's Hydroelectric Facilities

Boulder's eight hydroelectric facilities convert the energy in falling water into electricity. These hydroelectric facilities use energy from the same water that is also used to meet the city's water needs. This energy exists in the water because of large changes in elevation between the city's diversion points from the streams and the delivery points for treated water in the city. The energy would be wasted if it was not converted to electricity. No fossil fuels are consumed and nothing is emitted in the process.



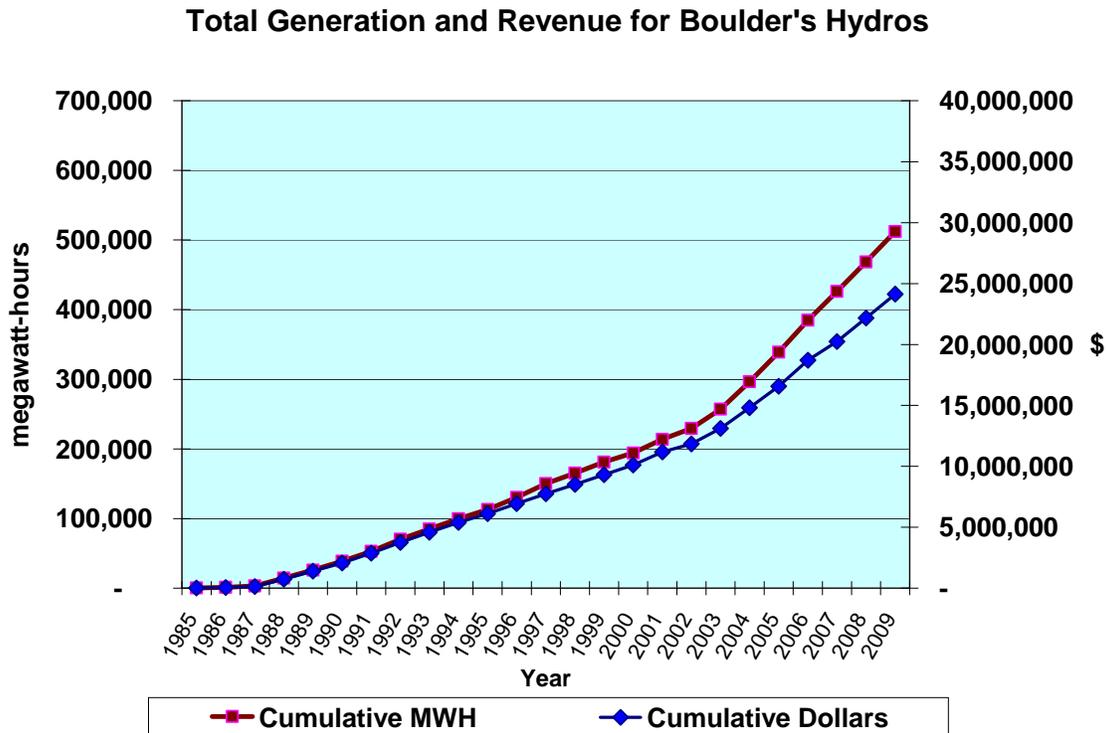
The city's hydro energy generation is a by-product and a secondary benefit of normal water utility operations. The seven hydroelectric facilities that were constructed by the city are installed on water delivery pipelines that are needed and would be there anyway to deliver water to the city. For these hydros, only the water that is needed to satisfy municipal water demand is used to generate hydroelectricity. The eighth hydro facility was an existing facility purchased by the city. The hydros were built and purchased (Boulder Canyon Hydro) using money from the city's Water Utility Enterprise Fund, although the Betasso Hydro was built using General Obligation bond funds issued in 1984 and subsequently transferred to the Water Utility in 1992. The Water Utility made

five annual payments to the General Fund from 1992-1996 and assumed the annual debt payment beginning in 1992.

Renewable energy generation by the city began when Maxwell Hydro began operating in 1985. That year, the city generated just over 400,000 kilowatt-hours of electricity. That amount of electricity is sufficient to supply the annual needs of about 50 Boulder households. During 1986 and 1987, the Kohler, Orodell, Sunshine and Betasso hydroelectric facilities were completed, and the cogeneration facility at the city's wastewater treatment facility was constructed. Silver Lake Hydro was built in 1998; the city purchased the Boulder Canyon Hydroelectric Project (of which Barker Reservoir is a component) in 2001; and Lakewood Hydro was built in June 2004.

In 2009, the city generated 43.7 million kilowatt-hours of electricity or enough to meet the annual needs of about 7,800 Boulder households. Production of clean hydropower offset the need to burn 22,500 tons of coal in 2009 and avoided the release of 40,300 metric tons of CO₂ into the atmosphere. Sale of this electricity produced about \$1.97 million for the city's Water Utility in 2009, which is used to lower the water bills paid by Boulder water customers.

Since the city's hydros first went into operation, they have generated more than 512,260 MWH and produced more than \$24.6 million of revenues for the city as shown in the chart below. They have also offset the burning of 264,000 tons of coal and prevented the release of 473,000 metric tons of CO₂.



The electricity that is generated is sold to Xcel under six contracts that were entered into from 1985 to 2001. These contracts predated the creation of Renewable Energy Credit ("RECs") in Colorado and, therefore, were silent as to the ownership of the hydro RECs.

In 2004, Amendment 37 was passed and the PUC subsequently promulgated rules defining RECs as:

“[A] contractual right to the full set of non-energy attributes, including any and all credits, benefits, emissions reductions, offsets, and allowances howsoever entitled, directly attributable to a specific amount of electric energy from an Eligible Renewable Energy Resource. One REC results from one megawatt-hour of electric energy generated from an Eligible Renewable Energy Resource.”

One of the rules, Rule 3650(q), states, “If the contract is silent as to renewable energy credits, the renewable energy credits will be deemed to be combined with the energy transferred under the contract.” The City filed a lawsuit regarding this interpretation of the City’s existing power sales contracts. In 2007, a settlement agreement was reached wherein 50% of the RECs under the city’s existing power sales contracts were assigned to Boulder and Xcel retained ownership of 50%.