



# Park City, Utah

## SAVE OUR SNOW ACTION PLAN

PREPARED FOR  
PARK CITY MUNICIPAL  
CORPORATION BY





## Acknowledgements

Park City would like to thank the following individuals for their contributions to this report:

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### **Additional Thanks to**

The 90+ community members who participated in the November 10, 2009 Save Our Snow brainstorming session. The ideas of these citizens helped inspire the action items that are detailed in this report.



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## 1.0 Introduction and Background

There is widespread consensus among the scientific community that human activities are negatively impacting the Earth's climate through increased greenhouse gas (GHG) emissions, causing the potential for large-scale adverse health, social, economic and ecological effects. Climate change is expected to impact Park City, Utah in a variety of ways. Primarily, Park City's climate is expected to warm substantially, delaying the date when snow starts to fall, and perhaps resulting in no snow accumulation at all by 2100 (Park City Mountain Resort). Decreasing snowpack is also likely to significantly reduce groundwater resources, increasing the frequency of drought and wildfire.

*"There is still time to avoid the worst impacts of climate change, if we take action now...If we don't act, the overall costs and risks of climate change will be equivalent to losing at least 5% of global GDP per year, now and forever."*

-Sir Nicholas Stern, UK  
Government Economic Service

The Save Our Snow Action Plan is the latest effort among Park City's many initiatives to address climate change. It builds on work in the Community Carbon Footprint and Roadmap to Reduction, completed in 2009, to define more specific strategies and implementation steps. Among many other initiatives are Park City Municipal's Environmental Strategic Plan to guide the community's comprehensive sustainability efforts; Park City's signing of the U.S. Mayors Climate Protection Agreement; community engagements such as Save Our Snow; efforts to reduce Park City Municipal's own GHG footprint of internal government operations and the numerous projects and programs led by Park City's many environmental non-profits.

Last year's Roadmap put forth a vision for Park City's efforts with respect to reducing climate change impacts:

*"The Park City community is committed to applying significant effort to combat the causes of climate change and to reduce its greenhouse gas emissions. Reducing our carbon footprint is our responsibility as citizens of the nation and the world. Working together, using our community spirit, innovation, and environmental passion, we will ensure for future generations the environmental protection, economic prosperity, and quality of life that makes Park City unique."*

Supporting this vision was the Roadmap's recommended goal to reduce Park City's GHG emissions 15 percent below 2005 levels by 2020. A total of 21 strategies were identified in the categories of community leadership, transportation and land use, energy use, energy supply, waste reduction and diversion, and carbon offsets to help Park City achieve this goal.

The Save Our Snow Action Plan refines this list of strategies, further considers their implications, and recommends next implementation steps for the Park City community to move these strategies forward.

## 2.0 Community Greenhouse Gas Inventory

An inventory of greenhouse gas (GHG) emissions was completed for the Park City community in 2009 as part of the Community Carbon Footprint and Roadmap to Reduction. This inventory was for a baseline year of 2007 and included significant emission sources within the Park City limits as outlined in the following table. Airline and vehicle travel for Park City from Salt Lake City International Airport were also included in the inventory.

Table 1. Park City Emission Sources

Direct (Scope 1)	Energy Indirect (Scope 2)	Other Indirect (Scope 3)
<ul style="list-style-type: none"> <li>• Natural gas consumption</li> <li>• Propane consumption</li> <li>• On-road vehicle transportation</li> <li>• Off-road vehicle and equipment use</li> <li>• Refrigerant losses</li> <li>• Fertilizers</li> <li>• Livestock</li> </ul>	<ul style="list-style-type: none"> <li>• Electricity consumption</li> </ul>	<ul style="list-style-type: none"> <li>• Airline travel</li> <li>• Solid waste disposal</li> <li>• Wastewater treatment</li> </ul>

The inventory for the baseline year of 2007 has been subsequently updated to correct for inconsistencies in utility data that included electricity and natural gas consumption outside of the Park City limits. The updated baseline inventory is 790,645 tons of CO<sub>2</sub>e (tCO<sub>2</sub>e) and the sources of emissions are portrayed in Figure 1.

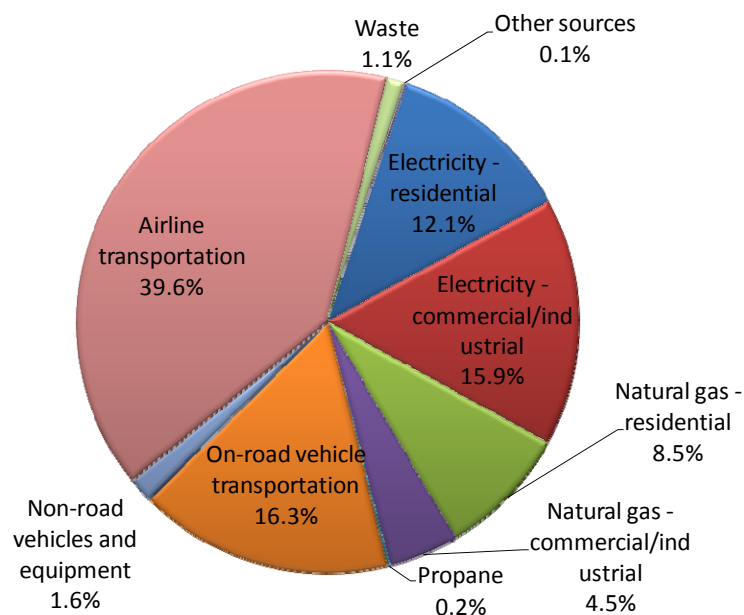




Figure 1. 2007 Total Community Emissions by Source

Emission sources not included in this inventory include upstream energy and process emissions embodied in the goods and services that enter Park City from outside of the geopolitical boundary. For example, the emissions generated to produce an aluminum can (extracting raw material, processing, machining, and transporting to the Park City limits) are not included in this inventory. Also, because this is a carbon inventory and not an “ecological footprint”, items such as food and consumer goods are not considered.

### What is a ton of GHG?

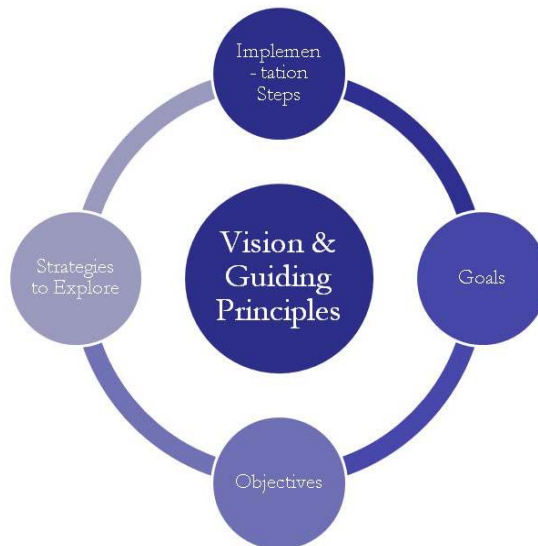
There are many greenhouse gases and the Park City inventory includes the six gases that make up the majority of emissions ( $\text{CO}_2$ ,  $\text{CH}_4$ ,  $\text{N}_2\text{O}$ , PFCs, HFCs, and  $\text{SF}_6$ ). The quantity of these gases is expressed in units of short tons (1 short ton = 2,000 lbs) and units of carbon dioxide equivalent are used to represent the different global warming impacts of these gases with one common unit. For example, 1 ton of methane ( $\text{CH}_4$ ) has 21 times the global warming potential of 1 ton of carbon dioxide ( $\text{CO}_2$ ). Therefore 1 ton of methane is equal to 21 tons of carbon dioxide equivalent ( $\text{tCO}_2\text{e}$ ).

