

TOWN OF CARBONDALE ENERGY & CLIMATE PROTECTION PLAN

Creating a Strong Carbondale Economy with Clean Energy

Adopted September 2006

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The Town of Carbondale joined the Cities for Climate Protection Campaign in the summer of 2005 and committed to developing an emissions reduction strategy. The Town then asked CORE to develop an emissions inventory (Appendix A). The Environmental Board took on the issue of creating a local energy plan and organized Carbondale's first Energy Extravaganza. Over 150 people attended the event in November 2005 and brainstormed initial ideas for the energy plan. Over the last 6 months Carbondale citizens, led by CORE and the Environmental Board, have been working on the creation of an "Energy Plan", which outlines steps for Carbondale to significantly reduce emissions, become more energy independent, and strengthen the economy in the process.

This plan provides a broad, long term vision, as well as intermediate steps for attaining these goals. It is founded on input from over 150 community members, the Carbondale Environmental Board, experts in the energy industry, and the elected officials in the Town of Carbondale. The plan will evolve and continue to be refined over time, but lays out a framework and steps, to significantly improve Carbondale's carbon footprint.

The Energy Plan proposes five key strategies:

1. **Lead by example.** Municipal government should make its buildings and operations a model of energy efficiency and renewable energy while reducing energy costs. Government can be the early adopter, making it easier for more households and businesses to adopt practices once they see they work.
2. **Change the rules that influence energy use.** Many aspects of energy use are the result of rules (policies, ordinances, regulations) that were made over time. Change these rules and we significantly change how we use energy. This plan recommends that the Town upgrade various ordinances and regulations that influence energy use, where useful adopt new ones, and where appropriate, join with others to address issues beyond town boundaries.
3. Partner with utilities and others to **create programs to remove barriers to wiser energy use.** The Town should work with Xcel Energy, Holy Cross Energy, CORE, and others to accelerate the transition to a clean energy future, offering programs to households and businesses that combine financing, technical assistance, and education.
4. **Increase local renewable energy supplies** The Town, with the ability to tap significant funding, can view itself as a local energy producer and investor.
5. **Cultivate clean energy jobs and businesses.** Carbondale can pursue implementation of this energy plan in ways that strengthen the community's "green brand" and supports and creates local jobs. In addition, Carbondale can take active steps to support and grow sustainable energy enterprises.

Why a Carbondale Energy Plan?

Carbondale is proud of our rich coal mining history and the community thrived from mining fossil fuels in the last half of the 20th century. With new national and global challenges and opportunities, Carbondale is now turning its attention to mining the energy of the 21st Century: efficiency and renewable energy sources. Carbondale is finding ways to minimize our carbon footprint on the planet, seeking new and more efficient ways to meet energy needs, and finding ways to tap the economic opportunity of clean energy sources. An energy plan, and focused implementation of the plan, can help us gain the most from these opportunities.

There are many reasons to pursue a low-carbon future:

1. Jobs and Economic Benefits

In 2005 Carbondale citizens and businesses spent over \$5.2 Million on electricity and natural gas. In addition, the combined total bill for motor fuel from all Carbondale citizens and businesses was likely more than \$6 Million. Town Government alone spent \$288,696 on electricity and natural gas costs in 2005. The vast majority of money spent on energy related bills immediately leaves the local economy. Finding ways for each household, business, and government operation to spend less on energy means a significant amount of funds can be used on other priorities, generating economic benefits. In addition, implementing clean energy alternatives is the new growth economy, and can be a significant source of jobs. Clean energy is already a significant portion of the Carbondale economy, with at least 20 local jobs already connected to clean energy development, implementation and education. Sustainable energy was identified by the Economic Roadmap group as a key part of Carbondale's economic future and this plan provides the next steps for implementation of that portion of the Roadmap.

