

City of Aspen Canary Initiative

Climate Action Plan

www.canaryinitiative.com

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The City of Aspen would like to thank the City Environmental Health Department staff for its innovation and support of this project. Special thanks to the Aspen Global Warming Alliance members for their guidance and input and to the Community Office for Resource Efficiency for their collaboration. The City of Aspen would also like to thank Portland’s Office of Sustainable Development which generously allowed the City of Aspen to use its ‘Global Warming Action Plan’ as a template for the Canary Action Plan.

May 2007

Dear Aspen Residents and Visitors,

On behalf of the City of Aspen and the Aspen City Council, it is my pleasure to introduce the Canary Initiative Action Plan. With its long history of commitment to protection of the environment, the City of Aspen recognizes the significant threat global warming poses not only to our beautiful valley and its quality of life, but to the global community. In 2005, the city adopted the ambitious Canary Initiative that identifies Aspen and other mountain communities as the canary in the coal mine for global warming. The goal is to aggressively reduce Aspen's carbon footprint to protect our community's future, and to contribute to global reduction of global warming pollution.

In conjunction with Aspen's Greenhouse Gas Emission Inventory and Climate Impacts Assessment, the Action Plan outlines the steps Aspen can take to achieve necessary reductions in its carbon emissions.

It is Aspen's hope that we will be successful in our reduction of carbon emissions, and that our commitment and action will be an example to other communities. This is not to say Aspen doesn't have a long way to go, because it does – but we have taken the first steps and will continue to take the necessary steps to meet the global warming challenge – a challenge unlike any other. If we are to ensure our community's future, and leave our children and grandchildren a livable planet, we all must commit ourselves to this challenge.

I urge all to join us. Together we will make a difference.

*Helen Kalin Klanderud
Mayor*

Global climate change presents one of the foremost economical, social and environmental threats to the new century. Increasing concentrations of greenhouse gases in the atmosphere are causing higher temperatures.

These increases are expected to lead to: more frequent intense storms, rising sea levels, changes in precipitation, snow pack and water availability, biodiversity loss, species extinction, changes in infectious disease incidence, increases in mortality due to heat stress, and human displacement.

The scientific community agrees that human activities are almost certainly contributing to the rise in global temperature. The release of carbon dioxide into the atmosphere through burning fossil fuels to generate electricity, manufacture goods, heat our homes, power our transportation, and grow our food is trapping additional heat in the atmosphere, thus causing global warming.

Global warming is more than a quality of life issue. It is about our future ability to live and how that future rests on the choices we make in our daily lives. In order to address the threats presented by global climate change, governments, businesses and the individual citizen must take action now and into the future. The City of Aspen recognizes the need to address the political challenges we face head-on, with facts and figures, and with an action agenda that involves the entire community. This Canary Action Plan seeks to fulfill our fundamental desire to continue to raise the standard of living by taking an active, responsible approach to protect our environment, increase our economic prosperity, and foster a sustainable community. Only by taking action now can we fulfill the desire to provide future generations with the same quality of life we enjoy.

**“People say time changes things, but really you
have to change them yourself.”**

-Andy Warhol

Introduction: The Canary Initiative - A Local Plan for Action

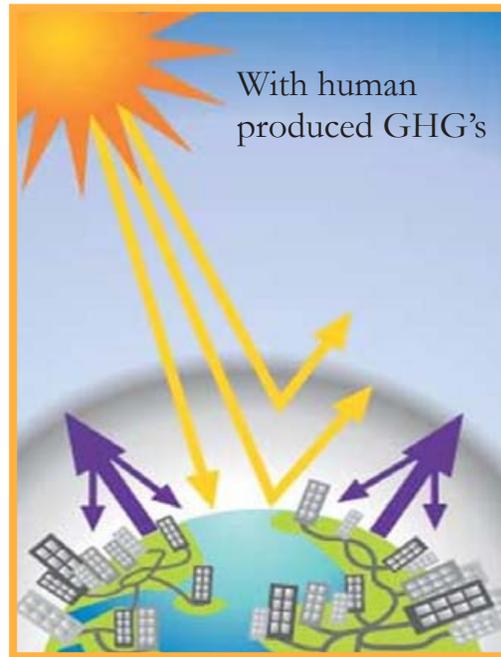
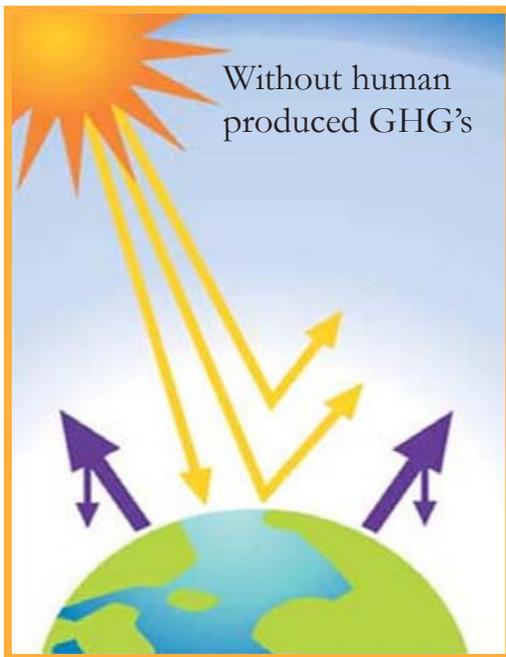
In March of 2005, the City of Aspen adopted a plan to aggressively address global warming by reducing greenhouse gas emissions. At the same time other cities from around the county also recognized the need to address greenhouse gas emissions locally in the absence of federal action. With the leadership of Mayor Nickels of Seattle, the U.S. Mayors Climate Protection Agreement was created. Since then signatory cities and other U.S. cities concerned about global warming have been pioneers, working as individual entities and collaborators to address this shared and immensely challenging issue through policy, education, business partnerships, and leadership. Aspen was one of the first to take the lead by creating a comprehensive plan to address global warming- the Canary Initiative.

The Canary Initiative is so named because Aspen (which is economically dependent on winter snow for recreation and summer snow pack for water supply.) sees itself as a canary in the coal mine for climate change. The Initiative called for: a green house gas (GHG) emissions inventory, an assessment of impacts due to climate change, an action plan and education and advocacy on regional, state and national levels. This document, the Canary Action Plan, is intended as the central policy piece for the Initiative and will outline the City of Aspen's goals for addressing global warming and how they can be achieved. The Canary Action Plan is also meant to act as a mechanism to monitor progress and as a guiding document for all policies developed within the City of Aspen.

The Aspen City Council created the Aspen Global Warming Alliance to guide the City in implementing its new 'Canary Initiative'. The Aspen Global Warming Alliance works with the City to implement its global warming goals and includes the Aspen Institute, the Aspen Global Change Institute, the Community Office for Resource Efficiency, The Aspen Skiing Company, the Rocky Mountain Institute, Holy Cross Energy, New Century Transportation Foundation, The Rocky Mountain Climate Organization, Aspen Center for Environmental Studies, Climate Mitigation Services, and climate scientist and author Susan Joy Hassol.

The Science of the Greenhouse Effect

The greenhouse effect is essential to life as we know it. Without it, the Earth would be permanently icy and inhospitable. The greenhouse effect results when naturally occurring water vapor and other gases in the Earth's atmosphere absorb some of the infrared energy radiating from the sun thus warming Earth's surface. These gases, called greenhouse gases (GHGs), allow Earth's atmosphere to function as a sort of thermostat, keeping temperatures on Earth within a specific habitable range. Increasing the atmospheric concentration of these energy-absorbing gases primarily from human combustion of fossil fuels, has and will continue to disrupt the global climate, substantially altering temperature and precipitation patterns.

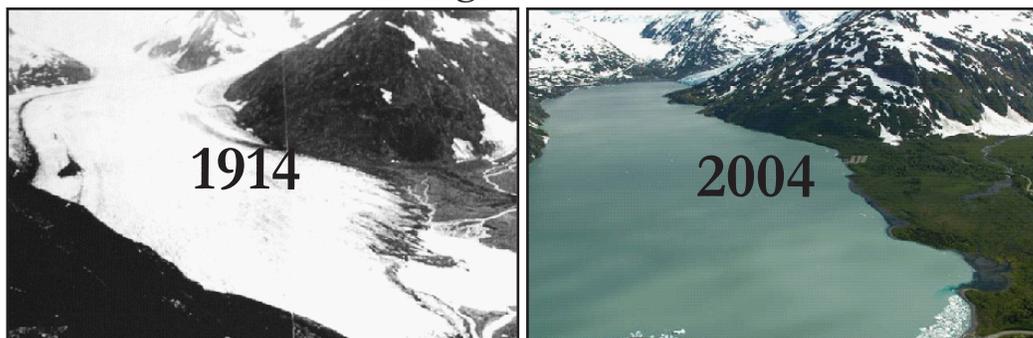


The gases of greatest concern are carbon dioxide, methane, nitrous oxide, and halocarbons.

- **Carbon dioxide**, which is produced primarily through burning gasoline, natural gas, coal, and oil is the largest contributor to the greenhouse effect, with emissions estimated to be over 80% of all U.S. GHG emissions.
- **Methane** is the result of decomposing landfill waste, manure and fermentation from livestock, fertilizers, mining, and natural gas and accounts for 10% of U.S. emissions.
- **Nitrous oxide, comes from** agricultural soil management and combustion engines and accounts for 5% of U. S. emissions
- **Halocarbons**, which include chlorofluorocarbons, hydrochloro-fluorocarbons, and perfluorocarbons, are typically produced during the industrial process and account for approximately 3% of U. S. emissions.
- **Black Carbon** aerosols from fossil fuels and biomass burning also have a warming effect, as does black carbon soot which changes the albedo of snow and ice causing them to melt more quickly.

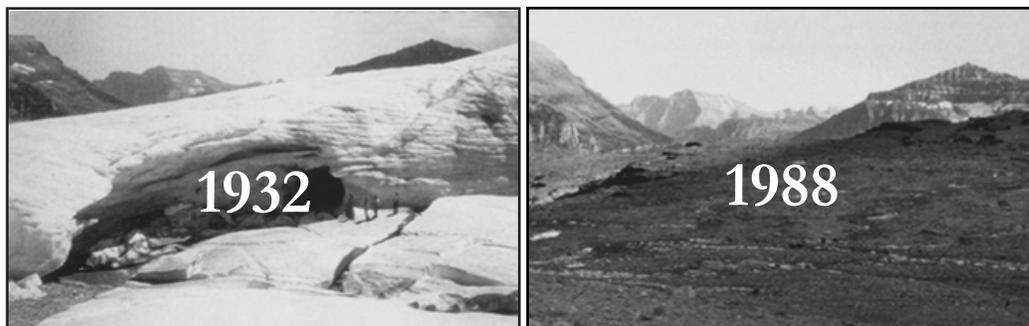
Changing patterns of land use and land cover can also contribute to climate change in three important ways. First, CO₂ is removed from the atmosphere through naturally occurring physical, chemical, and biological processes and is deposited in sediments. These sediments are carried by tectonic action below the crust for millions of years and later are released back into the atmosphere through ocean vents and volcanoes. The carbon cycle and concentration of carbon dioxide in the atmosphere has been relatively stable, fluctuating up and down by about 30 percent during the ice age and interglacial cycles (see figure on p. 5). However, since humans began extracting and burning fossil fuel deposits accumulated over millions of years in just the last several hundred years, the natural carbon cycle has been significantly altered.