The concept of GHG emissions can be quite abstract. To place these emissions in some context, it can be helpful to illustrate with equivalent daily actions. Some equivalencies for 1 ton of carbon dioxide equivalent include:

- Driving from Park City to Kimball Junction and back 135 times.
- Driving from Park City to Salt Lake City and back 19 times.
- About one round-trip by commercial airline from Salt Lake City to Los Angeles.

## 3.0 The Roadmap to Reduction

Building off insights gained from the Community Carbon Footprint, Park City convened a Community Carbon Advisory Board consisting of knowledgeable and interested stakeholders to validate the inventory process and develop a Roadmap for reducing Park City's Community Carbon Footprint. The Roadmap defined vision & guiding principles, recommended a goal, outlined 16 objective areas in which Park City could make progress, and identified 21 strategies for achieving the objectives.



### 3.1 Vision and Guiding Principles

Based on Board input, the following suggested vision statement was offered for the Roadmap:

*"The Park City community is committed to applying significant effort to combat the causes of climate change and to reduce its greenhouse gas emissions. Reducing our carbon footprint is our responsibility as citizens of the nation and the world. Working together, using our community spirit, innovation, and environmental passion, we will ensure for future generations the environmental protection, economic prosperity, and quality of life that makes Park City unique."*

To support this vision, board members offered input to develop the following recommended guiding principles:

- The municipality will be a strong partner in efforts to reduce community GHG emissions, leading by example and providing policy guidance while promoting personal accountability and community responsibility.
- Park City should explore a range of regulations and incentives to reduce GHG emissions.
- Transparency and technical credibility should be maintained throughout the process.
- Park City should be a leader to help other ski communities address climate change.
- Education is key in determining what level of commitment Park City makes to reducing its impacts on climate change.



The vision and these guiding principles anchor the remaining components of the Roadmap and this Save Our Snow Action Plan, while also providing direction for developing goals, implementing strategies, creating partnerships, and involving the community in moving these activities forward.

## 3.2 Goals

A few relevant targets are presented in Figure 2 below, as well as the implications for Park City should it choose to adopt one of these target goals. A majority of Community Carbon Advisory Board members supported pursuing a goal of 15 percent reduction below 2005 emissions by 2020. This target is in alignment with the goals established by the Western Climate Initiative.

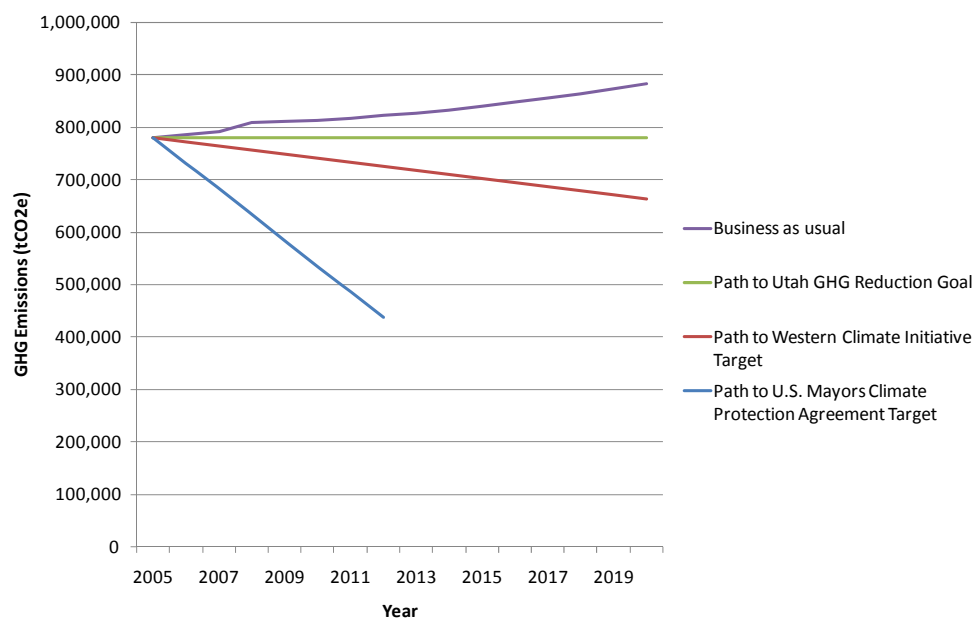


Figure 2. Forecast Park City GHG Emissions and Possible Reduction Targets

## 3.3 Objectives

To achieve the goal of reducing emissions 15 percent below 2005 emissions by 2020, the Board examined the potential benefits of reducing emissions across six major categories of action:

1. community leadership,
2. transportation and land use,
3. energy use,
4. energy supply,
5. waste reduction and diversion, and
6. carbon offsets.





A series of 16 objectives were then developed based on the work of other communities, input from the Carbon Advisory Board, and application of Park City's unique conditions (Table 2).

**Table 2. Proposed Objectives to Reduce GHG Emissions**

Proposed Objective	Primary Sector Addressed
<b>Community Leadership</b>	
Develop frameworks within local government to assure that GHG emissions are considered in decision making (not quantified).	Municipal Operations
Educate individuals in the community on their contributions to community emissions and support them in efforts to reduce emissions (goal/assumption: 2% reduction of residential energy portion of inventory).	Residential
Form a strong partnership with local businesses on reducing emissions (goal/assumption: 10% reduction of commercial energy portion of inventory).	Commercial
<b>Transportation and Land Use</b>	
Reduce the vehicle miles traveled by residents and visitors through continued promotion and development of transit services and land-use planning (goal/assumption: 2% reduction in VMT).	Residents, Visitors
Create a mass transit-oriented transportation alternative from Salt Lake City (goal/assumption: 10% reduction in visitor VMT).	Visitors
Increase the fuel efficiency of vehicles in Park City (goal/assumption: 2% reduction in vehicle emissions).	All
Reduce air travel by residents through education and remote work infrastructure (goal/assumption: 4% reduction in resident airline travel).	Residential, Commercial
<b>Energy Use</b>	
Require all new construction (commercial & residential) to be 20% more energy efficient than code.	Residential, Commercial
Encourage and incentivize existing building owners (commercial & residential) to reduce energy use by 20% below 2005 levels.	Residential, Commercial

Proposed Objective	Primary Sector Addressed
<b>Energy Supply</b>	
Generate and/or purchase 25% of Park City's community electricity from renewable resources by 2020 (goal/assumption: more aggressive than Utah target of 20% renewables by 2025).	All
<b>Waste Reduction and Diversion</b>	
Achieve overall solid waste diversion rate of 50% by 2020 (goal/assumption: from Summit County Integrated Solid Waste Master Plan).	All
<b>Carbon Offsets</b>	
Provide a reliable, effective, and preferably local option to offset GHG emissions (goal/assumption: assumed to provide remainder of reductions to achieve goal, about 9% in this scenario).	All

Figure 3 illustratively shows how applying these objectives across the six major categories can cumulatively contribute to Park City achieving the GHG reduction target of 15 percent below 2005 levels by 2020. A more or less aggressive approach to any of these objectives can qualitatively demonstrate how GHG efforts can be allocated between categories to identify alternative paths to achieving the proposed goal.