2. Energy Independence and Energy Security

The vast amount of Carbondale's energy is imported either from other parts of our country, or other parts of the world. Carbondale is currently completely dependent on these distant places for our energy needs. There is growing concern about the amount of oil imported from volatile foreign countries and energy independence is increasingly seen as one of the key components of a more peaceful world. In addition, requiring less energy from far away places will insulate Carbondale from energy shocks and spikes in cost. It is important to note however, that in terms of oil dependence, transportation consumes 68% of all oil in the U.S. Transportation energy use in Carbondale accounts for the highest portion of community energy costs.

3. Local Solutions to Global warming

In addition to measurable economic benefits and increased energy security, a local energy plan will help us become an active part of addressing global warming. Nine of the 10 warmest years in recorded history have occurred since 1995, and there is broad scientific consensus that global warming is occurring and that our earth is quickly approaching a tipping point with respect to this issue. The planet's most conservative, risk-averse business – the insurance industry - is now recognizing the reality of global climate change and urging action. Carbondale has unique

resources and a unique citizenry that gives us the opportunity to take positive action at the local level, and know we are doing everything we can to be part of the solution.

4. Enhanced quality of life and livability

Implementing clean energy improvements also has near-term benefits on the quality of our buildings, and our community. Continuing to make Carbondale a place that offers a variety of options for mobility, making it easy to bike, walk, or take transit, and continuing with compact, energy efficient land use patterns, also leads to a high quality, healthy living environment. In addition to the more hardnosed economic and energy security benefits, implementing more sustainable energy solutions enhances the overall livability and beauty of our community.

5. Solutions to the impacts of energy development

The Town of Carbondale has passed multiple resolutions expressing concern for the impacts of resource development in our region; this plan backs up our policy positions with local solutions. Garfield County has recently been termed “ground zero” for energy development in Colorado, with over 5,000 gas wells currently drilled, and well over 1,000 new wells being permitted each year. In order to supply our nation’s natural gas needs, Garfield County will likely see upwards of 20,000 wells in the next 15 years. In addition, Garfield County and the surrounding region lie on one of the biggest oil shale reserves in the world. In fact, over ½ of the world’s oil shale reserves are located within 200 miles of western Garfield County. To extract all of the oil shale that the industry is forecasting to be “recoverable” (800 billion barrels), it would take the largest open pit mines on the planet, dozens of new power plants, and require all the remaining unallocated water in the Colorado River.

6. Tapping unique local resources and success to date

Carbondale has a wealth of local and regional expertise and experience to draw from. People come from across the globe to take classes at Solar Energy International. Rocky Mountain Institute is world-renowned. Rising Sun employs some of the nation’s best lighting efficiency experts. CORE has pioneered renewable energy funding mechanisms. SunSense is one of the Western Slope’s largest wholesalers of solar electric products. The Town’s electricity providers, Holy Cross Energy and Xcel Energy, have exciting programs for efficiency and renewable energy. Holy Cross has more grid-connected solar systems and wind power customers than any rural utility in America. Xcel will spend more than \$1 billion on new wind farms and solar installations in the coming years. Many local architects and builders specialize in green design. The valley’s architects initiated passive solar design more than 25 years ago. Today, there are hundreds of efficient homes in the valley, using different techniques. **In short, our community is well positioned to make rapid progress on the clean energy initiative described below, and can address these issues in a hopeful and innovative way that will help Carbondale further prosper.**

CARBONDALE'S ENERGY, ECONOMIC AND CLIMATE PROTECTION GOALS

Around the country communities are selecting emissions goals to spur and guide climate protection efforts. Emissions reductions goals are an evolving science. We have based our emissions goals on what other active climate protection cities and corporations are doing. Goals will be refined as implementation of the plan moves forward. In addition to emissions goals our plan includes more qualitative goals.

- Reduce emissions directly attributable to Town facilities and Town operations by 25% by 2010 through increasing energy efficiency in all buildings and operation, and increasing the percentage of renewables.
- Reduce community-wide CO₂ emissions by 25% below our 2004 base year by 2012.
- Turn emissions reduction efforts into an economic advantage by reducing household, business, and local government energy bills; keeping more money currently spent on energy flowing in the local economy; and investing in existing jobs/creating new jobs tied to sustainable energy.
- Leverage community investments to obtain 25-50% of non-community funds or significant investment returns to create the new economic activity, through installations of renewable energy production on municipal facilities, homes and businesses.
- Obtain at least 30% of our energy for heating & electricity from renewable sources by 2015.
- Develop a resource-efficient building ethic in Carbondale to serve as a model for other communities.

