



City Council Staff Report

Subject: Municipal Carbon Footprint Reduction Goal
Author: Tyler Poulson and Diane Foster
Department: Sustainability
Date: December 17, 2009
Type of Item: Administrative Policy - Direction

Summary Recommendations:

Review the municipal carbon reduction goals presented and provide direction on whether City Council would like to adopt a goal for 2012.

Staff recommends that City Council adopt a 12% Below 2012 BAU emissions goal (Alternative B) and that direction is provided to begin identification of the carbon reduction items to pursue included in Exhibit C. Items identified should enable us to exceed our 12% goal as long as they are included during the spring, 2010 budget process. Staff also suggests that direction is given to research and pursue future, additional carbon reduction items which are financially prudent.

Background:

Staff began formally reporting carbon emissions for Park City Municipal's operations in 2008. The emissions inventories for 2007 and 2008 were presented as part of an August 2009 Work Session (minutes attached, Exhibit A) along with an initial proposal for a municipal carbon reduction goal. During the August Work Session, Council asked that the provided carbon reduction action items be reassessed and that savings estimates be confirmed. Council also requested that staff return with a revised list of action items, including more granular energy and cost savings data, prior to Council taking action and potentially adopting a carbon reduction goal.

In August, staff also reviewed carbon reduction goals set by other governments and communities. These goals are typically longer in term and more aggressive in carbon reduction than what staff is recommending. The two primary differences between the recommended goal in this Staff Report and goals set by other governments and communities are:

1. Many communities have not, and are currently not, experiencing the growth that is still underway in Park City; and
2. Longer-term, more aggressive goals typically forecast minor reductions in the first few years and then hope for major technological, policy, and/or energy-industry structural changes which will show significant reductions in the latter years leading up to the target goal year.

An example of the second point occurred in July of 2008 when the state of Utah set a goal for reducing the state's greenhouse-gas emissions to 2005 levels by 2020. Rick Spratt, the Director of the Utah Department of Environmental Quality at the time, said that most of the reductions would come through cleaner energy, a cap-and-trade program for emissions, more efficient cars, and better transportation systems.

Analysis and Discussion Items:

The Municipal Carbon Footprint

Staff reassessed the greenhouse gas emissions factors used in previous municipal footprint calculations and adjusted the electricity emissions coefficient (how much carbon-equivalent is emitted per kWh consumed) to be more in line with electricity generated in Utah, rather than electricity produced in the entire Northwest EPA region which includes a significant amount of hydropower. This change, from 0.9 lbs. CO₂e/kWh (pounds of carbon equivalent per kilowatt-hour) to 2.1 lbs. CO₂e/kWh, is consistent with the emissions coefficients used for the community carbon footprint and it more accurately portrays the emissions associated with the City's electricity consumption. After updating this emissions factor, Park City Municipal's carbon footprint was calculated to be 15,764 short tons CO₂e for 2007 and 17,012 short tons CO₂e for 2008. These new totals will be used to forecast 2012 emissions and set a reduction goal.

Carbon Reduction Action Items

Staff revisited the previous carbon reduction action items with managers and personnel from the Maintenance, Fleet, Transit, Water, and I.T. groups in an attempt to get more specific data and finalize the list for this Staff Report. Staff also worked with the Budget Department to review and validate the methodologies used. The Building Energy and Vehicle Fuel lists were reduced in order to wrap the completed Johnson Controls upgrades, completed Marsac Building upgrades, and a potential future 5% Fuel Efficiency goal into aggregated savings figures. The action item list includes some already completed and currently planned actions, where noted, in addition to potential actions. Completed and currently planned action items were included to portray an accurate representation of conservation measures put in place after the 2007 emissions baseline year. Inclusion of these items allows the City to take credit for the carbon reduction measures already implemented. A complete list of all completed, currently planned, and potential action items is included in Exhibit B.

Carbon reduction action items which haven't been completed and aren't currently planned are also included for assessment on their own in Exhibit C. These additional action items are representative of potential next steps that the City can take to reduce its municipal carbon footprint before 2012. Note that these items came out of meetings with the relevant departments and that the included items were based on whether they were viewed as feasible in the near future and if the savings associated with them could be reasonably forecasted.