Portage Glacier, Alaska



Photos: NOAA Photo Collection and Gary Braasch – WorldViewOfGlobalWarming.

Boulder Glacier, Glacier National Park



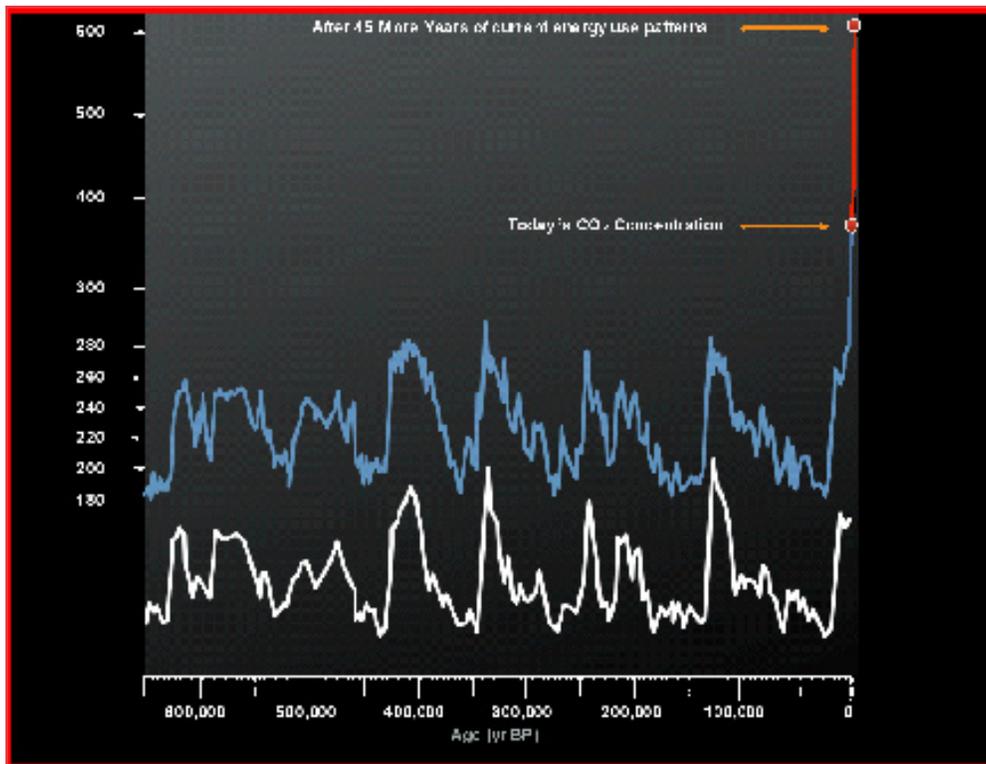
Photos: George Grant, Glacier National Archive; Jerry DeSanto, national Park Service

Second, land surface disruption that disrupts the natural uptake of carbon dioxide -- such as the slash and burn clearing of tropical forests -- also contributes to a build-up of CO₂ in the atmosphere. Because soil, forests, and plankton remove carbon dioxide from the atmosphere, change in vegetation type alters the amount of stored carbon. Since the industrial revolution began, fossil fuel combustion and disruption of the land surface has increased the concentration of carbon dioxide in the atmosphere by 37 percent and continues to climb at an unprecedented rate. Finally, patches of land and water covered in snow or ice reflect more heat, while patches of trees, dark ground and water absorb more heat. As more land and water is uncovered by melting snow and ice, the earth's surface absorbs more heat. This warming leads to more melting which causes more warming in a self-reinforcing cycle known as a positive feedback cycle.

The Earth is Warming... and so is Aspen

There is no scientific debate that the atmospheric concentration of GHGs is increasing and that this is leading to significant changes in the global climate. In 1988 the United Nations and the World Meteorological Organization convened the Intergovernmental Panel on Climate Change (IPCC). The IPCC remains the primary authority on global climate change and (since its inception) has pointed to the human contributions to global warming.

The 2001 IPCC Third Assessment, drawing on an expanded and improved body of scientific research, concluded that temperatures are likely to be much hotter than previously expected. The report found that a range of scenarios is expected to lead to a temperature rise of between 2.5 degrees F and 10.4 degrees F by 2100. The report also strengthened its conclusion about the role of humans, finding that “there is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities.”



Stacked records CO₂-e (blue) with the temperature proxy (white) from the European Project for Ice Coring in Antarctica (EPICA) ice core from Dome Concordia covering the last 650,000 years. The isotopic records indicate the sequence of 6 full glacial cycles [EPICA Community Members, 2004]. New CO₂-e data measured at the University of Bern are from ice at older than 420,000 years. These data confirm that the present CO₂-e concentrations in the atmosphere are unprecedented for least the last 650,000 years.

Gore Power Point: An Inconvenient Truth Slide Presentation and Science, submitted, 2005. Spahni, R., et al.

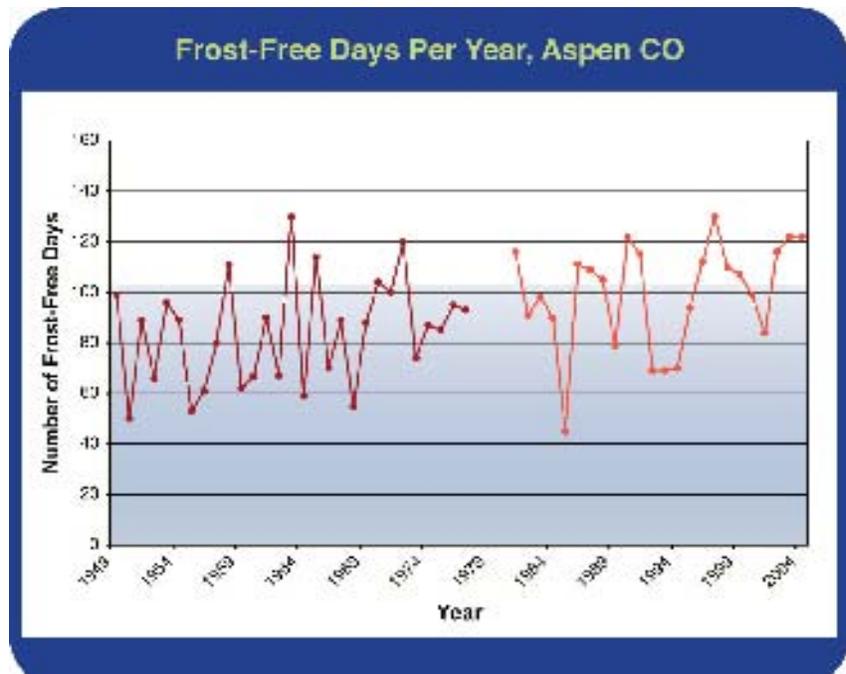
Aspen Climate Impacts Assessment

In Aspen scientists have already observed measurable effects of global warming. Over the past 25 years average temperature has increased 3 degrees F, frost free days have increased by about 20 per year (see inset chart), while overall precipitation has decreased by 6%-17% (depending on elevation), and the amount of precipitation falling as snow has decreased by 16%. These and other findings were compiled in the Aspen Climate Impacts Assessment (ACIA) released in July 2006.

Using the 2000 IPCC report, state of the art climate models, and data specific to the Aspen area the ACIA was able to make climate projections and illustrate the possible consequences of temperature change through the end of the century.

The projections used three different climate scenarios. Under the “low” (optimistic) emissions scenario, in which global greenhouse gas emissions peak around 500 ppm, Aspen is projected to experience about 6 degrees F of additional warming by 2100, giving it a similar climate to that of Los Alamos, New Mexico. Under the “high” scenario, in which global emissions would continue their rapid “business as usual” increase to around 700ppm, Aspen is projected to warm 14 degrees F by the end of this century, giving it a similar climate to that of Amarillo, Texas. Aspen and the world can do better than the “low” scenario, but we must start now.

The changes to climate and environmental systems that are likely to occur in the Aspen area under both scenarios, high or low, will affect the local environment, economies, and our quality of life. Some of these impacts are listed on the following page.

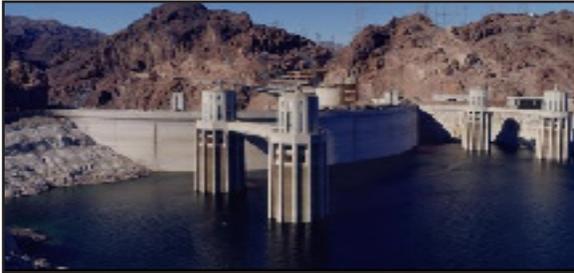


Frost-free days per year in Aspen as recorded at the Aspen National Weather Service Cooperative Network Station, 1949-2004. In 1980 the Station was moved approx. 200 ft. higher- causing the graph to depict less warming than actually occurred. Climate Change and Aspen: An Assessment of Impacts and Potential Responses- Aspen Global Change Institute 2006

Likely Impacts from Global Warming

Colorado and the other western Rocky Mountain states rely on snow pack for at least 75% of their water storage. Increases in temperature will have significant impacts including, but not limited to:

- Peak run-off coming earlier; adversely altering the working of natural water distribution
- Decreased natural water storage
- Increased summertime droughts
- Increased potential for water shortages throughout the Western Rockies



Current low water levels at Lake Mead



Pine beetle kill forests in CO

As temperature and CO₂-e concentrations increase, the plants and animals of Aspen's fragile alpine ecosystems will likely be adversely affected:

- Local plant and animal communities will be pushed upward in elevation, causing fragmentation and diminishing populations
- Some plant and animal populations will disappear altogether
- Tree growth will be limited by drier summers
- Spruce-fir forests will become more vulnerable to spruce beetle infestations (this is already seen in Summit County's current blight and predicted loss of 90% of its spruce-fir forests by 2010)
- Aspen stands will become susceptible to gypsy moth invasions
- All forests will be increasingly susceptible to wildfires