For more information on goal setting or to view goals set by various corporations please visit the following web page:

EPA Climate Leaders, Partner Goals
<http://www.epa.gov/stateply/partners/ghggoals.html>

Appendix B for a list of goals set by communities and corporations around the globe

Energy Plan Actions

1. Town Government Actions: Lead by Example

Action Item 1.1: Create the organizational, human resource, and financing framework for ensuring this plan is turned into action over a 5-year timeframe. See page 15 for more information on this step.

Action Item 1.2: Establish a Program for Energy Efficiency Retrofits in Municipal Buildings.

- Town will conduct energy audits of municipal operations to identify opportunities for saving energy and money.
- Town will invest in energy efficiency improvements on municipal facilities with 5 years or less payback period (14% rate of return).

Action Item 1.3: The Town commits to using best practices in energy efficiency and renewable energy in building all new buildings and operations.

Action Item 1.4: The Town will measure and track annual energy consumption in facilities and track annual progress toward lower emissions. Energy costs and trends will be very transparent and reported on annually during the annual budget cycle. Town staff will see the energy bills associated with their department.

Action Item 1.5: The Town will increase the percentage of renewable energy by 50% by 2010, either through on-site renewable generation, or through purchasing more power from renewable sources.

Action Item 1.6: All new town vehicle purchases strive for most fuel efficient models; use biodiesel where practical.

Action Item 1.7: The Town will make bus passes available to those Town employees who can commute by bus.

Action Item 1.8: Town facilities and operations will be sited based on access by transit, walking, biking, and evaluated for encouraging more compact land uses.

Action Item 1.9: The Town will support efforts to create affordable in-town housing for employees to reduce the need to commute.

Action Item 1.10 The Town will continue to encourage Town employees to make in-town trips on bicycle when practical.

Action Item 1.11: The Town will strive to use locally grown food for Town sponsored functions when practical.

2006/2007 Example Actions:

- Create implementation structure and financing method for overall plan, including staffing, relationship with other organizations, and longer term financing.
- The waste water treatment plant is the highest municipal consumer of energy. The optimization study already underway and will address energy efficiency improvements. Water supply operations will be reviewed for recommendations. The 2007 budget will include ways to improve the efficiency of the waste water treatment plant.
- Design the REC center as an efficiency model for visitors to our town. The Design Committee will work with an energy modeling consultant (with support from CORE).
- 2007 budget will include ways to increase percentage of renewables.

2. Change the rules that influence how we use energy

Action Item 2.1: Adopt and implement public policies to increase energy efficiency, use of renewable energy, and reduce dependence on oil.

- Enforce existing codes to address energy efficiency and resource efficient practices. (ongoing)
- Upgrade the building code to encourage greater energy efficiency and use of renewable energy in all new buildings constructed in town. (2007)
- Develop and implement a local renewable energy mitigation program. (2007)
- Continue to support mixed use developments on commercial projects to reduce transportation energy.
- Town will promote a leadership position and advocate on renewable energy supply and efficiency issues.
- Review possible public policies from around the country to promote green construction in all new buildings; work for local implementation.
- Support community efforts to move towards greater energy independence.
- Actively work with other communities and any statewide efforts to improve regional, statewide, and national policies and laws influencing energy use.
- Review Town codes to ensure they are in line and not in conflict with the community's desire to become more sustainable.

Action Item 2.2: Expand, adopt, and implement policies to encourage less oil-dependent, more climate friendly approaches to mobility and access.