Figure 1 is a graphical representation of the completed and planned action items that shows the categories in which they'll reduce carbon emissions. Figure 2 shows similar data for the additional action items (Exhibit C) which currently require some level of approval before implementation.

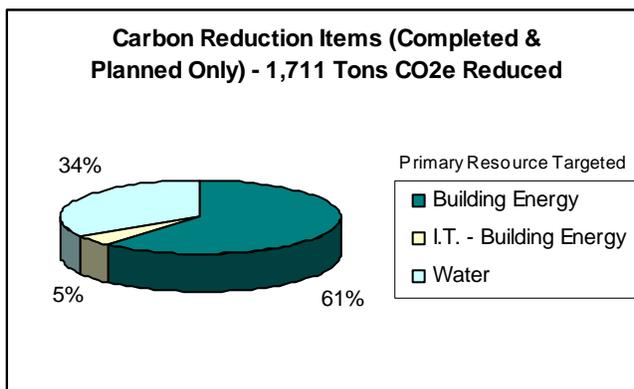


Figure 1. Completed & Planned Carbon Reduction Items

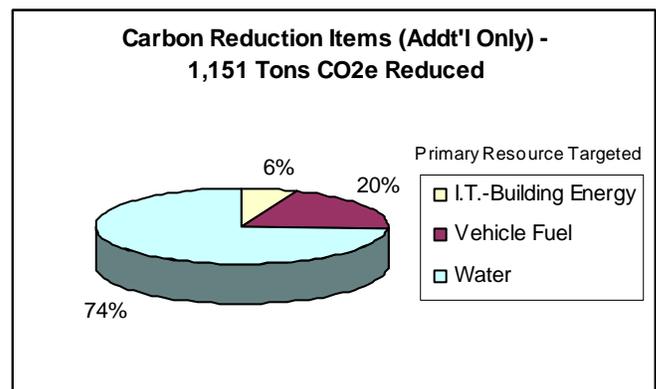


Figure 2. Additional Carbon Reduction Items

Note that there are other potential carbon reduction action items not included in the exhibits. These items are conceptual at this point and were excluded due to some uncertainty with their implementation or inability to confidently estimate energy savings at this time. Some examples of these ideas include elimination of extraneous power-consuming items, acquisition of more renewable energy resources, idle-reduction technology for Police cruisers, and additional water-saving ideas dependent on Automated Meter Reading technology. Staff expects the list of carbon reduction items to evolve over time as technology improves and the amount of imperfect information associated with their savings calculations is reduced. These additional savings measures, though not represented in the action item tables, may play a role in the City reaching a potential 2012 carbon reduction goal.

Business-as-Usual (BAU) Emissions Forecasts and Potential Carbon Reduction Goals

There are communities in the U.S. that have met their climate change goals, but few of them have experienced the past and current growth of Park City. While our community is 85% built out, new public facilities and new developments demand the services of all City departments and this often translates into an increase in our municipal carbon footprint. It is for this reason that the goals established are targets versus “Business as Usual” forecasts.

Staff created a forecast for 2012 carbon emissions based on 2007 baseline data and emissions growth estimates. The growth estimates were derived from a combination of data in the previously released Municipal Carbon Reduction Action Plan (Exhibit D), ongoing discussions with specific departments, and emissions forecasts from the Western Climate Initiative and other local governments. Staff chose 2007 as the baseline year due to a few factors such as that it was pre-Marsac transition, pre-Johnson Controls upgrades, and that 2007 was the initial year for calculating the City’s municipal carbon footprint. The emissions forecast data is displayed in Table 1 below.

The BAU trajectory has been graphed in Figure 3 along with paths for a variety of carbon-saving scenarios. The *BAU + Completed / Planned* line is based on the savings measures which the City has already implemented, or has existing plans to implement, between 2007 and 2012. This line shows that Park City’s municipal operations are on track to be 8.2% below the BAU trajectory thanks to the Johnson Controls project and other savings measures. The *BAU + Completed / Planned / All Current Addt’l* line shows where the municipal footprint is headed if all carbon reduction items in Exhibit B are pursued. The *BAU + Completed / Planned / Partial Addt’l* line reflects a 12% savings over the BAU scenario and assumes that only some of the additional items, or perhaps some unlisted measures, are pursued before 2012 to reduce the City’s footprint. Trajectories for the Utah GHG Reduction Goal and Western Climate Initiative goal have been included in Figure 3 for reference. These two goals have a more distant goal year (2020) and the emissions paths are based on the assumption that they make consistent progress between 2007 and 2020.