Aspen's economic base as a resort ski town will also be affected by warmer temperatures due to the following:

- The winter starting later and spring snow melt coming a month earlier
- The ski season starting later and ending earlier
- Degradation of snow quality and an increase in precipitation coming as rain
- Reduced snow making capacity due to warmer temperatures and decreased water availability

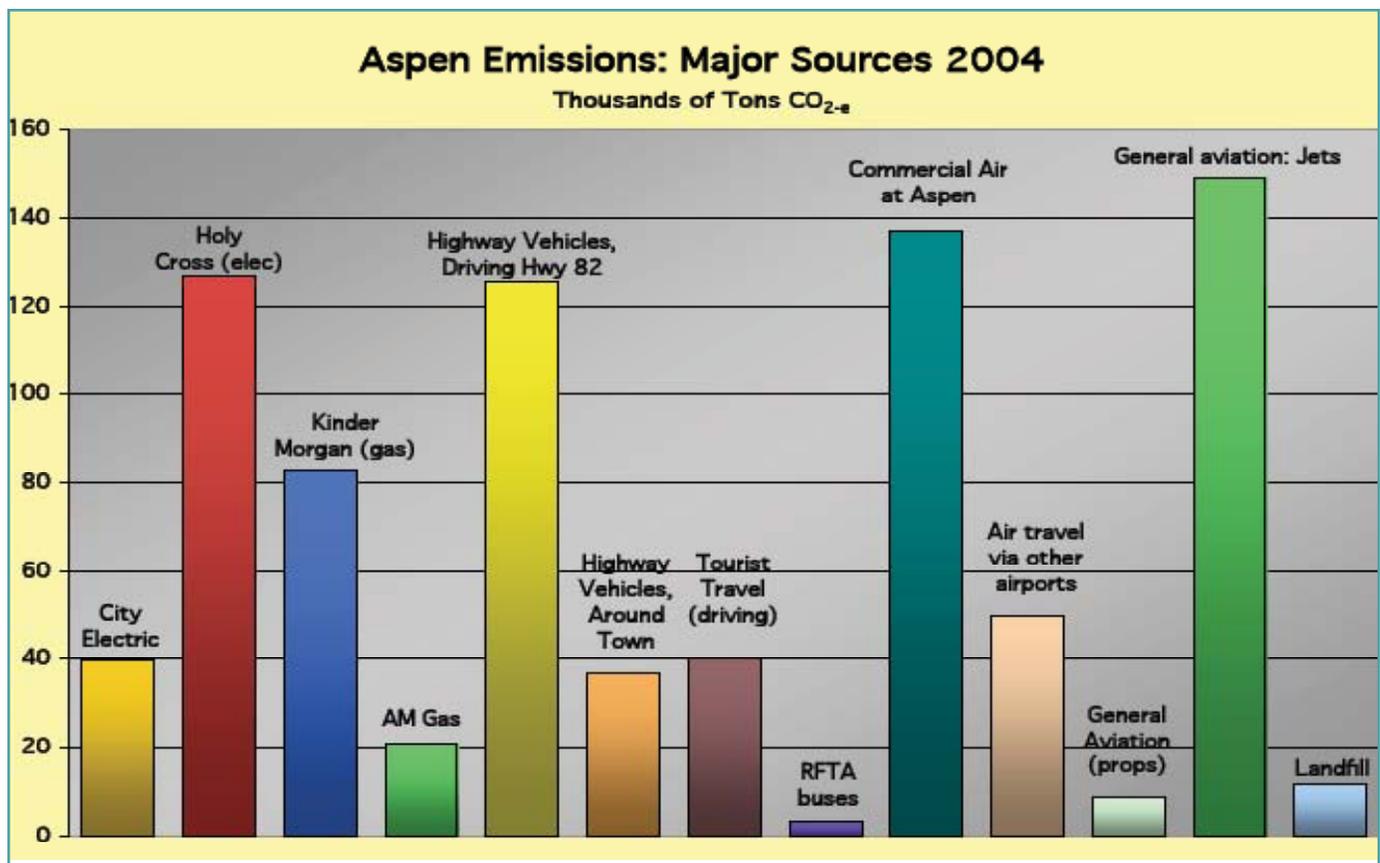
For more key findings and in-depth information, you can download each chapter or the full report 'Climate Change and Aspen: An Assessment of Impacts and Potential Responses' by the Aspen Global Change Institute at <http://www.agci.org/>.

Aspen's Greenhouse Gas Emissions

In 2004 the Aspen community's emissions totaled 840,875 tons of carbon dioxide-equivalent (CO₂-e) or 50 tons of CO₂-e per person, which is roughly double the U.S. per capita average. The break-down of GHG emissions produced in Aspen is illustrated in Graph (1) below. If Aspen's emissions increase at the same rate projected for the rest of U.S. they will reach 1,116,291 tons by 2025. Forecast emissions are based on population growth and the associated increases in energy use and vehicles miles traveled. Commercial and industrial energy uses are projected to increase as well.

The *Aspen Greenhouse Gas Emissions Inventory Summary* on the following page shows GHG emissions in Aspen by sector and fuel. These inventories do not include halocarbons, nor do they consider land use and land cover changes. A detailed description of the Aspen Emissions GHG Inventory and methodology is available at www.aspenglobalwarming.com/whereCO2comesfrom.cfm.

Graph 1: GHG Emissions by Sector
(short tons)



Aspen Greenhouse Gas Emissions 2004: Richard Heede, Climate Mitigation Services.

City of Aspen / Canary Initiative

Summary

Greenhouse Gas Emissions Inventory, 2004

Last Modified: 27 December 2005 Nik Neale Climate Mitigation Services

	Physical Units	Energy Units	GHG Emissions	CO2 Equivalent	Percent of Total	
Buildings electricity						
Million Btu						
Electricity (Aspen Electric Utility/Aspen Gas Light)	62,872,808 kWh	641,901 10 ⁶ Btu	38,571 tons CO2	38,571 tons CO2	4.71%	
Electricity (Other utilities suppliers - coal plants)	8 tons CH4	391 10 ⁶ Btu	8 tons CH4	185 tons CO2-e	0.02%	
Electricity (City of Aspen)	141,288,858 kWh	1,441,095 10 ⁶ Btu	128,038 tons CO2	128,038 tons CO2	14.87%	
Electricity (Coal utilities suppliers - coal plants)	77 tons CH4	3,727 10 ⁶ Btu	77 tons CH4	1,784 tons CO2-e	0.21%	
Total electricity	204,156,552 kWh	2,888,514 10 ⁶ Btu	na	168,557 tons CO2-e	19.81%	
Buildings natural gas and propane						
Natural Gas (City of Aspen)	1,482,744 ccf	1,232,985 10 ⁶ Btu	73,184 tons CO2	73,184 tons CO2	8.70%	
Natural Gas (City of Aspen - suppliers suppliers)	415 tons CH4	20,170 10 ⁶ Btu	415 tons CH4	9,548 tons CO2-e	1.14%	
Natural Gas (City of Aspen)	388,186 ccf	319,091 10 ⁶ Btu	18,299 tons CO2	18,299 tons CO2	2.18%	
Natural Gas (City of Aspen - suppliers suppliers)	104 tons CH4	5,048 10 ⁶ Btu	104 tons CH4	2,887 tons CO2-e	0.35%	
Propane (City of Aspen)	250,187 gallons	22,946 10 ⁶ Btu	1,882 tons CO2	1,882 tons CO2	0.23%	
Propane (City of Aspen)	250,187 gallons	22,946 10 ⁶ Btu	1,882 tons CO2	1,882 tons CO2	0.23%	
Total natural gas & propane	300,874 gallons	1,838,381 10 ⁶ Btu	na	108,754 tons CO2-e	12.70%	
Buildings other						
City of Aspen (Other services)	1,200 gallons	168 10 ⁶ Btu	na	18 tons CO2	0.002%	
Refrigerants, halocarbons, CFCs, etc.	na	na 10 ⁶ Btu	na	52 tons CO2-e	na	
Total buildings	1,200 gallons	3,723,891 10 ⁶ Btu	na	278,811 tons CO2-e	82.50%	
Transportation: Highway, aircraft, taxis, buses						
Highway vehicles, other City of Aspen	12,685,968 gallons	1,380,993 10 ⁶ Btu	125,714 tons CO2	125,714 tons CO2	14.95%	
Highway vehicles, other City of Aspen	3,688,454 gallons	462,569 10 ⁶ Btu	36,728 tons CO2	36,728 tons CO2	4.37%	
Taxi/other non-travel to & from Aspen	4,117,948 gallons	514,986 10 ⁶ Btu	48,348 tons CO2	48,348 tons CO2	4.80%	
Travel's Express (NFTA)	291,989 gallons	40,499 10 ⁶ Btu	3,139 tons CO2	8,189 tons CO2	0.37%	
Other Travel (Aspen Electric Utility)	17,480 gallons	2,416 10 ⁶ Btu	193 tons CO2	193 tons CO2	0.02%	
Other travel (Aspen Electric Utility)	18,380 gallons	1,673 10 ⁶ Btu	131 tons CO2	181 tons CO2	0.02%	
City of Aspen - other City of Aspen (City of Aspen, other services)	5,352 gallons	689 10 ⁶ Btu	58 tons CO2	58 tons CO2	0.01%	
Other City of Aspen (City of Aspen - other City of Aspen)	11,870 gallons	297 10 ⁶ Btu	118 tons CO2	118 tons CO2	0.01%	
Other City of Aspen (City of Aspen - other City of Aspen)	7,381 gallons	210 10 ⁶ Btu	85 tons CO2	85 tons CO2	0.01%	
City of Aspen (City of Aspen - other City of Aspen)	28,588 gallons	4,201 10 ⁶ Btu	378 tons CO2	878 tons CO2	0.04%	
City of Aspen (City of Aspen - other City of Aspen)	62,590 gallons	7,828 10 ⁶ Btu	813 tons CO2	813 tons CO2	0.07%	
Aspen (City of Aspen - other City of Aspen)	210,468 gallons	26,323 10 ⁶ Btu	2,807 tons CO2	2,807 tons CO2	0.24%	
Other (City of Aspen - other City of Aspen)	150,440 gallons	18,916 10 ⁶ Btu	1,854 tons CO2	1,854 tons CO2	0.20%	
Other (City of Aspen - other City of Aspen)	2,588 gallons	324 10 ⁶ Btu	28 tons CO2	28 tons CO2	0.00%	
Total Highway vehicles, aircraft, taxis, buses, & other	21,238,230 gallons	3,113,724 10 ⁶ Btu	211,175 tons CO2	211,175 tons CO2	25.11%	
Transportation: commercial and private aviation						
Air Travel - Commercial at Aspen County Airport	12,488,681 gallons	1,732,797 10 ⁶ Btu	183,837 tons CO2	183,837 tons CO2	16.29%	
Air Travel - Commercial at other airports	4,710,566 gallons	635,926 10 ⁶ Btu	78,878 tons CO2	48,885 tons CO2	5.91%	
Air Travel - General Aviation (City of Aspen)	14,151,348 gallons	1,810,419 10 ⁶ Btu	213,228 tons CO2	148,280 tons CO2	17.75%	
Air Travel - General Aviation (City of Aspen)	688,972 gallons	94,496 10 ⁶ Btu	18,347 tons CO2	7,888 tons CO2	0.88%	
Air Travel - General Aviation (City of Aspen)	128,948 gallons	14,861 10 ⁶ Btu	1,821 tons CO2	1,185 tons CO2	0.18%	
Air Travel - General Aviation (City of Aspen)	7,413 gallons	891 10 ⁶ Btu	112 tons CO2	78 tons CO2	0.01%	
Total commercial and private aviation	32,878,528 gallons	4,409,380 10 ⁶ Btu	482,124 tons CO2	344,487 tons CO2	40.97%	
Total transportation						
	33,936,858 gallons	7,523,114 10 ⁶ Btu	na	555,882 tons CO2	66.08%	
Landfill						
Landfill & Materials Recovery: electricity	110,476 kWh	1,127 10 ⁶ Btu	39 tons CO2	50 tons CO2	0.01%	
Landfill & Materials Recovery: other gas	4,949 gallons	673 10 ⁶ Btu	na	27 tons CO2	0.00%	
Landfill: suppliers suppliers	300 tons CH4	24,291 10 ⁶ Btu	300 tons CH4	11,500 tons CO2-e	1.37%	
Total landfill	various units	26,080 10 ⁶ Btu	na	11,577 tons CO2-e	1.88%	
Other: other emissions						
Human CFCs Emissions	3,895 kg H	na	182 kg N2O	88 tons CO2-e	0.004%	
Aspen Golf Course	4,882 kg H	na	133 kg N2O	50 tons CO2-e	0.006%	
City of Aspen (City of Aspen - other City of Aspen)	1,806 kg H	na	38 kg N2O	18 tons CO2-e	0.002%	
Other greenhouse with city of Aspen	15,078 kg H	na	478 kg N2O	158 tons CO2-e	0.018%	
Other greenhouse with City of Aspen	6,922 kg H	na	213 kg N2O	70 tons CO2-e	0.008%	
Total other emissions	31,943 kg H	na	897 kg N2O	325 tons CO2-e	0.04%	
Total	various units	11,272,243 10 ⁶ Btu	various units	840,875 tons CO2-e	100%	
Methane and nitrous oxide of total emissions				1,104 tons CH4	25,711 tons CO2-e	3.08%
Carbon dioxide of total emissions				815,164 tons CO2	89.92%	