- Reward compact land use patterns and development proposals that encourage less dependence on the car.
- Require all new development to provide convenient bike and walking access.
- Increase transit mode share by working regionally to upgrade transit: Carbondale RFTA representative will encourage RFTA to develop a timeline, target dates, and implementation plan for implementing regional Bus Rapid Transit.
- Carbondale will work with RFTA to develop a timeline and implementation strategy for creating an accompanying feeder transit system for in-town transit to increase local transit mode share.
- Review Town policies and development regulations to ensure that the Town is not encouraging vehicle dependence, and creating barriers to greater biking, walking and transit usage in unintended ways.
- Work with other communities and any statewide efforts to improve state policies to encourage a more climate friendly transportation system.
- Review all Town codes to ensure that they back up the community's goal of moving away from automobile dependence and are not in direct conflict with these goals.
- Conduct ongoing publicity campaigns to promote sustainable transportation, including the promotion of biking, walking as main transportation modes within Carbondale, make Carbondale known for respecting, encouraging biking, walking.

- A packet will be developed for the Building Official to facilitate home owner/contractor/architect /commercial compliance with existing codes: IECC 2003, lighting and solar ordinance.
- Work with River Valley Ranch (RVR) Design Review Committee to implement a green building standard as adopted in their covenants.
- The IECC 2003 does not address solar orientation, snowmelt, house size and other elements as per our previous residential code. These items will be analyzed and presented for recommendations to Town Staff and P&Z.
- Review existing commercial code and recommend a standard for Roadmap Group recommendation to adopt a resource efficiency standard for commercial projects
- Recommend implementation plan for Energy Star Purchasing Policy for town operations with supporting EPA reference and guidelines
- A regional roundtable for local food production will be held.
- CORE will utilize a Town Task force to advise on energy independence goal.
- Establish Green Fleets Committee to evaluate vehicle purchases for town fleet.
- Start a biking, walking campaign for in-town transportation.
- Participating in regional transportation demand management programs and promotions.

3. Create programs to overcome barriers: Partner with utilities and others to remove barriers, encourage alternatives, increase access to resources and increase energy awareness:

There are numerous ways households and businesses can reduce energy use or tap renewable energy. But currently, better practices are not always implemented due to a variety of barriers:

- Lack of awareness
- Lack of technical know-how
- Lack of upfront financing to cover initial cost
- Lack of motivation: issue does not rise to the top of the “to-do” list

Creating organized programs to package technical know-how and financing can make it much easier for households and businesses to implement improvements. A community wide campaign can also play a major role in increasing awareness and motivation to act on the information.

Action Item 3.1: Partner with Xcel, Holy Cross, CORE, NWCCOG, KN Energy and other entities to provide convenient source of financing, rebates, information and technical information for residential and commercial customers.

- The Town will partner with these entities to **encourage a household by household campaign to increase efficiency and tap renewables**. Through this program every household in Carbondale will be encouraged to implement improvements with the **goal of 25% of all households in Carbondale participating within the first two years. This action item will require staffing, and will tie into overall implementation plan.**
- The Town will partner with these entities to **encourage a business by business campaign to increase efficiency and tap renewables**. Through this program every business and commercial energy user in Carbondale will be encouraged to implement improvements with the **goal of 25% of all businesses and organizations in Carbondale participating within the first two years. This action item will require staffing, and will tie into overall implementation plan.**

2006/2007 Example Actions:

Residential

- Work with partners to establish what is currently available and how it can be packaged into one easy to use program with technical assistance and financing.
- Develop overall communications strategy and develop information materials.
- Launch the “Carbondale Sees the Light”/Compact Fluorescent (CFL) Program. Through subsidized CFL giveaway or discounts at local business promote energy savings with CFL’s. Buy in bulk and provide coupons to water customers.

- Promote solar, appliance incentives from Holy Cross, CORE and Xcel and federal tax credits on renewables and efficiency on radio, in newspapers and in bill inserts.
- Facilitate NWCCOG energy audits and free home improvements for low income households.
- Create a pilot weatherization program for existing building stock to evaluate costs and implementation strategy. Explore opportunities for low cost energy savings: water heater blankets, insulation and caulk, blower door and Energy Star Ratings.
- Advise local contractors/architects/engineers of Xcel's incentives through outreach and presentation by Xcel representative
- Work with the Chamber to advise commercial customers on Xcel incentives for lighting retrofits and other efficiency up-grades and Holy Cross' We Care Program for efficiency grants

4. Increase local renewable energy supplies

Action Item 4.1: Pursue additional installations of PV's on public buildings.