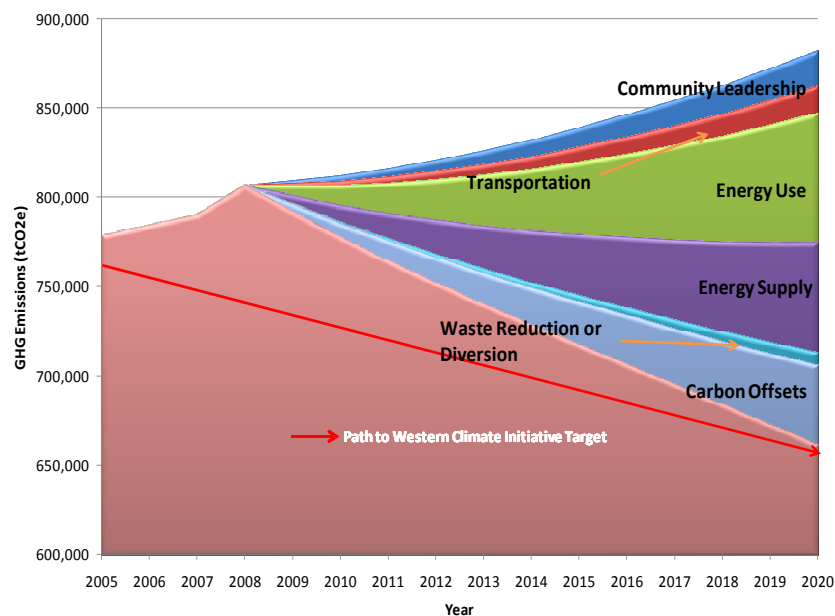


Figure 3. Park City GHG Emissions and Illustrative Roadmap Objectives



## 4.0 Save Our Snow Strategies

The Save Our Snow Action Plan picks up where the Roadmap left off by focusing on a few select strategies for carbon reduction, further defining these strategies, and considering next implementation steps. This Plan also introduces some additional emphasis on water conservation, which is a high priority for the Park City community.

### 4.1 Development Process

The development of the Roadmap incorporated the ideas of the Carbon Advisory Board but did not afford the opportunity for public engagement on the topic. In November 2009, a public event was held to collect input for this new Save Our Snow Action Plan. The event was attended by over 90 members of the community and generated over 300 ideas for reducing GHG emissions and conserving water, in addition to identifying ways to fund these ideas.

A Task Force of 26 members self-selected from the attendees at the public event to consider collected input, guide the development of strategies, and produce this Plan.

### 4.2 Strategies

The Task Force identified 8 broad strategy areas in which many of the public ideas and previous work of the Roadmap aligned. Within these broader strategies, more specific project-oriented themes also emerged. The following sections describe these strategies and specific project themes and, where possible, estimate the costs and benefits of implementing the project-level ideas.

Though it doesn't appear as a stand-alone strategy, the Task Force understands that effective marketing and education will be a necessary component of all of these strategies and projects. Participation by the community is a key variable in the performance of the strategies and will hinge on this outreach effort. Fortunately, the Park City community has a wide-array of entities providing educational programs that can be aligned behind these efforts [see box on right-hand side].

Aside from developing momentum within the community, Park City will also have to build external partnerships to execute on some of the strategies described below. Potential partners include utilities, non-profit organizations, and other communities. Again, fortunately, there is momentum developing throughout the State of Utah for many of these initiatives, such as renewable energy development, that will support Park City's efforts.

#### Organizations Providing Educational Programs

- Recycle Utah
- Swaner EcoCenter
- Mountain Trails Foundation
- Clean Air Park City (formerly Utah Moms for Clean Air, Park City Chapter)
- Wildlife Protection Society
- Summit Land Conservancy
- Snyderville Basin Water Reclamation District
- Utah State University Extension Service (local food/agriculture)
- Uinta Headwaters RC&D
- Build Green Utah (arm of the Park City Area Homebuilders Association)
- Summit County Sustainability Department
- Mountain Regional Water
- Park City Water Department
- Park City Sustainability Department



The Roadmap proposed the pursuit of an emission reduction goal of 15 percent over 2005 levels by 2020. Based on projected emissions in 2020, this amounts to a reduction of about 220,000 tCO<sub>2</sub>e or 25 percent of projected emissions. The project-level ideas that are considered in the following strategies produce an estimated reduction of nearly 11 percent, not quite half the reduction required to meet the goal. While these projects are not enough to meet the goal, they provide a solid

foundation and focused first steps on which the Park City community can take action.

### **Important, but not Quantified Strategies**

The community input process and Task Force identified a variety of other high priority carbon reduction and water conservation strategies. Ultimately, these were not quantified in this report due to a variety of reasons including that these items were already in progress or “owned” by an organization in the Park City community.

The Task Force decided to focus its efforts on important initiatives which needed quantification and external support. A list of the “Important, but not Quantified” strategies is included below for reference purposes:

- Alternative Transportation (Bus, Bike, Walk)
- Mass Transit Expansion (Especially Park City-SLC Bus Route)
- Overcoming HOA Limitations (Clotheslines, Solar Panels, etc.)
- Tree Planting
- Rainwater Collection, Greywater, and Water Reuse
- Water Budgeting to Promote Conservation
- Amending Landscape Ordinances to Promote Conservation
- Ongoing Education and Outreach

The Park City community will focus on making existing buildings more energy and water efficient. This effort The summary table on the following page also presents an upper bound potential for emission reductions in 2020 for each broad strategy. Based on current technologies, typical performance of strategies and achievable rates of participation, the upper bound suggests what the potential reduction might be for each strategy with the implementation of more aggressive projects. The upper bound is not an absolute upper bound, but a reasonable estimate. A more aggressive upper bound could be envisioned for 2020, and certainly for the mid-century timeframe.

The summary table also presents an estimated one-time implementation cost and annual savings for the proposed projects. The costs and savings include those incurred by both private and public entities in the community (e.g. individual citizens, local businesses, and Park City Municipal). For any given strategy, the costs and savings are not necessarily realized by the same entity. A negative Cost per Ton Reduction indicates a savings per ton of emission reduction (tCO<sub>2</sub>e) over the life of the strategy.



Table 3. Summary of Considered Strategies

Priority	#	Goal	Objective	Proposed Strategy/Project/"The How"	Possible Owner/Leader*	Implementation Cost (one-time)	Net Annual Cost Savings	Cost per Ton of CO <sub>2</sub> e Reduced Over Project Life (savings negative)	% Reduction of Business-as-usual Emissions in 2020 (as proposed, upper bound)	Absolute Reduction of Emissions in 2020, as proposed (tons CO <sub>2</sub> e)
H	1	Carbon Reduction	Increase Energy Efficiency	Energy use reduction in buildings – primary, 2 <sup>nd</sup> homes & businesses •Programmable thermostat & phantom load reduction •Increase number of energy audits •Outreach to property management firms & HOAs •Explore possible funding model	NFP, NNFP, CA support: SC & PCMC	\$4 million	\$2 million	-\$130	1.5%, 8.1%	12,000
M	2	Carbon Reduction & Water Conservation	Energy efficiency, increased renewable energy generation, & revenue generation	Improved building standards with a local permit-based fee program to incentivize green building (Aspen/Pitkin model of Renewable Energy Mitigation Program)	PCMC & SC support: CA	\$0	\$61,000	-\$76	0.1%, 0.2%	770
M / L	3	Carbon Reduction	Increase Renewable Energy Generation	Local Renewable Energy Development which considers a community solar farm (St. George SunSmart Program)	any	\$30,000	\$2,000	-\$20	0.003%, 6.2%	20
H	4	Carbon Reduction	Change carbon emissions profile of electricity consumed in Park City	•Utility-scale Renewable Energy Development •considers an investment in regional wind power •municipal power company / co-op •consider other/future possibilities (research)	SC & PCMC support: CA, NFP	\$41 million	\$3 million	-\$19	6.2%, 31.1%	49,000
L	5	Carbon Reduction	Reduce/Offset Airline Trips	•Work with all resort-related business to increase the length of visitor stay •Create something that will help to reduce resident airline travel (teleconference facility?)	Other, business	\$0	\$92,000	-\$5	2.6%, 4.8%	20,000
H / M	6	Carbon Reduction	Increase Recycling Rates & Increase amount of composting	•Expanding composting /community-wide composting •Possible mandatory recycling (residential / business) •Explore Pay-As-You Throw programs	SC & NFP; support PCMC	unknown	unknown	unknown	0.5%, 1.4%	3,600
TOTAL						\$45 million	\$5 million		10.9%, 51.7%	85,500

\*CA = Citizen Ambassador group; NFP = Non Profit group; NNFP = New Non Profit group; PCMC = Park City Municipal; SC = Summit County; support = supporting group. Numbers in the table may not sum due to rounding.