A Community Goal for Reducing Emissions

A rapidly increasing demand for energy will make slowing the growth in emissions a challenge. Reducing total emissions will be even more challenging. Like all challenges, getting started is often the most difficult step. Realizing this, the City began with small, achievable steps while simultaneously conducting more scientific research and community outreach. In 2005, the City of Aspen made a legally-binding commitment to reduce its GHGs (government operations only) by 1% per year by joining the Chicago Climate exchange and in doing so created the GHG cap and trade challenge of a 1% emissions reduction for all internal City departments (see inset).

By the end of 2006 the City of Aspen reduced its emissions by 11.5% below 2005 levels. Aspen also made a commitment to reduce community-wide emissions when Mayor Klanderud signed the U. S. Mayors Climate Protection Agreement in 2005. The Agreement calls for communities to meet the Kyoto Protocol, however, Aspen did not set an official community goal initially. After the release of the Aspen Climate Impacts Assessment (hereafter referred to as the ACIA), Canary Initiative staff held meetings with the community at large, representatives from the sectors specified in the Canary Action Plan, and with the Aspen Global Warming Alliance. The consensus was that the City of Aspen needed to set a very aggressive reduction goal. Combining this directive with the information received from the ACIA, recommended targets from the IPCC, and the emissions reduction path laid out by state of California, the following community goal was established (see Graph 2, page 12).

Chicago Climate Exchange

The Chicago Climate Exchange (CCX) is the world's first, and North America's only legally binding, multi-sector, rule-based, and integrated greenhouse gas (GHG) registry, trading and reduction program. Emissions trading is a globally recognized tool for lowering GHGs. Under CCX, members commit to reduce their GHG emissions below a 1998-2001 baseline by 1% per year during 2003-2006 and then .5% per year from 2007-2010 for an overall reduction of 6%. CCX members that reduce emissions below the targets can sell surplus emission allowances on the exchange or bank them for later use. Members that do not internally achieve their target reduction, achieve compliance by purchasing emission allowances from other members that have surplus credits. For more information go to:

<http://www.chicagoclimatex.com/>

Community Reduction Goals:

30% (below 2004 levels) by 2020 and 80% (below 2004 levels) by 2050

The Energy Behind the Goal

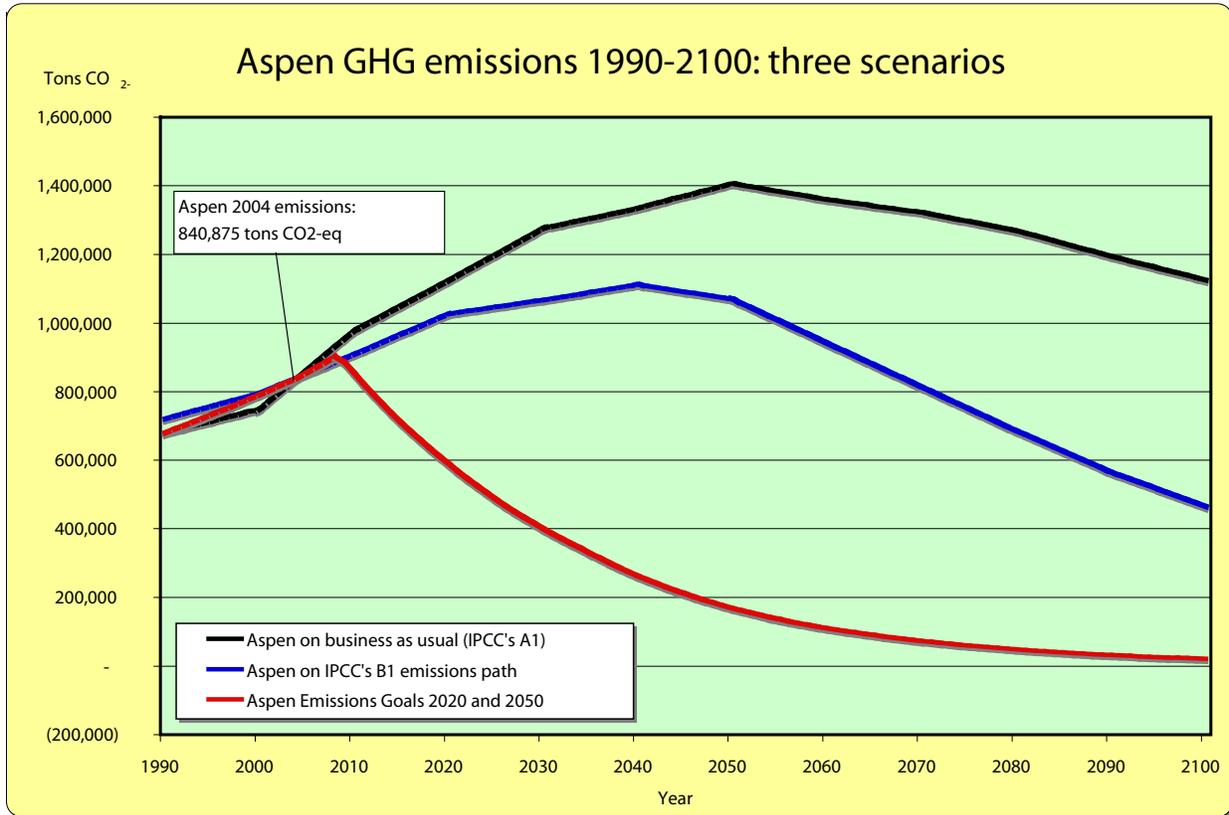
Economic and population growth, the energy intensity of our economy, and the carbon intensity of that energy have historically been the four factors responsible for producing the GHGs that drive global warming. However, population and economic growth are broader community issues that are not addressed in this plan, except to point out how certain efficiency strategies can enhance the economic bottom line. Instead, this plan seeks to achieve absolute reductions of GHGs (not tied to per capita consumption and regardless of economic expansion) by directly addressing the energy intensity of our economy and the carbon intensity of energy.

To do this, the first thing we must do is lower the 'energy intensity' of our economy - doing more with less energy. This means that while we still need to heat and cool our buildings, and transport ourselves and our goods, we must do so with much greater efficiency using far less energy during the process. Lowering the 'energy intensity' through improved energy efficiency has the added benefits of simultaneously lowering energy bills, reducing our dependence on foreign energy, and strengthening local economies. Thus, it is extremely important to immediately capture the 'low hanging fruit' and reduce our 'energy intensity' through energy efficiency and by implementing existing technology.

Equally important to lowering the 'energy intensity' of our activities is the need to lower the 'carbon intensity' of the energy we do use. Today nearly all of our energy comes from the burning of fossil fuels - the dominant source of global warming pollution. It is crucial that we replace this energy with clean, renewable energy sources such as wind, hydro, solar and biofuels. While the renewable energy industry is still in its infancy, we undoubtedly have the ingenuity to make the current technology more cost-effective as well as create new and improved technology to lead us into the future. Investing in renewable energy technology today decreases emissions now, encourages development of better technologies, thus ultimately enabling us to achieve our end goal.

Establishing a goal and creating an action plan are only the beginning. Impressive achievements in building energy efficiency, transportation, recycling, and renewable energy have already helped and will continue to help Aspen reduce per capita emissions. However, significant political and community will is needed if these goals and the challenges presented by global warming are to be met. Ultimately, meeting this challenge will be a direct result of individual action that drives a revolution.

Graph 2: Aspen Emissions Scenarios to 2100



Above are three emissions scenarios for Aspen to 2100.. The base year is 2004 with emissions of 840,875 tons CO_{2-e}. The black line represents a business-as-usual scenario, with an emissions peak in 2050. The blue line shows the IPCC's B1 scenario applied to Aspen, with an emissions peak in 2040. The red line shows the emissions path proposed by Canary Staff as the City's emissions targets: reductions of 30% of 2004 by 2020 and by 80% of 2004 by 2050 with a peak in 2008.