Given the current financial climate, it’s important to note that the upfront costs for the additional emissions reduction items in Exhibit C are not yet budgeted. Despite this, staff feels that funding for items with a net financial gain to the City can be prioritized with other budget requests in the FY 2011 budget (consistent with budget policies) in advance of the 2012 goal year. It’s important to note that the financial payback time, if all items in Exhibit C are pursued, is forecasted to occur within one year of implementation. By creating a carbon reduction target, staff will have clear direction to plan for the additional emissions reduction items mentioned in Exhibit C and possibly other action items depending on improved information, technology changes, available financing, and a proven financial payback.

Table 1. Municipal Carbon Footprint Forecast – 2007 - 2012

Municipal Carbon Footprint Forecast - Totals are in Tons of CO₂-equivalent					
Emissions Source	2007 (Actual) - Baseline Year	2008 (Actual)	2012 BAU Estimate	% TOTAL Increase (2007-to-2012)	Assumption Used for BAU Estimates
Buildings, Facilities & Streetlights	6,979	7,217	8,091	16%	3% annual increase assumption*
Water Distribution & Infrastructure	4,479	5,011	6,660	49%	8% annual increase ~ department forecast of 25% more water distributed in 2012 than 2008. Also, included a UV Filtration System added in '08 and the energy forecast for Quinn's WTP.
Vehicle Fleet + Transit (Buses)	2,968	3,446	4,652	57%	9% annual increase ~ rough forecast from Muni Carbon Reduction Report and meetings with departments
Vehicle Fleet w/o Buses	921	1,115	1,292	40%	7% annual increase ~ rough forecast from Muni Carbon Reduction Report and meetings with departments
Transit Dept (Buses)	2,047	2,331	3,360	64%	10% annual increase ~ rough forecast from Muni Carbon Reduction Report and meetings with Transit
Employee Commute	1,072	1,072	1,243	16%	3% annual increase assumption*
Solid Waste Generation (est.)	266	266	308	16%	3% annual increase assumption*
TOTAL	15,764	17,012	20,954	33%	5.9% overall annual forecasted increase

**Note: 3% annual increase assumptions were used in cases where related forecast information and/or empirical data wasn't available. Items taken into consideration when deciding on the 3% figure included the 1990 - 2007 emissions growth forecast (2.8%) for Park City Municipal provided by Environmental Performance Group and a range of other emissions growth forecasts, including those by The Western Climate Initiative.*