#### 4.2.1 Energy Use in Existing Buildings

The Park City community will focus on making existing buildings more energy and water efficient. This effort will include increasing access to building energy and water assessments and retrofits while also increasing awareness of existing utility-offered programs. Specific efforts will be made to assist second home owners and particular commercial sectors with reducing energy consumption.

A potential funding mechanism for energy and water assessments and recommended retrofit work is property tax financing or property assessed clean energy (PACE) bonds. This mechanism will require some state-level legislation, but will likely be considered by the Utah legislature in future sessions. State-level enabling legislation would allow the City to provide guaranteed loans for retrofit work which would subsequently be paid back through property tax bills over an extended period (e.g. twenty years).

To better inform residents of existing resources, the [parkcitygreen.org](http://parkcitygreen.org) website provides resources for residents to conduct their own home energy assessment and also guidance for hiring a home energy assessor. The site describes and provides links for incentives covering assessments as well as incentives available for implementing specific energy saving retrofits. Similar informational resources are available for businesses at [parkcitygreen.org](http://parkcitygreen.org). The site is approaching 4,000 unique visitors since launch and continues to see sustained visitor traffic.

One area that presents a significant opportunity for the Park City community to reduce energy consumption may be in second homes. According to a study of second homes in Aspen, Colorado, the average second home is occupied 88 days per year and unoccupied the remaining 277. Furthermore, second homes were found to use as much, or more, energy per square foot when *unoccupied* than primary homes did when occupied. Potential reasons include the presence of more energy consuming amenities and the possibility that some of these operate when the property is unoccupied and/or out of season (e.g. snowmelt systems that continue to operate in the summer). Based on tax assessor reports, second or non-primary residences make up approximately 60 percent of the residential floor space in Park City. There are numerous opportunities to reduce energy use in unoccupied second homes, saving these home owners money and reducing Park City's community emissions. These opportunities can be implemented without compromising the security, comfort, or

**Goal:** Carbon Reduction

**Objective:** Increase Energy Efficiency

**Proposed Strategy:** Energy use reduction in buildings – primary homes, second homes & businesses

- Programmable thermostat & phantom load reduction
- Increase number of energy audits
- Outreach to property management firms & HOAs
- Explore possible funding model (e.g. PACE bonds)

**Possible Owner/Leader:** Non-profit group, new non-profit group, Citizen ambassador group - also, support from Summit County and Park City Municipal

**Priority:** High



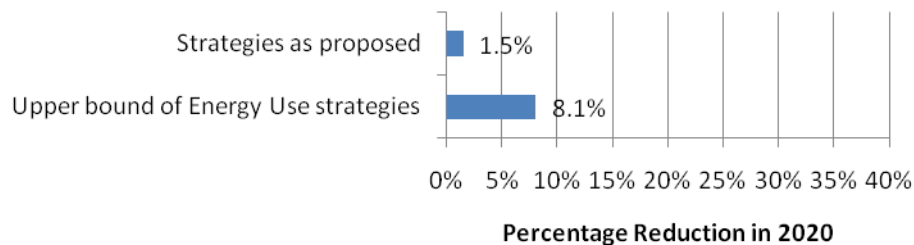


maintainability of a property and they include tighter management of temperature set points, reducing plug-loads of unused appliances and amenities, increased weatherization and freeze protection, and improved controls for equipment to prevent unnecessary or unseasonal operation.

Given its size and economic importance to the community, the lodging industry in Park City may also be able to collaborate around some common energy saving opportunities that would lead to cost savings and emissions reductions. One opportunity that may be shared by many lodging properties is the installation of systems that control heating, cooling, and possibly lighting based on room occupancy. These systems are available in a number of configurations including thermostats that are programmable from the front desk, thermostats that respond to occupancy in the space, and room-key solutions that turn off lighting and reduce heating and cooling when the key is not placed in a slot by the door. These systems offer a range of savings depending on configuration and the operating characteristics of the property, but can generally be expected to payback in less than 5 years.

### Energy Use Strategies

#### Estimated Reduction in Community Emissions Over Business-as-usual in 2020



#### ESTIMATED PERFORMANCE OF PROPOSED STRATEGIES

**Implementation Cost (one-time):**  
\$4,000,000

**Cost Savings (annual):** \$2,000,000

**Strategy Life:** 10 years or longer depending on maintenance of equipment and practices

**Net Cost Over Strategy Life (savings negative):** -\$16,000,000

**GHG Emission Reduction Over Strategy Life:** 123,000 tons CO<sub>2</sub>e

**Cost Per Ton CO<sub>2</sub>e Reduced (savings negative):** -\$130

The financial performance presented above is for the community as a whole and could include, on any given measure, costs and/or savings borne by individual citizens, businesses, and Park City Municipal. See Appendix A for assumptions behind the estimated performance.



### **Related Activities and Opportunities**

- Recycle Utah participates in outreach & education on energy conservation and has potential to support some of the energy-related goals set by the Task Force
- ParkCityGreen.org is an existing resource to support energy conservation
- A centralized physical resource like the Community Office for Resource Efficiency (CORE) in Aspen and Crested Butte, Colorado might offer additional services





#### 4.2.2 Improved Building Standards

Residential building energy codes are currently adopted at the state level in Utah. In 2007, the State adopted the 2006 International Energy Conservation Code (IECC). Based on energy modeling conducted by the Department of Energy's Building Energy Code Programs, residential buildings in Park City's climate zone might save 13 percent in energy cost under the updated 2009 IECC code.

While Park City cannot directly impact this energy code, it is likely that the State of Utah will adopt the 2009 IECC code, and potentially additional updates beyond that, within the timeframe of this CAP. The state recently adopted the commercial provisions of IECC 2009 under HB45 and a review process is underway to consider adopting IECC 2009 for residential construction as well. Therefore, it is assumed that the growth rate of per-household residential energy consumption will decrease over the life of this plan.

**Goal:** Carbon Reduction & Water Conservation

**Objective:** Energy efficiency, increased renewable energy generation, & revenue generation

**Proposed Strategy:** Improved building standards with a local permit-based fee program to incentivize green building

**Possible Owner/Leader:** Park City Municipal and Summit County, with support from Citizen ambassador group

**Priority:** Medium

One indirect way of influencing new building energy consumption beyond the code would be through a program similar to the Renewable Energy Mitigation Program (REMP) in Aspen and Pitkin County, Colorado. The REMP program regulates energy use for

##### Water Conservation Activities

- Park City's Water Department leading an effort to develop Water Budgeting
- New law just passed allowing tank-based rainwater collection
- Park City Water Department reviewing existing landscape ordinances and identifying potential conservation opportunities

snowmelt systems, spas, and swimming pools. These exterior energy uses must use energy from within the house energy budget or through on-site renewable energy generation. Additional energy use beyond the above sources results in the assessment of a one-time fee at the time of building permitting. Furthermore, houses over 5,000 sq. ft. are required to install a renewable energy system or face additional fees. These fees are used to develop energy efficiency and renewable energy projects in the community. Since the program's inception in 2000 nearly \$8 million has been raised.