Aggregate Emissions: 1990-2100 for each scenario

Aspen BAU (IPCC A1).....	130.1 million tons of CO _{2-e} .
Aspen B1 scenairo.....	96.4 million tons of CO _{2-e} .
Aspen's Emissions Goals 2020 and 2050.....	37.2 million tons of CO _{2-e} .

Scenarios and chart by Rick Heede, Climate Mitigation Services, January 2007.

Public Process, Results & Actions

The final Canary Action Plan is the result of collaboration between the Aspen Global Warming Alliance, members of the public, businesses, non-profit organizations, utilities, and City and County staff. The draft plan was released for public comment in April 2006, and copies were distributed to community members and the various entities listed above. As is illustrated in the section, “A Community Goal for Reducing Emissions”, the City of Aspen held meetings with community members and the specific sectors highlighted in this document, building, transportation and electricity, to present the draft and to invite comments and improvements. Community members and sector representatives were encouraged to engage in conversation with City staff regarding how to address global warming and were invited to submit comments on the Canary Action Plan.

The final plan makes use of much of this feedback in identifying specific measures that the City government can implement to reduce emissions. This plan also emphasizes a need to equip community leaders and decision makers with the knowledge and tools needed to address the causes, and expected impacts, of climate change so that they may lead their families, neighborhoods, and companies to reduce GHG emissions in the ways most effective to them.

The City of Aspen recognizes that in order to reach any meaningful goal for emissions reduction, considerable effort will be required by the City, Pitkin County, the Roaring Fork Transportation Authority (RFTA), County Employees Advocating Saving Energy (CEASE), other local governments, utilities, schools, the commercial and non-profit sectors, individual residents, and visitors. In the interest of open dialogue and with the recognition that the problems of, and solutions for, global warming will continue to evolve the Canary Action Plan will also continue to evolve. Emissions reduction goals and sector objectives will likely remain the same, however, the action items will be retired and updated at the time of each inventory as deemed necessary by staff and City Council. The City of Aspen will continue to engage the public sector and community at large in the Canary Action Plan. Ideas for future measures are listed in the document “Canary Action Ideas” which can be found online at www.canaryinitiative.org. Comments and suggestions for this document can also be submitted via the web site.

It is vital that everyone recognize that addressing global warming requires action on the individual level. Each of us can and must make a difference. For example, the typical Aspen household generated approximately 52,540 pounds of CO₂-e in 2004. *The Canary Counter* on page 16 gives average individual emissions for a U.S. resident and can be used to calculate personal emissions. To precisely calculate and track your personal emissions as well as the money you spend on energy services, you can use the Energy Tracker. To access the Energy Tracker visit www.canaryinitiative.com click on “Calculate Your CO₂ Emissions” and click on Energy Tracker. If you choose to fill out the Energy Tracker please consider sending it to us at globalwarming@ci.aspen.co.us. Your data will help the City learn more about the energy usage of local citizens. To learn how you can reduce your individual emissions please go to the Canary Initiative web site or feel free to contact the City of Aspen Canary Initiative at (970) 429-1831. To learn more about the impacts of global warming on winter sports and to speak out for federal action please visit www.savesnow.com. For more information on how to make your home energy efficient please visit www.aspencore.org.

Canary Action Plan Components

This plan identifies five primary sections with specific GHG reduction targets and timelines as well as a Policy, Research & Education section which will help enhance the success of the other five strategies but is not credited directly with quantifiable reductions. Each section has a set of main objectives. These objectives, which act as the core of the Canary Action Plan, will be met by key reduction measures that will be revisited every two years, when the Emissions GHG Inventory is updated. Table (1) indicates the target reductions for each component in units of short tons (2,000 pounds).

Table (1) : Action Plan Sections & Reduction Goals from 2004 levels (in tons)

Component/Emissions reductions in tons of CO ₂ -e by	2020	2050
Policy, Research & Education.....	NA	NA
Buildings: Energy Efficiency.....	21,351	85,403
Ground & Air.....	111,132	444,530
Electricity: Renewable Energy.....	33,311	133,246
Landfill: Waste Reduction, Recycling.....	2,315	9,262
Carbon Offsets: Local Energy Offsets.....	66	259
TOTAL.....	168,175	672,700

Objectives

A. Policy, Research & Education

1. Ensure that education and policy decisions at all levels - government, business, and individual - seek to significantly reduce greenhouse gas emissions.
2. Provide education in a variety of venues, and data needed by the community to understand the need for action to reduce global warming.

B. Buildings: Energy Efficiency

1. Reduce greenhouse gas emissions 20% below 2004 levels in all City of Aspen facilities by 2009.
2. Require all new construction (commercial & residential) to be 50% more energy efficient than the International Energy Conservation Code by 2009.
3. Encourage and incentivize existing buildings (commercial & residential) to reduce GHG emissions 20% below 2004 levels by 2009.

C. Transportation: Ground & Air

1. Reduce the volume of single occupancy traffic into Aspen and around town.
2. Create a mass transit-oriented transportation alternative into Aspen that is more convenient and affordable and has lower GHG emissions per passenger mile than the average private vehicle.
3. Increase the use of highly fuel-efficient and low emissions-fuel engines and machinery in on-road and off-road vehicles.

4. Require that all new development projects have a net decrease in transportation related emissions compared to existing development conditions.
5. Reduce emissions from air travel.

D. Electricity

1. Generate and/or purchase 45% of Aspen's electricity (community-wide) from renewable resources by 2012.

E. Landfill: Waste Reduction & Recycling

1. Increase the overall solid waste recycling rate by 20% over the 2006 baseline by 2009.
2. Decrease the amount of solid waste generated.

F. Carbon Offsets: Local Energy Offsets, Forestry & Other

1. Provide a reliable and effective option to offset GHG emissions.
2. Educate City staff and the community on the global warming impacts of the industrialized food supply chain and encourage the cultivation and purchase of locally produced foods.

Indicators & Other Measures of Success

Tracking and measuring the results of the Canary Action Plan is very important as it will help City staff determine the success of the Action Plan, and in doing so, will guide future policies, outreach, and education. The City of Aspen will monitor the success of Canary Initiative efforts by updating the inventory for all GHG emissions (within the Aspen Urban Growth Boundary) every two years and at the same time prepare a report on our progress in implementing this plan. The report will include data on local energy use, renewable power purchases, travel, solid waste disposal, and recycling rates. The progress report will also identify areas from the plan needing continuing work as well as additional actions from the Canary Action Ideas to pursue over the next two years. The following indicators will be used to measure the Canary Action Plan's success.

- Tons of CO₂-e reduced
- Tons of CO₂-e offset
- Energy upgrades performed through the Community Office for Resource Efficiency (CORE) and Holy Cross incentives
- Number of City departments actively reducing emissions
- Number of businesses tracking their energy use and actively reducing their emissions
- Number of households tracking their energy use and actively implementing efficiency measures
- The carbon intensity of each dollar spent in the local economy
- Average annual daily trips into Aspen
- Tourism and lodging occupancy

(Please note that all of these factors apply for activity occurring within the Aspen Urban Growth Boundary)

The Canary Counter

Per household greenhouse gas emissions

Source	Units	Rules of Thumb	Total Units	lbs/ unit	Total lbs of CO2
	kWh (Aspen Electric)	\$100 electric bill = 1,300 kWh	-	0.611	-
	kWh (Holy Cross Energy)	\$100 electric bill = 1,000 kWh	-	1.65	-
	kWh (Xcel Energy)	\$100 electric bill = 900 kWh	-	2	-
	kWh (Renewable credit)	\$2.50 Renewable fee = 100 kWh	-	-1	-
	CCF (Kinder Morgan)	\$100 gas bill = 100 CCF	-	10.077	-
	gallons (Propane)	\$100 propane bill = 40 gallons	-	10.077	-
	gallons (size of trash can)	standard can = 32 gal large can w/ hinged lid = 96 gal	-	62.5	-
	# of full recycling bins	1 bin / wk = 500 lbs / yr	-	500	-
Household Sub Total				-	-
U.S. Per Capita Household Average				25,000	-
	gallons (gasoline)	20 miles = 1 gallon	-	19.59	-
	gallons (diesel)	20 miles = 1 gallon	-	22.38	-
	miles (RFTA bus)	Glenwood to Aspen = 45 miles	-	0.23	-
	miles (carpooling)	Glenwood to Aspen = 45 miles	-	0.69	-
	miles (commercial)	Aspen-New York = 1,895 miles Aspen - LA = 935 miles Aspen - Chicago = 1,021 miles Aspen - Miami = 1,828 miles Aspen - Paris = 4,980 miles	-	0.574	-
Transportation Sub Total				-	-
U.S. Per Capita Transportation Average				19,380	-
	# of trees planted	trees act as a carbon 'sink' thus preventing the carbon dioxide it absorbs from entering the atmosphere	-	-25	-
TOTAL EMISSIONS				-	-
U.S. Per Capita Average				44,380	-

Canary Action Plan

A. Policy, Research and Education

The City of Aspen will assume a leadership role in taking aggressive, prudent action to reduce GHG emissions. This action will be rooted in performance-based policy to allow creativity and flexibility in accomplishing our goal. Policies will strive to incorporate life-cycle analysis, considering the long-term costs and impacts whenever feasible, so that policy makers and the community can make better decisions. High quality, accurate, and timely information is essential to implementing these policies successfully. The City must ensure that the community has access to this information and becomes increasingly aware of global warming and the impacts residents and businesses have on GHG emissions.

Objective 1: Ensure that education and policy decisions at all levels - government, business, and individual - seek to significantly reduce greenhouse gas emissions.

Government Actions

2007-2009

1. Update the inventory of GHGs from City operations and track related solid waste, energy, economic, and environmental data every two years starting with 2007 data.
2. Explore City initiated funding mechanisms to reduce GHGs.
 - a. GHG reduction impact fee on development.
 - b. GHG reduction fee for city government utility accounts.
 - c. System improvement fee and/or a system benefit charge and/or energy intensity target-based billing for electricity, natural gas, and propane.
 - d. Waste diversion charge dedicated to GHG emissions reduction.
 - e. Extend parking pricing to all appropriate areas to reduce single occupancy vehicle use, and dedicate a portion of revenue to reduce vehicle miles traveled.
 - f. Increase paid parking rates as needed.
 - g. Offset program with revenue dedicated to local reduction projects.
 - h. Establish a carbon tax that dedicates its revenue to future energy efficiency projects.
3. Expand education of employees and department heads on global warming with a focus towards specific operational changes that can be made to reduce GHG emissions.
 - a. Require employee education on fuel efficient driving and reducing energy consumption at work.
 - b. Create an interactive web page/blog where City employees can share progress and ideas, and solicit feedback for energy efficiency and other CO₂-e reducing measures.