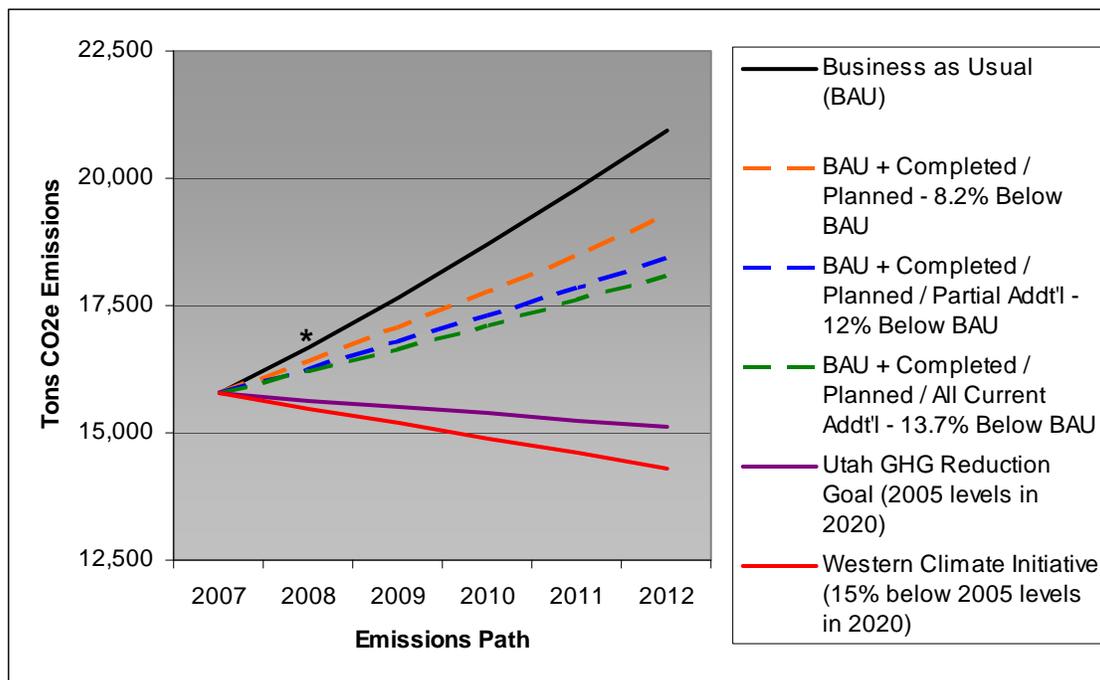


Figure 3. Emissions Forecasts, 2007 – 2012; Note that the Asterisk Represents 2008 Actual Emissions

Department Review:

All applicable departments have reviewed the details presented and their comments have been incorporated within this Staff Report.

The City Manager and City Attorney suggest consideration for framing the goals as Municipal Carbon Footprint Mitigation Goals. By more squarely owning our City's economic/budget measurements of resort community "success" (e.g., growth in spending, events, and visitors) and the reality that projections of expanded City services will continue to increase our footprint, they assert that our program will be more credible, and able to focus on policy choices that may otherwise conflict with a carbon reduction policy, if the City squarely acknowledges that we are merely mitigating the environmental impact of our growth. Being a leader in picking the low hanging fruit of carbon reduction strategies has minimal on the ground impact if at the same time we are avidly taking overt economic development and operational actions that conflict with actual emissions reductions. If, and when, our economic and operational goals result in diminished growth and a flatline BAU forecast, then we can honestly focus on "reduction".

Alternatives:

A. BAU + Completed / Planned Goal – 8.2% Below BAU in 2012

Adopt an emissions reduction goal based on completed and currently planned conservation measures.

B. BAU + Completed / Planned / Partial Add'l Goal – 12% Below BAU in 2012

Adopt an emissions reduction goal based on completed and currently planned conservation measures, in addition to a partial mix of additional items in Exhibit C. This will require future prioritization of some of the items in Exhibit C.

C. BAU + Completed / Planned / All Current Add'l Goal – 13.7% Below BAU in 2012

Adopt an emissions reduction goal based on completed and currently planned conservation measures, in addition to implementation of all additional items in Exhibit C. This will require future prioritization of all of the items in Exhibit C.

D. Council Proposes Other Carbon Reduction Goal – TBD% Below BAU in 2012

Adopt an emissions reduction goal based on criteria other than what is stated in alternatives A through C.

E. Do Not Adopt a Carbon Reduction Goal

Significant Impacts:

If a goal is adopted, the Environmental Sustainability Department will partner with each department in their contributions toward meeting a carbon emissions reduction goal. The Sustainability staff can manage this task with existing resources as long as there are not significant changes to the current environmental strategic plan (Exhibit E).

Consequences of not taking the recommended action:

- The City will continue to incur growing costs associated with utilities (electricity, natural gas, and water) and vehicle fuel consumption.
- The City will lack formal direction from Council on its carbon emissions reduction targets.
- The City will miss an opportunity to proactively enact a carbon reduction plan before potential formal policy measures are passed down on a national, regional, or state level.
- The City will not earn Milestone 2 of the ICLEI: Local Governments for Sustainability process.

Recommendation:

Staff recommends that City Council adopt a 12% Below 2012 BAU emissions goal (Alternative B) and that direction is provided to begin identification of the carbon reduction items to pursue included in Exhibit C. Items identified should enable us to exceed our 12% goal as long as they are included during the spring, 2010 budget process. Staff also suggests that direction is given to research and pursue future, additional carbon reduction items which are financially prudent.