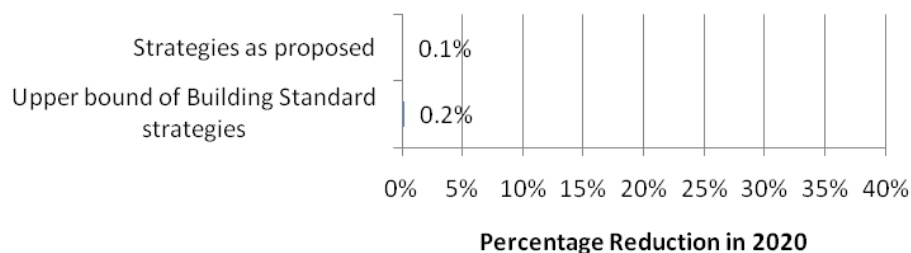
The Park City community could consider a similar program to reduce the impact of high-energy intensity amenities, incentivize the construction of smaller homes with lower energy consumption, and also incentivize the installation of other key sustainability features. For example, installing ultra-low flow water fixtures or xeriscape landscapes for the purpose of conserving water could yield a reduced fee or even a discount off of base permitting fees for those properties not subject to a size-



or amenity-based fee. This program could extend beyond new building permits to include efficiency opportunities in remodeling as well.

## Improved Building Standards

### Estimated Reduction in Community Emissions Over Business-as-usual in 2020



#### ESTIMATED PERFORMANCE OF PROPOSED STRATEGIES

**Implementation Cost (one-time):**  
negligible

**Cost Savings (annual):** \$61,000

**Strategy Life:** 10 years or longer depending  
on building maintenance

**Net Cost Over Strategy Life (savings  
negative):** -\$610,000

**GHG Emission Reduction Over Strategy  
Life:** 8,000 tons CO<sub>2</sub>e

**Cost Per Ton CO<sub>2</sub>e Reduced (savings  
negative):** -\$76

The financial performance presented above is for the community as a whole and could include, on any given measure, costs and/or savings borne by individual citizens, businesses, and Park City Municipal. See Appendix A for assumptions behind the estimated performance.

#### Related Activities and Opportunities

- Ongoing work to develop a new, near net-zero community housing project.



#### 4.2.3 Local Renewable Energy Development

The Park City community has a number of opportunities for implementing renewable energy generation locally and thereby reducing the GHG emissions associated with energy consumption. Potential sources include solar photovoltaic, solar thermal, ground-source heat pumps, micro-hydro, anaerobic digestion, and small-scale wind. Utah State University and the Energy Dynamics Lab in Logan are currently working on a renewable energy feasibility study for Park City Municipal and the community-at-large.

In order to generate the most direct reduction in Park City's GHG emissions, these renewable resources would be installed "behind the meter" at Park City residences and businesses where they would directly reduce Park City's consumption of electricity or natural gas. "Behind the meter" refers to renewable resources that are installed such that the energy they generate is represented as a net reduction in monthly utility bills. However, other mechanisms such as the third-party power purchase agreement (PPA) could allow Park City to realize the benefits of renewable energy generation that is not installed "behind the meter". The state legislature passed HB145S02 which allows third-party PPAs for non-profits and governments, though residents and businesses are precluded from participating.

There are a number of strategies for financing the development of renewable energy projects in Park City. These may include developing a voluntary green power program with Rocky Mountain Power that would return funds to Park City locally ("Enhanced" Blue Sky program), the possible future availability of property tax financing (PACE bonds), and cooperative development of a community renewable energy project.

The community renewable energy project model has been successfully implemented in the St. George, Utah SunSmart Project. This community solar farm is located at the edge of the community and maintained by the participating utility companies. By developing solar at the community-scale, the system achieves economies of scale and reduces maintenance and hassle for participating residents. Residents purchase whole (1kW) or half (500W) units and subsequently receive a credit on each monthly bill for the amount of energy produced by their unit. SunSmart has negotiated with the State of Utah to allow tax credits to be available for participants even though the system is located "off-site". Federal renewable energy tax credits may also be extended to this type of community solar arrangement.

A number of variations on the community-scale project can be envisioned, including co-locating a facility with a Park City Municipal building and having residents similarly invest in the renewable energy project for a monthly return based on energy generation. The strategy proposed for local renewable energy development is modeled on a project similar to the St. George SunSmart project described above.

**Goal:** Carbon Reduction

**Objective:** Increase Renewable Energy Generation

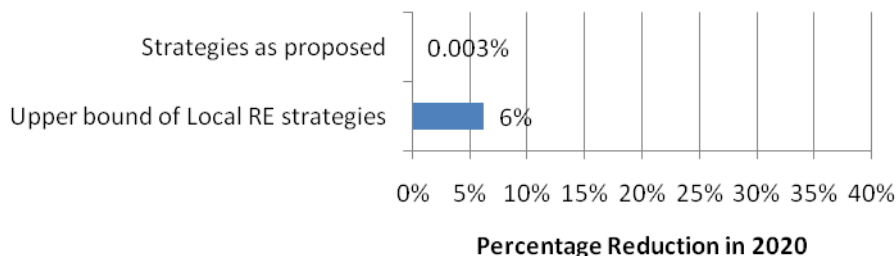
**Proposed Strategy:** Local Renewable Energy Development which considers a community solar farm

**Possible Owner/Leader:** any

**Priority:** Medium-Low



## Local Renewable Energy (RE) Estimated Reduction in Community Emissions Over Business-as-usual in 2020



### ESTIMATED PERFORMANCE OF PROPOSED STRATEGIES

**Implementation Cost (one-time):** \$30,000

**Cost Savings (annual):** \$2,000

**Strategy Life:** 25 years

**Net Cost Over Strategy Life (savings negative):** -\$20,000

**GHG Emission Reduction Over Strategy Life:** 1,000 tons CO<sub>2</sub>e

**Cost Per Ton CO<sub>2</sub>e Reduced (savings negative):** -\$20

The financial performance presented above is for the community as a whole and could include, on any given measure, costs and/or savings borne by individual citizens, businesses, and Park City Municipal. See Appendix A for assumptions behind the estimated performance.

### Related Activities and Opportunities

- Homeowners associations (HOA) and established covenants, conditions, and restrictions (CC&Rs) can be a barrier, or perceived barrier, to some on-site renewable energy or energy efficiency opportunities. Many citizens have had success in working with their HOA to remove these barriers.
- Strong participation in available green energy purchase programs.



#### 4.2.4 Utility-scale Renewable Energy Development

Beyond the local and community-scale renewable energy opportunities, Park City may have some emerging chances to participate in utility-scale renewable energy development in the region. As previously mentioned, third-party PPAs will allow certain entities to access efficient financing models and incentives. There may be additional ways for the community to choose larger scale, renewable energy for local development.