Action Item 4.2: Pursue Clean Renewable Energy Bonds to build local renewable power station.

Action Item 4.3: Actively encourage installation of renewable energy systems on private property through financing mechanisms and community campaign.

Action Item 4.4: Town will consider purchases of green power to reduce GHG.

Action Item 4.5: Pursue development of other local renewable supplies such as microhydro.

Action Item 4.6: Support efforts to turn waste cooking oil into biodiesel.

2006/2007 Example Actions:

- Sunsense will install a 6 KW Solar Electric system at Sopris Park. CORE is soliciting grant funds to match Xcel's incentives to hopefully provide 75- 85% funding needs.
- CORE is providing consulting for a micro hydro (25-40KW) project at Nettle Creek. CORE will work with water utility staff to evaluate proposed project.
- CORE will explore opportunities for Town or citizen investments in a Colorado wind power cooperative or REC Renewable Energy Credits.

5. Cultivate clean energy jobs and businesses focused on sustainable technologies, expertise, and education

Action Item 5.1: Actively encourage the preservation of existing renewable energy jobs and encourage the creation of additional jobs tied into a sustainable energy economy:

- Develop the current Carbondale Elementary School site to provide a campus for sustainable energy education and a business incubator for sustainable businesses.
- Partner with sustainable energy businesses and the Chamber to create a green brand for the Town.
- Create a supportive environment for businesses to build green and support green businesses.
- Develop informational materials to promote Carbondale as a center of sustainable energy.
- Conduct outreach to state and national audiences of the resources Carbondale offers for sustainable energy education; promote Carbondale as an example of sustainable energy technologies.

2006/2007 Example Actions:

- CORE will work with the Chamber to create a self-guided Green Tour highlighting: SEI, CORE, strawbale construction, Blue Creek affordable housing, PV systems on Town Hall and other opportunities.
- The Town will move forward in pursuing a non-profit/incubator center to create a supportive environment for sustainable energy initiatives to thrive.

Implementation and Financing

Plans get implemented when it's someone's responsibility to ensure the plan is implemented, there are financial rewards for ensuring implementation, the plan is backed up with support from organizations and policy makers, and there is adequate financing. To ensure this document turns into action we need to answer "Who will do the work, who is responsible for moving items forward, and where does the funding come from?" Without answering these questions this document is simply a wish list.

Possible organizational/staffing arrangements:

- In-house energy manager within Town Government, full time salary completely covered by Town government.
- Staffing is part of regional non-profit energy office, Town funds part of salary joining with other entities in a regional effort.
- Energy Services Company: Town contracts with a for-profit company.
- Individual contractors on a project by project basis.

It will take a team of resources to implement the plan, and it may require using a combination of several above-listed approaches.

Possible financing sources

Financing is required for staffing, management, and upfront costs of efficiency upgrades and installation of renewable energy systems. Here are potential sources of financing:

- **Franchise fees:** The Town received more than \$156,000 in franchise fees from energy utilities in 2005. Up until this year all franchise fees went into the general fund. In 2006 the Board decided to dedicate Excel franchise fees to encourage energy efficiency and renewable energy. The Town could choose to dedicate more or all these franchise fees toward creating a more energy-wise community.
- **Bonds:** In 2001 San Francisco voters overwhelmingly approved a landmark \$100 million bond initiative that paid for solar panels, energy efficiency and wind turbines for public facilities. The measure paid for itself entirely from energy savings at no cost to taxpayers. Visit www.votesolar.org to learn more.
- **Grants:** CORE has raised significant grant funds to date for energy improvements throughout the valley, and grants can be a valuable part of the funding mix.
- **Revenue-generating mechanisms:** The energy plan suggests pursuing a revenue-generating mechanism such as Pitkin County's Renewable Energy Mitigation Program.
- **Utilities:** Fully utilizing existing or emerging utility efficiency and renewable energy programs can also add to the pool of financial resources available.