Exhibits (Attached):

Exhibit A - Related Meeting Minutes from the August 20, 2009 Work Session

Exhibit B - Completed / Planned and Potential Carbon Reduction Action Items

Exhibit C - Potential Carbon Reduction Action Items Only

Exhibit D - The Municipal Carbon Reduction Action Plan, July 2009 (available online at http://www.parkcitygreen.org/Documents/PCMC-Municipal-Carbon-Reduction-Action-Plan_8-14-0.aspx -OR- reference copy available in Sustainability Department)

Exhibit E – Environmental Strategic Plan

Exhibit A – Related Meeting Minutes from the August 20, 2009 Work Session

PARK CITY COUNCIL WORK SESSION NOTES SUMMIT COUNTY, UTAH AUGUST 20, 2009

Tyler Poulson, Environmental Sustainability Coordinator, directed Council's attention to Municipal Carbon Footprint Reduction Goals. Council reviewed the Municipal Carbon Reduction Action Plan in July and directed Staff to return with a formal recommendation of a carbon reduction goal for municipal emissions. Staff compared Greenhouse Gas Emission Reduction Goals for Park City to those set by local and national organizations. Staff recommended that Council discuss the municipal carbon reduction targets and adopt the "Low Hanging Fruit" municipal reduction, which represents a 6.4% reduction from Business as Usual (BAU) in 2012.

Ms. Foster explained the goals took into consideration some of the Johnson Controls programs. She noted some areas would decrease, but others would increase due to increased service levels projected over the next few years.

Mr. Hier asked whether the potential reductions and estimated costs and savings outlined in Table 2 were hard savings that would be reflected in operating budgets. Mr. Poulson explained the savings were a combination of energy, vehicle fuel, water savings, etc., and Staff sees the "low hanging fruit goal" as achievable by pursuing the no- and low-cost actions. Ms. Foster explained Staff did not recommend the medium cost goals because those funds were not presently budgeted. Staff clarified that implementation costs were fixed, upfront costs, with the savings accrued in subsequent years.

Mr. Hier requested additional documentation regarding the figures presented in Table 2 and Staff agreed to return to Council with that information. Ms. Simpson requested cost estimates for Goal B, 12% by 2012 and mid-range action items. Ms. Foster asked if Council was requesting a delay for further clarification of numbers. Council members indicated they were considering a combination of 12% by 2012 Goal and Medium Cost Implementation Actions.

Manager Bakaly noted this was a direction shift from Council's previous discussion to pursue low hanging fruit. Staff felt there were significant savings from pursuing the low hanging fruit now and considering more aggressive actions later. If Council's direction was to pursue medium cost actions, Staff should present additional information on the numbers so Council can understand the savings. Mr. Bakaly noted that would require prioritization for funding as well as Staff resources.

Exhibit B - Completed / Planned and Potential Carbon Reduction Action Items

Item #	Primary Resource Targeted	Carbon Reduction Action	Implementation Cost Figure (\$)	Implementation Timeframe	Annual Savings Estimates						Time for Nominal Payback Energy Savings Only (Years)	Estimated Lifetime for Upgrade (Years)
					Electricity kWh	Natural Gas Therms	Water (Kgal)	CO2e (tons)	Dollar Savings (Energy Only)	Energy Savings Only (Years)		
1	Building Energy	Johnson Controls Upgrades Upgrades Implemented in 2008 and 2009	Completed Item - \$1,273,277	Completed	668,948	54,550	2,549	1,051	\$99,138*	12.8	10-20+	
2	Building Energy	Marsac Upgrades High-efficiency Lighting; Geothermal Heat Pump System; Efficient Temperature Regulation	Completed Item - Efficiency Upgrade Costs were Part of Entire Project	Completed	TBD	TBD	TBD	TBD	TBD	TBD	10+	
3	IT - Building Energy	Computer Desktop Tower to PowerSave City-wide, After 1 hour	Staff Time	2.5 Days	41,360			44	\$3,185	Immediate	5+	
4	IT - Building Energy	Computer Monitor to PowerSave City-wide, After 1 hour	Staff Time	2.5 Days	23,540			25	\$1,813	Immediate	5+	
5	IT - Building Energy	Server Virtualization Reduce 28 current servers down to 4 servers	Budgeted - Approx \$35,000 - Part of Upgrade and Replacement Schedule	Spring 2010	78,164			83	\$6,018	5.8**	3+	
6	Vehicle Fuel	5% Fuel Reduction Goal Eco-driving; Idle reduction; Improved Trip Planning; Acquisition of More Efficient Vehicles; Improved Vehicle Maintenance, etc.	Staff Time / Some Upgrade Costs / TBD - Behavioral and planning changes. Note that fuel reduction strategies are also being considered on their own apart from the Carbon Reduction Plan	Varies - <1 year in general				233	\$69,167	Immediate	5+	