**Goal:** Carbon Reduction

**Objective:** Change carbon emissions profile of electricity consumed in Park City

**Proposed Strategy:** Utility-scale Renewable Energy Development

- considers an investment in regional wind power
- potentially create a municipal power company / co-op
- consider other/future possibilities (research)

**Possible Owner/Leader:** Park City Municipal and Summit County, with support from Citizen ambassador group and non-profit groups

**Priority:** High

A study by Synapse Energy Economics on the Co-Benefits of Efficiency and Renewables in Utah estimates that the health and water externalities of conventional energy generation in Utah are at least equal to the cost of that generation. Health and water externalities have a "...monetary value of between \$1.7 and \$2.0 billion dollars per year (2008\$), or between \$36 and \$43 per megawatt-hour (MWh) of fossil generation in Utah, a value which is comparable to the direct costs of conventional



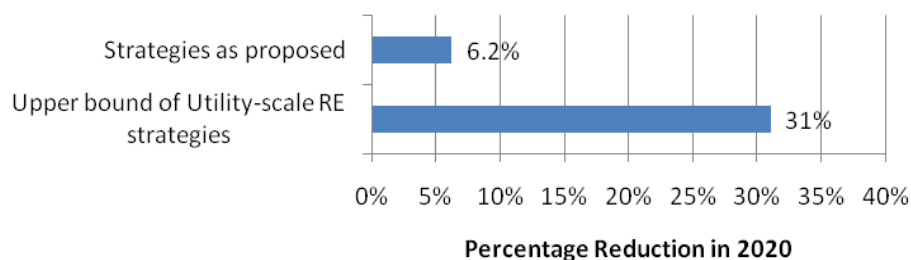
electricity generation.”

Geothermal, landfill gas, solar, and wind are all resources available in Utah. Geothermal resources are concentrated in the western portion of the state, and only portions of this area have been shown to have sufficient energy density for power generation. There are at least four landfills that are capturing methane for power generation including Salt Lake City, two in Davis County, and the Trans-Jordan Landfill. No methane capture currently occurs at the Three Mile Landfill that serves Summit County. The Summit County Integrated

Solid Waste Management Master Plan estimates that 20 percent of the solid waste delivered to Three Mile Landfill is food scraps. This is higher than the national average (12.4%) and may indicate a reasonable potential for landfill gas generation. Solar resources in Summit County are moderate (5.1-5.5 kWh/m<sup>2</sup>/day) compared with the southern and western portions of the state, but certainly viable for energy production.

Perhaps the most promising larger-scale renewable energy development opportunity for Park City is in wind. While the resources in the immediate vicinity of Park City are rated mediocre, just to the southeast of Heber and to the west on the Wasatch Front the resources for wind are outstanding (600-800 W/m<sup>2</sup> at 50 meters). The Porcupine Ridge site in Summit County is in this outstanding wind area and has been assessed by the Department of Energy and Utah State University. There may be the capacity for between 25 and 130 megawatts (MW) of wind development at Porcupine Ridge. This is enough potential capacity to generate more electricity in a year than Park City consumes.

## Utility Scale Renewable Energy (RE) Estimated Reduction in Community Emissions Over Business-as-usual in 2020



### ESTIMATED PERFORMANCE OF PROPOSED STRATEGIES

**Implementation Cost (one-time):**  
\$41,000,000

**Cost Savings (annual):** \$3,000,000

**Strategy Life:** 20 years

**Net Cost Over Strategy Life (savings negative):** -\$19,000,000

**GHG Emission Reduction Over Strategy Life:** 1,000,000 tons CO<sub>2</sub>e

**Cost Per Ton CO<sub>2</sub>e Reduced (savings**



**negative): -\$19**

The financial performance presented above is for the community as a whole and could include, on any given measure, costs and/or savings borne by individual citizens, businesses, and Park City Municipal. See Appendix A for assumptions behind the estimated performance.

### **Related Activities and Opportunities**

- There is growing momentum at the state level for the development of renewable energy in Utah. Studies of development opportunities and integration requirements, a growing municipal utility organization (Utah Associated Municipal Power Systems – UAMPS), and the interest of other communities may provide Park City with opportunities to partner in the development of utility-scale renewable energy.
- Various state-level agencies including the State Energy Program, the Division of Public Utilities, the Division of Air Quality, and the Office of Consumer Services recently commissioned a report, released in March 2010, titled “Co-benefits of Energy Efficiency and Renewable Energy in Utah”. This report quantified a portion of the externalities associated with carbon-based energy generation in Utah and also demonstrated the economic and social value of energy efficiency and renewable energy generation.





#### 4.2.5 Visitor Transportation

With a strong tourism economy, a large portion of the Park City community's greenhouse gas emissions are the result of airline and vehicle travel by visitors. Clearly, the Park City community does not want to discourage visitor travel, but rather to educate and incentivize visitors to seek efficiencies in their travel to, and within, Park City.

One option is to educate on and incentivize longer stays in Park City, thereby decreasing the travel emissions per night of a visitor's stay. This might be achieved through additional efforts among tourism service providers and the business community in Park City to structure existing sales and/or incentives packages to provide significant benefits for visitors that stay longer. Providing and promoting the use of world-class teleconferencing facilities in Park City might make it easier for visitors to stay longer and reduce the need for residents to travel as well.

The impact of a visitor's trip to Park City could be further reduced by raising awareness of the ease of visiting Park City without a car. Many first-time visitors to Park City rent cars, but often do not rent again on subsequent visits. The existing, and continually improving, options for walking, biking, and free transit make a car-free visit to Park City an attractive and feasible option for many visitors. Additionally, the encouragement of rail and other lower-carbon travel options may reduce overall emissions associated with visitor nights in Park City.

Though not a direct reduction in emissions related to visitor travel, carbon offset programs offer the potential to mitigate environmental impacts of air travel. Park City area resorts could increase their promotion of offset programs to encourage travel with less impact and a better understanding of the environmental implications of airline transportation.

**Goal:** Carbon Reduction

**Objective:** Reduce / offset  
airline trips

**Proposed Strategy:**

- Work with all resort-related business to increase the length of visitor stay
- Create policies and programs that help reduce resident airline travel (teleconference facility?)

**Possible Owner/Leader:**  
Other, business

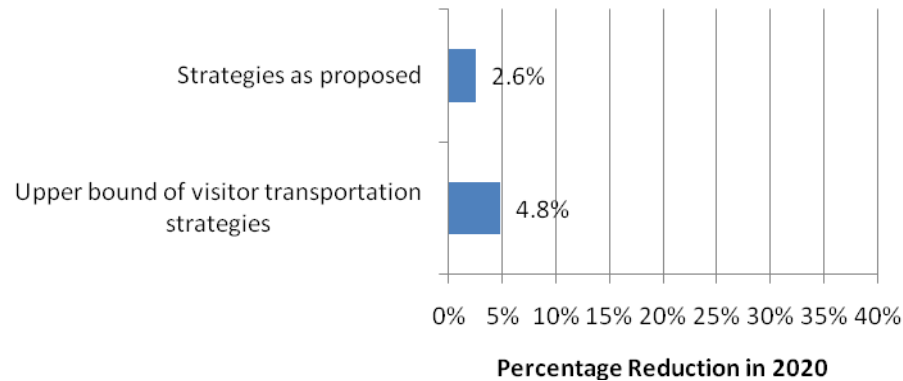
**Priority:** Low





## Visitor Transportation

### Estimated Reduction in Community Emissions Over Business-as-usual in 2020



#### ESTIMATED PERFORMANCE OF PROPOSED STRATEGIES

**Implementation Cost (one-time):** \$0

**Cost Savings (annual):** \$92,000

**Strategy Life:** 20 years

**Net Cost Over Strategy Life (savings negative):** -\$1,840,000

**GHG Emission Reduction Over Strategy Life:** 404,200 tons CO<sub>2</sub>e

**Cost Per Ton CO<sub>2</sub>e Reduced (savings negative):** -\$5

The financial performance presented above is for the community as a whole and could include, on any given measure, costs and/or savings borne by individual citizens, businesses, and Park City Municipal. See Appendix A for assumptions behind the estimated performance.