PROGRESS 2006: At the All City Employee Meetings during October 2006 time was spent educating, sharing progress and taking feedback from staff on the Canary Initiative.

4. Establish policy that accurately accounts for specific departmental energy use/savings.
 - a. Explore allocating energy use/expenditures to the respective City department budgets.
 - b. Help City departments establish their own GHG reduction action plans, consistent with or exceeding community goals.

PROGRESS 2006: In 2006, staff assisted the Parks Department in creating its own action plan.

- c. Create an employee advisory committee to advise the Canary Initiative on ways the city can continue to reduce GHG emissions.
5. Review all major City policies and programs in the early stages of development to integrate the goals and actions set out in this plan and to identify other ways to reduce related GHG emissions.
 - a. Explore the feasibility and implications of converting the down town Fire Hearth into an alternative fuel demonstration project, that if successful in providing a lower emissions output would act as an example of a low emissions alternative to other conventionally fueled 'decorative' fire places or hearths in Aspen.
6. Identify the largest economic growth sectors in Aspen and forecast future emissions from projected growth rates in order to effectively target emission reduction policies.

Objective 2. Provide education, in a variety of venues, and data needed by the community to understand the need for action to reduce global warming.

Community Actions

2007-2009

1. Implement and support education and outreach programs to inform local and regional elected officials, the general public, media, and community leaders about the causes and impacts of and solutions for global warming.
 - a. Demonstrate how it is possible to improve Aspen's economy and environment through emissions reductions.
 - b. Improve community understanding of global warming and the projected global, regional and local impacts of climate change.
 - c. Inform residents, businesses, and institutions about how their actions affect global warming by reporting CO₂-e lbs on utility bills, energy audits on transfer of property, etc.
 - d. Encourage residents, businesses and institutions to reduce GHG emissions via City programs, public meetings, public educational events, etc.
 - e. Provide teachers and students with access to educational materials about global warming.
 - d.. Create educational programs, groups and challenges in the local schools that advocate sustainable living and global warming awareness.

PROGRESS 2006: (a) In 2005 staff conducted a workshop for ACRA members on how to use energy efficiency as an economic development tool. (b) In 2005 & 2006, staff presented the Canary Initiative to representatives from over 50 cities and over 20 organizations. (c) Four 'town meetings' were held to solicit public feedback. Press releases for the GHG Emissions Inventory and the ACIA received excellent local and regional coverage. Additional media coverage has included Colorado Public Radio, National Public Radio, ABC News, as well as numerous pieces on local radio, TV and newspapers. The Aspen Climate Action Conference, hosted in October 2006 was attended by over 120 representatives from resorts, towns and businesses from around the West.

2. Provide tools to the community to estimate its GHG emissions and make emissions reductions.

PROGRESS 2006: The Energy Tracker was introduced to individuals & businesses with the help of Maroon Corps. At least 4 major businesses are now tracking their energy consumption. Our website www.canaryinitiative.com provides many resources for emissions reductions. Bonneville Environment Foundation also created www.aspengreentags.org that allows Aspenites to quantify their GHG emissions with local accuracy and offset their emissions online – with 10% of the proceeds returning to Aspen for emissions reduction projects.

3. Encourage and support reduction efforts at regional, state, national and international levels.

- a. Work with other cities to create sound climate policy.
- b. Support efforts to lobby for state and federal climate policy.

PROGRESS 2006: In order to advocate for change at a larger scale as well as learn from other cities, Aspen has been a member of ICLEI's Cities for Climate Protection since 1997 and has participated in three U.S. Mayors Summits including Sundance. The City has been a supporter of Native Energy. To advocate for state action on GHG's the City collaborates with Rocky Mountain Rail Authority and is a primary sponsor and active participant in the Colorado Climate Project.

4. Prepare a progress report on the Canary Action Plan every two years, and propose action items for the subsequent years, starting in 2008 in conjunction with the updated emissions inventory.

B. Buildings: Energy Efficiency

The City of Aspen will collaborate with the Community Office for Resource Efficiency (CORE) in scope, staffing and budget to promote energy efficiency and conservation as the preferred strategy. With REMP funding and funds generated through other local emissions offset programs, CORE will take a lead role in developing energy-saving programs and continue to build partnerships with other valley governments, non-profits, utilities and private sector business to implement energy programs.

Principles for Reducing Building Energy Use:

1. Consider community values along with a broad definition of cost effectiveness that includes total costs to individuals and all resource savings.
2. Benefit all neighborhoods and citizens with particular attention to low income residents.
3. Support local business and expand local infrastructure for delivering energy-efficiency services.

Greenhouse gas emissions from buildings accounted for 32.5 % of Aspen's GHGs in 2004. Electricity, natural gas, and fuel generated 273,311 tons of greenhouse gas emissions in 2004. The GHGs associated with electricity use in the Aspen Greenhouse Gas Emissions Inventory 2004 accurately reflect the carbon intensity from each source: coal, nuclear, hydroelectric and wind generation.

The energy efficiency objectives are achievable, but ambitious, particularly given the growth trends and changing nature of the energy industry. Fully implementing and expanding existing CORE programs and other City, County, State, and regional initiatives as well as the servicing utilities will capture maximum energy savings.

Objective 1: Reduce GHG's 20% below 2004 levels in all City of Aspen facilities by 2009.

Government Actions

2007-2009

1. Invest in all energy efficiency measures with simple pay backs of 10 years or less.

Community Office for Resource Efficiency (CORE) promotes renewable energy, energy efficiency and green building techniques throughout the Roaring Fork Valley. It also offers rebates and/or zero interests loans for solar hot water and photovoltaic systems, Energy Star appliances, efficient lighting retrofits and funding for projects through the Climate Change Mini Grant Program. These innovative programs, in conjunction with local governments and utilities, will keep one billion pounds of GHG's out of the atmosphere. **The Renewable Energy Mitigation Program (REMP)** was adopted by both the City of Aspen and Pitkin County in 2000. The program is the first of its kind and has been recognized nationally. REMP was designed primarily to promote renewable energy and energy efficiency and help create a clean energy future. By requiring owners of new homes to either mitigate high energy use on site, or pay a fee, damaging impacts are neutralized. The REMP program has raised over \$6,000,000 during the past six years. For more information call CORE at 544-9808, (www.aspencore.org).

PROGRESS 2006: Major projects that have been implemented or approved include boiler replacement at the Wheeler Opera House, energy audits at the Red Brick & Yellow Brick school buildings and some affordable housing units, distribution pumps for the water delivery system, irrigation pump replacement at the golf course, and \$1 million worth of improvements at the Aspen Recreation Center. Several other minor projects have been implemented or funding has been approved.

2. Require the calculation of life cycle cost analysis in the City Asset Management Program when applicable under the “Energy Systems & Materials checklist”.
3. Develop and adopt energy and resource-efficient building standards for all existing City facilities.
 - a. Require all city-funded remodel projects to exceed the International Energy Conservation Code by 15 % on retrofits.
 - b. Require Energy Star® or equivalent products, when available, for any new equipment that uses electricity or natural gas.
 - c. Explore requiring audits of affordable housing properties at time of sale, funded by the City. Improve audited units to the Energy Star® level or better.

PROGRESS 2006: The High Performance Building Policy was incorporated into city policy, requiring all city-funded projects to establish performance targets, include them in the budget and bid process and provide lifecycle analysis.

3. Continue to convert City street lights and work with CDOT to convert traffic signals to the most energy efficient technology where appropriate.

Objective 2: Require all new construction (commercial and residential) to be 50% more energy efficient than the International Energy Conservation Code by 2009.

Community Actions

2007- 2009

1. Actively promote/expand the implementation of local residential energy efficiency programs funded through CORE, City of Aspen, and utility providers. Continue to expand financing for the purchase of high-efficiency appliances at time of their replacement, heating and cooling systems, weatherization services, and renewable energy systems.
 - a. Implement community based outreach efforts to promote energy and water conservation, solid waste reduction, safety, and livability.

PROGRESS 2006: (a) The City of Aspen Utilities Department launched a Demand Side Management program including financial assistance for appliance rebates, renewable energy systems and energy audits. (b) Presentations on waste reduction and recycling were given by EH and Canary staff to local 5th graders and the general public through America Recycles Day.

- b. Provide efficient building design assistance and technical resources to Aspen residential developers, designers, home builders, and residents.

c. Develop and implement a plan whereby each housing and commercial unit in Aspen must meet its REMP requirements through on site renewable energy and efficiency practices, effectively retiring the REMP in-lieu fee option within a 10 year period through incremental increases in the percentage of renewable energy required and raises in the fee structure.

2. Increase energy efficiency requirements for all construction.

a. Expand the requirements for the Renewable Energy Mitigation Program (REMP) in residential projects and extend it to include commercial development.

PROGRESS 2006: The City set very high performance targets for recent affordable housing projects. Burlingame residential units are expected to be 50% more efficient than the International Energy Efficiency Code.

Objective 3: Encourage and incentivize existing buildings (commercial and residential) to reduce GHG emissions 20% below 2004 levels by 2009.

Community Actions

2007-2009

1. The City of Aspen will actively promote/expand the implementation of local residential energy efficiency programs funded through CORE, the City of Aspen and utility providers. Continue to expand financing for the purchase of high-efficiency appliances, heating and cooling systems, weatherization services, and renewable energy systems.

a. Facilitate the auditing and weatherization of 50 households.

b. Implement community based outreach efforts to combine and promote energy and water conservation, solid waste reduction, safety and livability.

c. Provide efficient building design assistance and technical resources to Aspen developers, designers, builders, and building users.

PROGRESS 2006: The City is in the process of conducting its first round of audits on affordable housing units around Aspen.

2. Increase energy efficiency requirements for all construction.

a. Explore requiring an energy rating of residential properties at time of sale.

b. Explore requiring energy use per square foot benchmarking for commercial properties at time of sale, change of use, and/or building permit application.

3. Assist small businesses, non-profit organizations, and public agencies to gain access to energy efficiency services.

PROGRESS 2006: In 2006 the Maroon Corps and the Canary Initiative teamed up to assist local businesses in tracking their energy use and GHG emissions via the Energy Tracker, identifying strategies to reduce emissions, and potentially offset emissions.

C. Transportation: Air & Ground

The City shall pursue energy efficient transportation that provides convenient, affordable access to goods, jobs, education, recreation, and information with reduced GHG emissions.

Principles for Reducing Transportation Emissions:

1. Actively encourage and continue to improve the means of public and alternative transportation.
2. Promote the economic, environmental, and social benefits of alternative transportation, including developing an active and healthy community.