Appendix A:

Green House Gas Report for Town of Carbondale BASELINE YEAR 2004

Background:

In November of 2005, an inventory of Greenhouse Gas Emissions was initiated at the request of the Town of Carbondale. The year 2004 was selected as the Baseline Year in order to obtain pertinent data for both municipal operations and the entire community.

Emissions for the Town of Carbondale were calculated using the Cities for Climate Protection Campaign (CCP) software. The Town is a member of the Cities for Climate Protection and its umbrella organization ICLEI. Actual data for electricity and usage by sectors were obtained from Holy Cross and Xcel Energy. Kinder Morgan supplied information for natural gas. Estimates for transportation emissions were calculated from Regional Travel Study 4/05 and from Crystal River Market Place Daily Trip Study 1998.

COMMUNITY EMISSIONS- Total 110,000 Tons

The inventory of community Greenhouse Gas (GHG) emissions for 2004 Baseline is 110,000 tons. This amount of GHG produced is approximately 36,000 pounds per person in Carbondale. Is this a lot? If every man, woman and child in Carbondale drove 36,000 miles per year, they would produce 36,000 pounds per year- that is if the car got 20 miles to the gallon. This carbon will stay in the atmosphere for 100 years contributing to global warming pollution.

The average American produces 54,000 pounds of GHG per year. Since the average Carbondalian produces only 36,000 pounds per year, is our community more efficient? Not quite. The inventory of GHG of Carbondale is understated. The inventory did not count all the energy used by the community. Specifically the inventory does not include the GHG produced by: the energy used for air travel for Carbondale residents, the energy used by visitors to arrive at our community, the energy used to produce or deliver food, construction materials and goods to our community or from waste disposal.

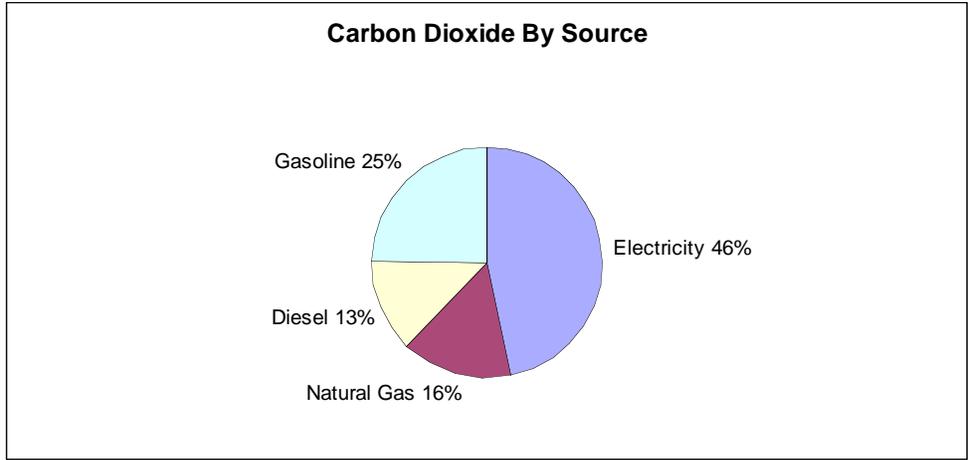
Where do the GHG emissions come from?

In our community our electricity usage produces the highest amount of total of emissions, with 46% of total emissions. In Colorado over 80% of the electricity is produced from burning coal, which produces carbon dioxide (CO₂), a major GHG.

There are 2 suppliers of electricity in Carbondale. Xcel Energy provides 90% of the electricity to the entire community through a geographic distribution system. Holy Cross has 10% of the supply share. Since Xcel is the supplier of electricity to Holy Cross, the CCP model used the same carbon dioxide production per kilowatt hour for both sources of electricity.