#### 4.2.6 Solid Waste Reduction and Recycling

According to surveys by Recycle Utah, the Park City community was responsible for almost 50 percent of the roughly 5,000 tons of solid waste diversion in Summit County in 2007. Two areas identified for continued improvement and diversion from the landfill include composting and residential recycling.

Recycle Utah hosts weekly summer composting seminars in Park City to promote the use of backyard composting. Community drop-off sites in addition to institutional and restaurant programs have been proposed to further increase the diversion of organic materials from the landfill.

Another area of opportunity is in residential recycling. The introduction of a pay-as-you-throw (PAYT) rate structure, whereby the amount paid is in proportion to the volume of waste generated, could achieve significant waste reduction. Additionally, mandatory recycling is a potential option for home-owners associations, condominiums, and others.

Diversion of solid waste from the landfill can have a two-fold benefit with respect to GHG emissions. First, biodegradable materials, such as cardboard, paper or other organic materials are prevented from decomposing at the landfill and generating GHG emissions. This diversion results in a direct reduction in the community's GHG inventory. Furthermore, diverting recyclables decreases the worldwide extraction of virgin materials and its associated energy requirements. For almost all materials, the GHG emissions that occur in returning recycled material to market are much less than those that occur bringing virgin material to market. Therefore, recycling has an impact on reducing GHG emissions both in Park City from a decomposition perspective as well as in upstream materials markets.

**Goal:** Carbon Reduction

**Objective:** Increase Recycling Rates & Increase amount of composting

**Proposed Strategy:**

- Expanding composting /community-wide composting
- Explore Pay-As-You Throw programs
- Possible mandatory recycling (residential / business)

**Possible Owner/Leader:**

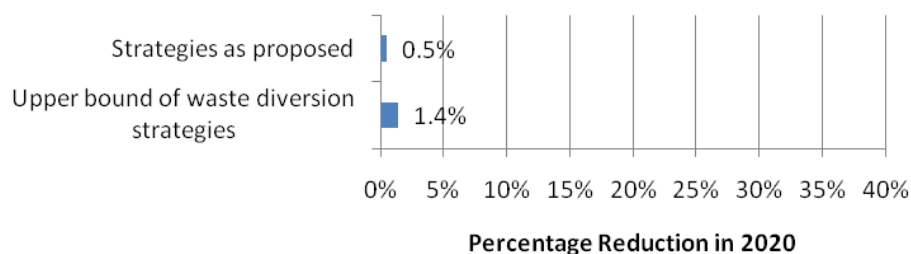
Summit County and non-profit groups with support from Park City Municipal

**Priority:** High-Medium



## Waste Diversion

### Estimated Reduction in Community Emissions Over Business-as-usual in 2020



### ESTIMATED PERFORMANCE OF PROPOSED STRATEGIES

**Strategy Life:** 20

**GHG Emission Reduction Over Strategy**

**Life:** 71,700 tons CO<sub>2</sub>e

See Appendix A for assumptions behind the estimated performance.

#### Related Activities and Opportunities

- Park City is in close proximity to numerous, local recycling opportunities. Recycle Utah operates in Park City and accepts an vast array of recyclable materials, in addition to providing numerous educational opportunities on composting and other topics. Park City is also serviced by multiple private recycling contractors who provide services to both businesses and residents.



### **4.3 Measuring Progress Towards Emission Targets**

The role of the Community Carbon Footprint and Roadmap to Reduction in measuring future progress toward emission targets should be considered in light of other factors that can cause year-to-year variation in emissions. Annual variations in the inventory caused by weather, changes in the economy, fluctuations in commercial activity, and other factors generally create a level of uncertainty that will obscure the impact of most individual GHG reduction activities. Only a concerted, community-wide effort across many source categories taken in aggregate will produce the magnitude of reductions that will be readily discerned at the inventory level.

As the strategies in this Plan are implemented, a hybrid approach can be applied that maintains an updated inventory as well as estimates the GHG reduction impacts on a strategy-by-strategy basis. A frequently updated inventory can help to identify trends in Park City emissions that may impact the outcome of an adopted target and will, if concerted reduction efforts occur, reveal progress toward that target. Simultaneously, the aggregated impacts of individual strategies that Park City adopts to achieve emission reductions should be tracked to more directly measure the success of the Save Our Snow Action Plan.

### **4.4 Implementation Steps**

This Action Plan is the primary reference tool for prioritizing and guiding next steps towards emissions reductions in Park City. As this plan demonstrates, there are many strategies that can be pursued at a net financial savings to the community while simultaneously lowering GHG emissions. Implementation will require efforts across multiple fronts including political, commercial, non-profit, and individual groups.

The next step in implementation is to transition the proposed strategies from Table 3 to their ultimate owners and leaders while utilizing the Action Plan as an overarching strategy tool. The Save Our Snow Task Force, in concert with Environmental Sustainability staff from Park City Municipal and the County, will work on a transition strategy to ensure hand-off of ownership responsibilities and the best chance for adoption of the measures identified.



## Appendix A: Strategy Performance Assumptions

### Energy Use in Buildings

#### Proposed Strategies

- Energy Assessments and Retrofits
  - 10% of properties by square footage participate in PACE type financing program
  - 10% energy savings achieved on average
  - No cost or savings indicated, assumed to be essentially revenue neutral on a community-wide basis
- Energy Efficiency in Second Homes
  - 60% of residential floor space in second homes
  - Equivalent energy use intensity in unoccupied second home equivalent to occupied primary home (Aspen Second Homes Energy Study)
  - Second homes unoccupied 76% of the time (Aspen Second Homes Energy Study)
  - Conservative savings of 10% of electricity and 5% natural gas estimated based on potential combination of strategies to target unoccupied energy use
  - \$0.05/sq. ft. to identify and implement low- or no- cost measures to save energy when unoccupied (low-end of market cost for residential audit)
- Lodging Property Occupancy Controls
  - Estimate 4.4 million square feet of guest room floor space (Lodging Inventory)\*\*\*
  - Used average energy intensity for lodging in this climate zone (Commercial Building Energy Consumption Survey)
  - Conservative savings of 2% of electricity and 9% of space heating (building energy modeling for networked thermostats)
  - Average \$400/room installed cost (various manufacturer estimates)

#### Upper bound of Strategies

Set a goal of 20% reduction in energy intensity. Park City's average energy intensity remains above the average for this climate zone even after the reduction, so this magnitude of reduction is likely achievable.

### Improved Building Standards

#### Proposed Strategies

- Adoption of 2009 IECC residential code at state-level
  - 11% reduction in the growth of residential energy emissions (electricity and natural gas) between 2010 and 2020 (DOE Building Energy Code modeling)
  - Cost to implement codes or build under 2009 IECC compared to 2006 IECC are not known
  - Annual cost savings estimated from reduced electricity and natural gas consumption
- REMP-style program
  - Projected build-out of Park City includes 668 single family lots (Park City Municipal)
  - About 3.5% of current housing stock is larger than 5,000 sq. ft. (Tax Assessor Report)



- Given the same distribution of house sizes amongst new single family lots and all elect to pay fee of \$5,000 (REMP) instead of installing renewable energy the program revenue generation potential is about \$115,000
- Cost to community is essentially neutral since fees are used to fund community projects

Upper bound of Strategies

Similar code-based efficiency opportunities in residential and commercial sectors

## Local Renewable Energy Development

Proposed Strategies

- Community-scale solar energy development
- 0.1 percent participation rate of 13,000 residential accounts
- \$6/W installed system cost (St. George SunSmart)
- State and Federal Tax Credits applied
- 14 kW system
- Savings to participant at typical energy rates