In 1993 the City of Aspen adopted the Aspen Area Community Plan which outlined several transportation goals to reduce congestion and air pollution, most of which would also reduce GHG emissions. Thirteen years later the accomplishments from this plan include maintaining Hwy 82 traffic volumes at 1993 levels, developing a comprehensive Transportation Demand Management program, instituting paid parking, the purchase of a valley-wide transportation corridor, and significant transit improvements.

Recently the City requested CDOT undertake a re-evaluation of the Entrance to Aspen EIS and is currently conducting a community process to determine a solution to the long debated issue. The City views alternative transportation to be a crucial element to reducing GHG emissions. We recognize that reducing transportation emissions will require a multi-pronged approach. First, the need for vehicle trips in and out of Aspen should be reduced as much as possible. Second, a clean-fuel transit system must make access in and out of the city convenient and affordable, while producing emissions much lower than today's levels. These two measures by themselves might actually increase emissions by reducing cars on the road thereby making driving that much more attractive. Therefore, a third component is necessary which is to discourage or even limit driving into Aspen.

Objective 1: Reduce the volume of single occupancy traffic into Aspen and around town.

Government Actions

2007-2009

1. Expand City policies to further encourage alternative transit whenever appropriate for employee commuting and to require alternative transit during travel for business whenever feasible.
2. Reduce per employee vehicle miles traveled in City vehicles by 10% by 2009 by promoting teleconferencing and the availability of pedestrian and bicycle transit and carpool options for business commutes and trips.
 - a. Promote the City Car Share program to City departments.

PROGRESS 2006: Starting in 2006, each department was challenged to reduce its GHG emissions 1% below a 2005 baseline. If the department met the goal, every employee received a \$100 bonus. If the entire City met the goal, each employee got an additional \$100 bonus. This challenge included tracking electricity, natural gas, gasoline, diesel and air travel. Partly as a result of this challenge, the City reduced its emissions 11.5% the first year, with nearly all departments meeting their goals. In addition to the challenge, an interactive checklist of reduction strategies (including alternative transportation options) was provided.

3. Continue to encourage City telecommuting and flexible hours policies to avoid one commuting day per month per employee (average).

Community Actions

2007-2009

1. Continue to work as a member of RFTA to improve transit service in the Roaring Fork Valley by increasing the speed, frequency, reliability, and attractiveness of transit service between and within valley communities.

- Partner with surrounding communities and RFTA to implement Bus Rapid Transit (BRT) including faster valley service, new vehicles (alternative fuel, cleaner, greener, quieter), new or enhanced transit centers, ITS Components, valley-wide trail, and valley-wide safe pedestrian/bike linkages with public transit as quickly as possible.

PROGRESS 2006: The City Council, CDOT, the Transportation department and RFTA experimented with several options to increase transit service and implemented a bus lane down Main Street that greatly improved transit service. RFTA also initiated 1/2 hour service to the lower Roaring Fork Valley and committed funds to purchasing more hybrid buses.

2. Expand the participation in the Transportation Options Program (TOPs) and reduce single occupancy vehicle (SOV) trips by 10% .

- Expand the number of businesses that offer transit passes to all employees and tourists by 10%.
- Encourage businesses to offer transit passes to customers/clients.
- Encourage businesses to provide transportation in and around Aspen so that personal vehicles are not needed to commute.
- Encourage all employers who offer subsidized parking to employees to also offer a parking “cash out” – an equivalent payment to employees who do not require vehicle parking.

PROGRESS 2006: The City sponsors the Roaring Fork Valley Vehicles Car Share program.

3. Extend paid parking to/increase parking rates in all appropriate areas to SOV use, and dedicate excess revenue to reduce vehicle miles traveled.

PROGRESS 2006: Parking Department staff proposed a plan to expand the limits of paid parking.

4. Investigate a City-wide residential parking permit and state-wide registration fee based on a vehicle's GHG emissions. Revenue should go towards reducing use of SOVs.
5. Advocate for transit-based alternative transportation to and from Denver, competitive with the personal automobile.

Objective 2: Create a mass transit-oriented transportation alternative into Aspen that is more convenient and affordable and has lower GHG emissions per passenger mile than the average private vehicle.

Community Actions

2007-2009

1. Commit to endorsing an Entrance to Aspen solution that will significantly reduce GHG emissions and emphasize increased alternative transportation.

Objective 3: Increase the use of highly fuel-efficient and low emissions fuel engines and machinery in on-road and off-road vehicles.

Government Actions

2007-2009

1. Create City policy that sets a minimum fuel-efficiency for each class/type of vehicle purchased.
 - a. Increase the average fuel efficiency of passenger vehicles in the City fleet by 10% by 2009.
2. Require the use of low or no-CO₂-e technologies in all City vehicles and equipment, such as medium-duty construction equipment.
 - a. Dedicate funding for research and development of these technologies.
3. Educate all employees on fuel-efficient driving practices, such as avoiding unnecessary idling.
4. Maintain EPA's "Best Environmental Practices for Fleet Maintenance", or similar policy in the City's Street Shop.

PROGRESS 2006: The City Streets Department is currently using this practice.

Community Actions

2007-2009

1. Shift all SOV trips above 1993 levels to alternative modes.
2. Strongly advocate raising the federal Corporate Average Fuel Economy standard.
3. Encourage the use of low or no-CO₂-e technologies in non-road vehicles and equipment.
4. Work to increase private citizen fuel efficiency.
 - a. Work with vehicle maintenance providers to educate consumers about the potential savings and impact on fuel consumption of maintaining vehicles properly and practicing fuel-efficient driving techniques.
 - b. Support programs to retire and recycle inefficient vehicles.

Objective 4: Require that all new development projects have a net decrease in transportation related emissions compared to existing development conditions.

Government Action

2007-2009

1. Establish City policy that requires a net decrease in transportation related emissions compared to existing developments, such as affordable housing projects (this may involve offsetting new GHG emissions).
2. Minimize construction traffic on Highway 82 and around town.
 - a. Limit parking passes for construction projects.
 - b. Work with the construction industry and transportation providers to reduce vehicle trips to and from construction sites. This could include new services for shuttling workers, tools and materials.

Community Actions

2007-2009

1. Continue to support the connection between land use and transportation impacts by supporting the City of Aspen's Community Development Office in its effort to align City policies in both areas.
3. Continue to promote growth through redevelopment and infill that maintains or improves the quality of life for existing neighborhoods.
 - a. Explore limiting development where alternative transportation options are not available.

3. Expand the City's TOPs Program, which includes policies to reduce vehicle miles traveled and increase non-motorized vehicle trips.
4. Implement new parking ratios in the Land Use Code and support programs that allow for innovative new development to occur with alternative transportation in design.
 - a. Explore loosening parking requirements for development where significant alternative transportation options are incorporated.
5. Continue, as a member of RFTA to work with other jurisdictions/organizations to improve access to transit services.

PROGRESS 2006: The City Transportation department and RFTA experimented with several options to increase transit service, and implemented a bus lane down Main Street that greatly improved transit service. RFTA also initiated 1/2 hour service to the lower Roaring Fork Valley and committed funds to purchasing more hybrid buses.

Objective 5: Reduce emissions from air travel.

Community Actions 2007-2009

1. Conduct a new comprehensive GHG Emissions Inventory of the air travel emissions of residents and visitors arriving and departing from the airport in Aspen.
2. Work with the Board of County Commissioners, the Aspen Pitkin Airport and CORE to create, manage and promote a voluntary carbon offset program funds from which will be invested in local, verifiable ghg emissions offset projects and efficiency programs in order to mitigate ghg emissions from air travel.
3. Encourage the use of more fuel efficient jets and discourage use of less fuel efficient jets.

PROGRESS 2006: United Airlines, with the support of Aspen Pitkin Airport purchases a new fleet of CRJ700's thereby increasing their fuel efficiency by approx. 30%.

4. Encourage visitors and residents to use the most fuel efficient method of transportation when traveling Denver, Eagle or Grand Junction.
 - a. Promote alternative transportation to visitors and encourage fuel efficient rental car fleets.
5. Explore new technologies for auxiliary power units (APUs), runway taxi energy use, etc.

D. Electricity

Aspen Electric provides renewable energy at no additional charge to the customer. Holy Cross Energy offers customers the option of purchasing electricity from renewable sources.

Principles for Reducing Building Energy Use:

1. Support environmentally responsible, sustainable energy sources such as solar, wind, geothermal, biomass, and small hydroelectric power plants.
2. Meet all growth in electricity demand since 2004 with new, zero-carbon dioxide sources of electricity with an end goal of 100% renewable energy by 2015.

The City anticipates that future development of renewable energy resources by Holy Cross Energy, other regional utilities, and private power producers will depend substantially on customer demand. However, because Holy Cross Energy serves a substantial portion of the population within the Aspen Urban Growth Boundary, the City is committed to working with it directly as we estimate it will need to substantially increase its renewable portfolio if we are to meet the Canary Initiative emissions reduction goals.

The GHGs associated with electricity use in the Aspen Greenhouse Gas Emissions Inventory 2004 were calculated to accurately reflect the carbon intensity from each source, such as coal, nuclear, hydroelectric and wind-generated electricity. It should be noted that per the steps outlined in this plan, our electricity will continue to be generated by more and more renewable energy sources, therefore lowering its ‘carbon intensity’, and thereby making it a ‘clean’ source of energy. When it becomes cleaner than natural gas and oil, we may turn to electricity to meet the needs of heating our buildings and/or powering our vehicles. Although this would likely result in more energy use, greenhouse gas emissions could drop dramatically. This is an example of how we must constantly re-evaluate our energy use, always focusing on lowering ‘energy intensity’ and ‘carbon intensity.’

Objective 1: Generate and/or purchase 45% of Aspen’s electricity from renewable resources by 2012.

Government Actions

2007-2009

1. Create a plan to generate and/or purchase 100% of Aspen Electric’s electricity from renewable energy resources or as close to it as is feasible.
 - a. Expand the Demand Side Management program to reduce demand by 5% by 2009.
 - b. Install on-site renewable energy systems at appropriate City facilities.
 - c. Continue to explore cost effective opportunities to invest directly in new larger-scale renewable projects like wind, photovoltaic, geothermal, and landfill gas systems.
 - d. In all new contracts with outside electricity providers require that 10% of the purchased portfolio be from renewable sources.
 - e. Require any new coal power the City buys be “clean” to encourage innovative technology.

PROGRESS 2006: This year Aspen Electric increased its percentage of non-carbon electricity to 73% through increased hydroelectric output and an increased investment in wind-generated electricity. Aspen Electric has also implemented a Demand Side Management Program incentivizing energy efficiency through rebates. Aspen Electric is also exploring the viability of building another hydroelectric plant.