Other sources of GHG emissions include natural gas used to heat homes and buildings and the diesel and gasoline burned in our automobiles, SUV's and trucks. The distribution of GHG by fuel source is presented in the following table and graph.

Source	Percent of Total GHG	Total Tons GHG
Electricity	46	50,865
Natural Gas	16	17,000
Gasoline	25	27,150
Diesel	13	14,200



Who is producing all the GHG?

In the community of Carbondale the highest production of GHG is from the residential and transportation sectors. Together these 2 sectors contribute 84%.

Sector	%	Total Tons GHG
Residential	46	50,200
Commercial	14	15,400
Industrial	2	2,000
Transportation	38	41,400
Total	100	110,000

Residential:

The residential sector produces 46 % of community emissions. Over 80% of these GHG are produced from using electricity or approximately 20 Tons per household. With 2000 households in Carbondale, the average household uses 1600 -1700 kilowatt hours per month. This average usage is higher than the average Holy Cross customer that uses 900 kilowatt hours per month. This difference possibly reflects the use of electric heat in the community.

Commercial:

This sector produces a significantly smaller share of GHG in the community, with 14% of the emissions. Source of GHG in this sector is about 44% from natural gas and 56% from electricity.

Industrial:

The industrial sector produces 2% of GHG emissions. This sector is relatively small as there is little to no manufacturing in Carbondale. These emissions reflect electricity used for lighting street lights as per Xcel’s figures for usage.

Transportation:

This sector has approximately 38 % of the emissions. The contribution of the transportation sector is understated, since these figures do not include air travel, visitor travel or fuel used to carry goods (food and products) to the community. The GHG calculations for emissions in this inventory cover mostly commuter activity. An excel spreadsheet was prepared with input from the Roaring Fork Regional Travel Study report from 2004. Most of the figures used were from the 2000 Census included in this report. The breakdown for diesel versus gasoline reflects a best estimate from the study.

Transportation sector analysis of GHG covers 4 major groups:

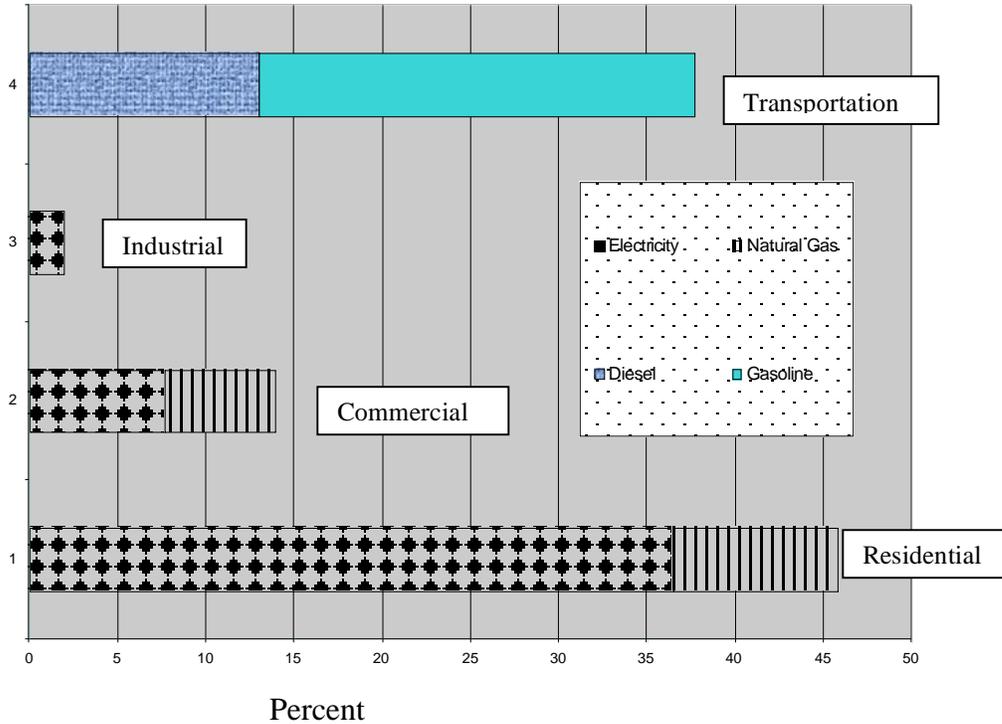
Group	Tons	Percent
Commuters In	18,100	16.4
Commuters Out	17,500	16
In Town – resident workers	900	0.8
Around Town	4,800	4.4
Total	41,400	37.6