Upper bound of Strategies

- Essentially limited only by available renewable energy resources and willingness to invest
- An illustrative upper bound was set at 20 percent of electrical consumption being satisfied with local renewable energy (equivalent to many state-level RPS standards)

## Utility-scale Renewable Energy Development

Proposed Strategies

- Investment in 20MW of wind capacity, enough to generate 20% of Park City's electrical consumption
- Installed cost of \$2,100/kW (USU/DOE)
- Annual O&M cost of \$15/MWh (DOE)
- Cost savings at \$0.07/kWh

Upper bound of Strategies

- Essentially limited only by available renewable energy resources and willingness to invest. Generation beyond Park City's consumption can serve as an offset for other emissions.
- An illustrative upper bound was set at 100 percent of electrical consumption being satisfied with renewable energy

## Visitor Transportation

Proposed Strategies

- Based on estimates of airline miles traveled for Park City residents and visitors in 2007
- Increase average length of stay by 0.5 nights per visitor
- Decrease per capita trips by residents by 0.25 trips per year (current per capita airline trips is estimated to be 6.2)



- Cost for outreach, incentives and infrastructure to make a trip longer for visitor or eliminate a trip for resident: \$20 per trip
- Savings per resident trip reduced: \$100 over the cost of a flight

Upper bound of Strategies

- Increase average length of stay by 1 nights per visitor
- Decrease per capita trips by residents by 0.5 trips per year (current per capita airline trips is estimated to be 6.2)

## **Solid Waste**

Proposed Strategies

- 4 percent increased diversion due to expansion of composting options (statistical study of other communities, SERA)
- All remaining recyclable material with methane generating potential (e.g. fibers like paper) recycled, 50 percent estimated to be residential

Upper bound of Strategies

75 percent diversion of solid waste currently being landfilled



## Appendix B: Other Strategies Considered

The Task Force also considered in detail car sharing and local carbon offset fund strategies. While these strategies have some attractive benefits for the community, their potential impact on emissions reduction is relatively small and they are therefore not included with the primary recommendations of the Task Force.

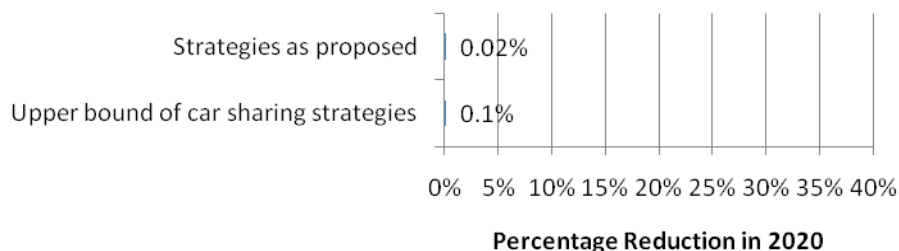
### Car Sharing

The Park City community has significant efforts underway to provide more transportation options including the improvement of infrastructure and promotion of alternative modes of transportation (e.g. transit, biking, and walking) as well as an expansion of services by the bus transit system. A car sharing service would provide another alternative to private vehicle ownership. Since it tends to be more costly per mile than private vehicle ownership, it could motivate users to reduce vehicle miles travelled (VMT). This reduction in VMT may be more pronounced since participants also have the option of Park City's free transit system. A car sharing vendor, U Car Share, is running an operation with 19 vehicles in Salt Lake City.

The most likely participants in a car sharing service in Park City might include those that can use the free transit system and walking/biking for the majority of their trips and have only occasional need for a vehicle. These might include portions of the full-time, part-time, and seasonal resident populations as well as visitors to Park City that arrive without a vehicle. The availability of a car sharing service might motivate full-time residents to reduce vehicle ownership and drive less, might encourage part-time and seasonal residents to reduce vehicle ownership or travel to Park City without a personal vehicle, and could provide an alternative to visitors if access to the program was simple.

### Car Sharing

#### Estimated Reduction in Community Emissions Over Business-as-usual in 2020







### ESTIMATED PERFORMANCE OF PROPOSED STRATEGIES

**Implementation Cost (one-time):** \$0

**Cost Savings (annual):** \$9,000

**Strategy Life:** 10 years

**Net Cost Over Strategy Life (savings negative):** -\$90,000

**GHG Emission Reduction Over Strategy Life:** 1,200 tons CO<sub>2</sub>e

**Cost Per Ton CO<sub>2</sub>e Reduced (savings negative):** -\$100

The financial performance presented above is for the community as a whole and could include, on any given measure, costs and/or savings borne by individual citizens, businesses, and Park City Municipal. See Appendix A for assumptions behind the estimated performance.

#### Related Activities and Opportunities

- \$15 Walkability Bond improvements in progress
- Mountain Trails Foundation and the Park City Municipal Trails Coordinator are focused on trails & alternative transportation
- PCMC in process of hiring consulting engineering firm to update City's Transportation Master Plan
- Mass Transit, – especially expanded bus service to include a Park City-to-SLC route.
- A Buy Local program to promote patronage of local businesses, thereby reducing VMT.
- Progress on a student trip reduction program to promote carpooling, bike to school days, and similar activities.
- An existing Municipal fleet anti-idling program, with a school anti-idling program in progress.
- Maximized fuel efficiency of transit service through scheduling and route planning.

#### Assumptions for Car Sharing Evaluation

##### Proposed Strategies

- Provider brings car sharing service to Park City
- 10% of neighborhoods suitable for sharing, 3% of full-time residents and 5% of part-time residents in these neighborhoods participate (Victoria Transport Policy Institute)
- 5% of visitors to Park City participate
- Participants tend to be low mileage per capita, 5,000 VMT annually (Park City average is about 9,000)



- 40% reduction in VMT among participants
- Installed cost borne by provider
- Cost of \$0.20 per mile for personal vehicle and \$0.30 per mile for car share participants (Victoria Transport Policy Institute)

#### Upper bound of Strategies

- 20% of neighborhoods suitable for sharing, 5% of full-time residents and 5% of part-time residents in these neighborhoods participate (Victoria Transport Policy Institute)
- 5% of overnight visitors to Park City participate
- 60% reduction in VMT among participants

### Local Carbon Offset Program

Another funding mechanism that could support some of the strategies recommended above would be a local carbon offset program. Such a program might offer offset purchasing options to both visitors and residents at lodging establishments, ski resorts, and other partnering locations in the community. The funds generated by these offset purchases would be invested locally in carbon reducing projects. Though the initial carbon reduction is owned by the purchaser, the long-term carbon reductions could be retained by Park City.

The biggest opportunity for a local carbon offset program to flourish may require marketing to visitors at a time when they are likely to purchase. This will be increasingly challenging with the variety of offset options now offered by airlines, lodging, and car rental agencies at the time of purchase.

## ESTIMATED PERFORMANCE OF PROPOSED STRATEGIES

**Implementation Cost (annual): \$300**

**Revenue Generated (annual): \$3,000**

The financial performance presented above is for the community as a whole and could include, on any given measure, costs and/or savings borne by individual citizens, businesses, and Park City Municipal. See Appendix A for assumptions behind the estimated performance.

### Assumptions for Local Carbon Fund Program Evaluation

#### Proposed Strategy

- Based on estimates of airline miles traveled for Park City residents and visitors in 2007
- Targets airline travelers, residents and visitors, to offset flight
- Participation rates in existing airline program vary from less than 1 to 50 percent depending on approach, assumed 0.05 percent of 2007 emissions offset
- \$20/ton CO<sub>2</sub>e, a competitive price for offsets
- 10% administrative overhead costs