2. Explore establishing a 'hot water' utility where hot water would be produced by renewable resources and could be provided for space and domestic water use.
3. Explore partnering with Pitkin County by purchasing electricity from the methane recapture project at the landfill, should the project develop.

Community Actions

2007-2009

1. Encourage Holy Cross Energy, through its customers, staff and board of directors, to increase its renewable energy portfolio to 25%.

PROGRESS 2006: As a founding member of CORE and the Aspen Global Warming Alliance, Holy Cross Energy has been actively pursuing renewable energy and demand side management. Their existing renewable energy portfolio is 7.5% of total output.

2. Include renewable resource requirements in utility franchise agreements.
3. Support the deployment of small-scale renewable energy systems in mobile applications.
4. Provide technical assistance to builders and developers to incorporate passive solar design, solar water heating and photovoltaics in building-integrated designs.
5. Support a gradual increase in the renewable percentage requirement under Colorado Amendment 37-*The Renewable Energy Standard.*

E. Landfill: Waste Reduction & Recycling

The City shall promote solid waste management practices that reduce GHG emissions and promote community understanding of the relationship between solid waste reduction and global warming.

Principles for Reducing Emissions from Solid Waste

1. Reduce the generation of solid waste, including source prevention and reduction in packaging and other excess materials by recovering materials from the waste stream for direct reuse and recycle whenever possible.

Reducing waste, recycling and reusing products and materials all reduce GHG emissions. Preventing waste at the source and reducing extraneous materials like packaging reduces the need for raw materials and energy throughout the life cycle of manufacturing, transportation, reuse, and eventual disposal. Using recycled materials in manufacturing processes typically requires substantially less energy than using virgin materials. Lastly, decreasing the amount of waste sent to landfills reduces emissions of methane (a GHG more potent than carbon dioxide). Pitkin County is currently in the process of exploring electricity generation from methane capture. Should this project go forward the City of Aspen will work with the County to purchase electricity from the landfill.

Recycling Efforts-In 2004 approximately 11,577 tons of CO₂-e was released from the Pitkin County Landfill. This accounted for approximately 1.4% of Aspen's total GHG emissions. Recycling efforts diverted about 4,881 tons of CO₂-e (a reduction of 30% from usual waste emissions). In 2005 the City of Aspen adopted a Waste Reduction/Recycling Ordinance aimed at increasing the recycling rate, diverting yard waste (grass and leaves) from trash, and establishing a reporting system. The reporting requirement will allow the City to calculate its recycling rate and therefore establish a baseline for subsequent years. The goals of this ordinance, and corresponding outreach, are to make recycling an integral part of trash service, more convenient for all citizens and ultimately increase recycling rates. The success of this ordinance will help reduce GHG emissions through increasing recycling and diverting yard waste.

Objective 1: Increase the overall solid waste recycling rate by 20% over the 2006 baseline by 2009.

Government Actions

2007-2009

1. Track waste disposal and recycling practices and quantities at all City facilities. Use this information to set a recycling rate goal for City facilities.

Objective 2: Decrease the amount of solid waste generated.

Government Actions

2007-2009

1. Require that all events that receive City funding minimize waste.
 - a. Establish policy that would require that all City-funded events to be “Zero-Waste”.
 - b. Create a ‘Guide to Zero-Waste’ for departments.
 - c. Secure use and location for compost bin.
 - d. Obtain a supply of reusable materials and utensils for small City meetings and functions, and develop a strategy to reuse them.

2. Expand City policies for greater paper reduction.
 - a. Use recycled products with at least 30% post consumer recycled-content. Investigate establishing standards for the purchase of additional recycled-content products.
 - b. Require purchasing printers and copiers with duplexing capacity.
 - c. Make duplexing the default setting for all City owned computers.
 - d. Implement a City practice of posting and/or circulating memos, using fax post it notes or reusable cover sheets, dedicating one tray in printers to “recycled” paper (i.e. paper that has already been printed on one side).

3. Require City contractors and vendors to document the use of recovered material in their product and follow environmentally responsible solid waste management practices.

4. Require that all City funded construction projects be deconstructed and/or use 10% of recycled –content and or reclaimed products.

Community Actions

2007-2009

1. Explore policy action to require the use of compostable plastic, recyclable paper and/or reusable checkout bags by all stores located in the City of Aspen.

2. Expand the viability of deconstruction (and use of recycled materials) for small and large scale building projects throughout Aspen.

3. Increase curb side recycling and other residential/commercial recycling.

4. Develop residential food and yard waste collection options.

5. Assist local businesses in implementing improved solid waste management practices and recycling.

6. Continue to promote the reuse and recovery of electronic devices and increasing recycling capacity.

F. Localization: Carbon Offsets, Food & Other

Principals for Enhancing CO₂-e Sequestration and Mitigation

1. Pursue carbon-offset strategies to complement, but not substitute for, local emissions reduction strategies.
2. Promote consumer behavior that reduces GHG emissions by purchasing locally produced food and other products and services.

Offsets

One of the largest and easiest up-front actions Aspen can take to mitigate its GHG emissions is to purchase carbon offsets. However, there are a few important limitations to offsets that must be addressed for an offset purchase program to be scientifically and economically sound. There is not a given ratio of money to any specific weight of carbon offset; different renewable energies and efficiency measures produce or save varying amounts of electricity and thus mitigate carbon emissions at varying levels. Adding to this uncertainty is the fact that the carbon market in the United States is currently unregulated; there are no rules or baselines for the industry, leading to an overall lack of transparency and consistency in accounting and implementation of offset programs. While the purchase of offsets does consolidate small amounts of funding for large-scale offset projects, because the money leaves the community, an offset program is ultimately an economic and financial drain as it fails to increase the efficiency or economic development of the community investing in offsets.

To address both of these issues, the City of Aspen with cooperation from the Board of County Commissioners and CORE will create a local offset program in which revenue from locally purchased offsets will go towards funding local carbon offset projects, and energy efficiency and renewable energy programs. This will allow the City to accurately track the volume of emissions offset per dollar invested and actually reduce the emissions for which Aspen is responsible. A local offset program could also provide additional funding for the longer term, more complex residential and transportation action measures.

Food & Other

The large scale food and beverage industry uses huge amounts of energy for growing, cooking, cooling, freezing, cold storage and transport. The average North American, purchasing conventional groceries, contributes on average 4.3 tons of greenhouse gases per year in food alone. The purchase of local or organic foods contributes 90% less GHGs on average. In terms of energy 9.14 % of total energy consumption in the U.S. is due to the production, processing and transportation of food. The transportation of food within the US accounts for over 20% of all commodity transport and results in at least 120 million tons of CO₂-e emissions every year.

A good way to address the issues surrounding food is to look at how we can get the services we want while minimizing the energy used to procure them. The concept of a service based economy has been pioneered by Aspen's neighbor Amory Lovins, who points out that, " people don't actually want kilowatt-hours of electricity or barrels of oil, but rather the 'end-use services' they provide—lighting, heating, refrigeration, mobil-

ity, or cold beers and hot showers.” With food, in order to supply the desired product and avoid the energy consumption and waste usually incurred in the process, we need to reduce and simplify the long and complex energy chain it takes to get food from the farm to the shelf. At each stage in the chain there is loss and waste, both of which add to cost and create pollution. Shorter chains are therefore inherently more economically efficient and environmentally sound as they reduce packaging and transport-related energy consumption. Thus, a particularly powerful action which can be taken at the local and individual levels is to purchase locally produced food. There are also local economic and environmental benefits produced from localizing food consumption. From an economic perspective one dollar spent in your community will circulate roughly seven times before leaving, whereas one dollar spent on an imported product leaves the community immediately. Environmentally, buying locally protects open agricultural lands and other local natural resources.

Objective 1: Provide a reliable and effective option to offset GHG emissions.

Government Actions

2007-2009

1. Establish a local trust, either through CORE or through another contracted entity to manage a local offset program that would keep the majority of revenue local. This program would allow residents, businesses, visitors and governmental bodies to purchase offsets and provide funds to invest in local emission reduction projects, such as renewable and energy efficiency projects and specified offset programs. The reductions from these programs would be tracked and inventoried and would work to reduce the overall Aspen Emissions Inventory.

PROGRESS 2006: Bonneville Environmental Foundation (BEF) created www.aspengreentags.com a web page that allows users to calculate their emissions and purchase ‘greentags’ to offset their emissions. BEF has agreed to return 10% of revenue to CORE for use in its existing funding projects.

2. Explore requiring permitted events to reimburse all City departments for energy use and offset their respective emissions.

a. Require permit applications to quantify projected GHG emissions.

Community Actions

2007-2009

1. Create a comprehensive marketing plan for the local offset program which, among other strategies, effectively integrates it with the ‘ZGreen Visitor’ program.

2. Work with special events to mitigate their ghg footprint by purchasing offsets from the local program.

Objective 2: Educate City staff and the community on the global warming impacts of the industrialized food supply chain and encourage the cultivation and purchase of locally produced foods.

Government Actions

2007-2009

1. Create a 'Low Carbon Footprint' guideline for all city-funded events, including picnics, parties and meetings, that encourages food providers to purchase product within a 500 mile radius.

Community Actions

2007-2009

1. Survey the Aspen area to inventory existing and potential land for food cultivation, and catalog what types of food are currently being and could be produced.

2. Increase the land area dedicated to food cultivation.

- a. Support the expansion and matience of the Community Garden.
- b. Incentivize local food cultivation to homeowners and businesses.

3. Create and maintain on-line resources for the global warming impacts and solutions for food.

- a. Create and maintain an on-line list of available locally-grown food and restaurants in the valley.
- b. Provide an on-line resource that assists the public in quantifying the carbon footprint of various foods.
- c. Create a booth at the Farmers Market for Aspen locals to share and sell small quantities of home grown food.

Adaptation

This section is a place holder for future sections that may need to be added.

Aspen has been feeling the effects of climate change for at least a quarter century. The Aspen Climate Impact Assessment has also identified that we experience more change – and perhaps much greater change - in the decades to come. Unfortunately we have committed to some additional change because of the nature of global warming pollution. Some GHGs remain in the atmosphere for up to a century, so the fossil fuels burned a half century ago will still be impacting climate change for some time.

It is for this reason that in addition to aggressively reducing our GHG emissions, we must also adapt to a rapidly changing environment. To do so in a sustainable fashion requires thought, collaboration and creativity. The City of Aspen and the Aspen Global Warming Alliance would like to undertake, such an endeavor by creating an Adaptation Plan. It is our intent to add this to the Canary Action Plan sometime in the future. This page is a placeholder for that plan.

If you wish to participate in this endeavor, please contact city staff through www.canaryinitiative.com.