Exhibit B Cont... - Completed / Planned and Potential Carbon Reduction Action Items

Item #	Primary Resource Targeted	Carbon Reduction Action	Implementation Cost Figure (\$)	Implementation Timeframe	Annual Savings Estimates					Time for Nominal Payback Energy Savings Only (Years)	Estimated Lifetime for Upgrade (Years)
					Electricity KWh	Natural Gas Therms	Water (Kgal)	CO2e (tons)	Dollar Savings (Energy Only)		
7	Water	Irrigation Timers	\$29,000 - One-time cost for 200 customers	Summer 2010, if approved	16,597	46	7,000	18	\$1,306	22.2**	6+
8	Water	10% Increase in Water Rates - 2 to 4% residential - 5 to 8% commercial	Completed Item - \$5,000	Summer 2009	TBD	TBD	TBD	TBD	TBD	TBD	10+
9	Water	Landscape Water Checks	\$10,000 - One-time cost for 100 customers	Summer 2010, if approved	23,236	64	9,800	25	\$1,829	5.5**	7
10	Water	Water Budgeting	\$60,000 - One-time Cost - There will likely be some ongoing admin costs	Summer 2012, if approved	749,978	2,070	316,313	806	\$59,024	1**	10+
11	Water	Micro-hydro Power Turbines at the Quinn's WTP	Budgeted - \$230,000 for Phase I (40 kW) - Cost and Energy Estimates Subject to Change	Summer 2011 for Phase I of Turbines	262,800			278	\$20,236	10+**	10+
12	Water	Variable Frequency Drives/Soft Starts - Retrofit existing stations	Budgeted - \$40,000 - \$80,000 per station	Retrofits are in progress; est. one pump station per year through 2012	80,000			204	\$6,160	10+**	3+
13	Water	Raw Water Pipes - Using Raw Water for Irrigation and Snowmaking saves Treatment and Pumping Costs	Budgeting TBD - part of upgrade and replacement schedule	2012, Roughly 2 years for implementation	90,000			95	\$6,930	10+**	10+
TOTALS					2,034,623	56,730	335,662	2,862	\$274,806		

Notes for Carbon Reduction Table

1) Light green cells are either completed since 2007 or in the budget process to be completed as part of normal department business; non-highlighted line items are awaiting approval either as part of the Municipal Carbon Reduction Plan or otherwise.
 2) There are numerous other potential energy savings projects, either known or unknown at this time, that may be technically and financially feasible before 2012. These additional items were not included due to some uncertainty or need for a pilot project before making part of a formal plan. These other potential items include idle-reduction technology for the Police fleet, water-saving technologies incorporated into Automated Meter Reading (leak detection), elimination of extraneous power consuming items, acquisition of more renewable energy resources, etc.
 *The Johnson Controls savings estimate (\$99,138) is the guaranteed annual savings figure for the project. Some financial estimates related to water savings were included in the Johnson Controls financial figure.
 **The payback time on items with two asterisks will likely be quicker than what's displayed since there are financial benefits, outside of just energy savings, that weren't fully accounted for in this process

Exhibit C - Potential Carbon Reduction Action Items Only

Item #	Primary Resource Targeted	Carbon Reduction Action	Implementation Cost Figure (\$)	Implementation Timeframe	Annual Savings Estimates				Time for Nominal Payback Energy Savings Only (Years)	Estimated Lifetime for Upgrade (Years)	
					Electricity kWh	Natural Gas Therms	Water (Kgal)	CO2e (tons)			Dollar Savings (Energy Only)
3	IT - Building Energy	Computer Desktop Tower to PowerSave City-wide, After 1 hour	Staff Time	2.5 Days	41,360		44	\$3,185	Immediate	5+	
4	IT - Building Energy	Computer Monitor to PowerSave City-wide, After 1 hour	Staff Time	2.5 Days	23,540		25	\$1,813	Immediate	5+	
6	Vehicle Fuel	5% Fuel Reduction Goal Eco-driving; Idle reduction; Improved Trip Planning; Acquisition of More Efficient Vehicles; Improved Vehicle Maintenance, etc.	Staff Time / Some Upgrade Costs / TBD - Behavioral and planning changes. Note that fuel reduction strategies are also being considered on their own apart from the Carbon Reduction Plan	Varies - <1 year in general			233	\$69,167	Immediate	5+	
7	Water	Irrigation Timers	\$29,000 - One-time cost for 200 customers	Summer 2010, if approved	16,597	46	18	\$1,306	22.2**	6+	
9	Water	Landscape Water Checks	\$10,000 - One-time cost for 100 customers	Summer 2010, if approved	23,236	64	25	\$1,829	5.5**	7	
10	Water	Water Budgeting	\$60,000 - One-time Cost - There will likely be some ongoing admin costs	Summer 2012, if approved	749,978	2,070	806	\$59,024	1**	10+	
TOTALS					854,711	2,180	333,113	1,151	\$136,324	9 Months	5-10+

Notes for Carbon Reduction Table

1) There are numerous other potential energy savings projects, either known or unknown at this time, that may be technically and financially feasible before 2012. These additional items were not included due to some uncertainty or need for a pilot project before making part of a formal plan. These other potential items include idle-reduction technology for the Police fleet, water-saving technologies incorporated into Automated Meter Reading (leak detection), elimination of extraneous power consuming items, acquisition of more renewable energy resources, etc.

**The payback time on items with two asterisks will likely be quicker than what's displayed since there are financial benefits, outside of just energy savings, that weren't fully accounted for in this process

Exhibit E – Environmental Strategic Plan – Adopted January 2009

GOAL 1. Preserve and enhance the ecological systems and diversity of the City and, in turn, the Region

Objective	1.0	Reduce Municipal carbon & greenhouse gas emissions.
Objective	1.1	Reduce Municipal water consumption.
Objective	1.2	Reduce Park City's <i>community</i> CO2 emissions.
Objective	1.3	Reduce Park City's <i>community</i> water consumption.
Objective	1.4	Minimize liability and proactively address potential environmental issues
Objective	1.5	Complete environmental regulatory commitments

GOAL 2. Encourage the efficient use of all resources in order to ensure a future with a secure and sustainable energy supply

Objective	2.0	Develop General Municipal Building Efficiency Measures
Objective	2.1	Develop Internal Municipal Policies that encourage conservation
Objective	2.2	Increase Park City's community-wide recycling rates.
Objective	2.3	Increase utilization and visibility of renewable energy in Park City
Objective	2.4	Explore city-supported environmental sustainability programs for residents

GOAL 3. Encouraging environmental stewardship and protection of Park City's natural environment through sharing of environmental information with the community and active, meaningful community participation

Objective	3.0	Support local organizations that educate the public, schools, other jurisdictions, professional associations, business and industry about reducing global warming pollution.
Objective	3.1	Support discussions for transit options between Park City and
Objective	3.2	Strengthen the State Residential Energy Code through strongly advocating for state and national policies that:
Objective	3.3	Play an active role in environmental community education and outreach
Objective	3.4	Stay current on environmental initiatives, concepts & best practices
Objective	3.5	Encourage greater community participation in the creation of renewable energy projects in Park City

GOAL 4. Incorporate environmental considerations as an integral part in assessing growth management options, land use plans, transportation plans and development proposals.

Objective	4.0	Reduce community-wide energy consumption & reduce community-wide energy costs
Objective	4.1	Increase utilization of alternative transportation
Objective	4.2	Maintain air quality at current levels
Objective	4.3	Improve visibility of night sky
Objective	4.4	Pursue a regulatory role to increase energy efficiency in new construction as well as remodels

GOAL 5. Continue to review and investigate best practices that have the potential of substantially improving the environment

Objective	5.0	Ensure the Environmental Sustainability Plan keeps pace with technology, nation-wide trends and the community's collective interests
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