1. Commuters In- Incoming workers fill 68% of the 3600 jobs in Carbondale, traveling an estimated distance of 36 miles round trip.
2. Commuters out- There are 2800 resident workers in Carbondale, 73% commute out of town to work, traveling an average of 44 miles round trip. Ten percent out of 73% take the bus, 63 % are in a car, truck, van.
3. In town resident workers- 27% of the resident workers stay in town to work.
4. Around town – This group covers all other trips on Highway 133 according to estimate of HYW 133 traffic study for the Crystal Market Place with 19,500 total trips in 1998. Non-commuter trips around town are estimated to be approximately 4700. These around town travelers have an average trip of 5 miles.

For the community of Carbondale, fuel source for each sector is illustrated below.

Sector	Electricity Percent of Total GHG	Natural Gas Percent of Total GHG	Gasoline Percent of Total GHG	Diesel Percent of Total GHG
Residential	36.5	9.3		
Commercial	7.7	6.2		
Industrial	1.9			
Transportation			24.7	12.9
Total	46.1	15.5	24.7	12.9

Relative GHG percentage by sector and fuel source is outlined in the graph below.



Municipal Operations Greenhouse Gas Inventory

Background:

Municipal emissions were calculated from actual data for natural gas, electricity, propane and fuel consumption for town trucks and vehicles used in town government operations. Commuter emissions were estimated based on out of town employee figures.

In 2004 the Town of Carbondale’s energy bill was over \$280,000.

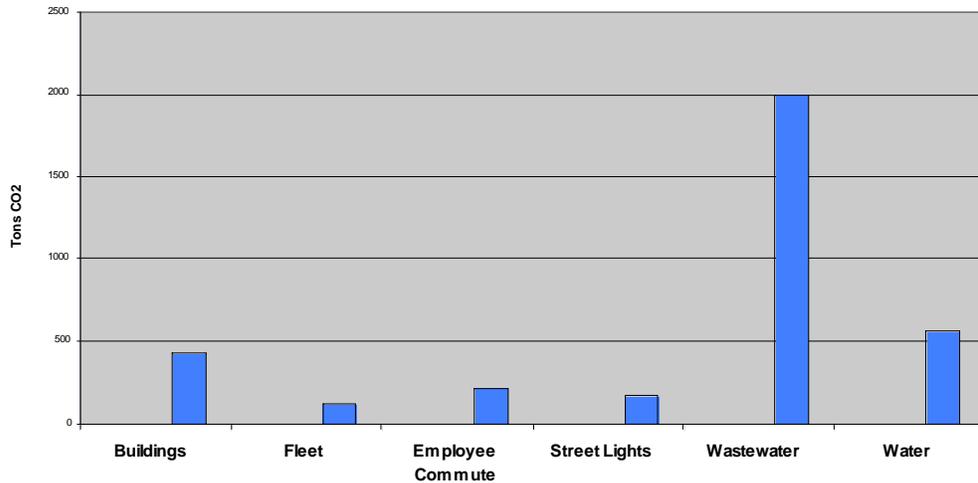
Diesel	\$5,000
Electricity	\$191,000
Gasoline	\$18,000
Natural Gas	\$64,000
Wind Power	\$ 2,850
Total	\$280,000

Municipal emissions inventory:

Carbondale Town Government emissions in 2004 were 3500 Tons or 3% of the community total.

The GHG emissions were calculated for each Municipal operation. The waste water and water plant operations contribute approximately 73 % of GHG. These emissions do not include the methane produced from sewage disposal.

The following graph illustrates GHG emissions from buildings, street lights, employee commuting, fleets, waste water and water operations.



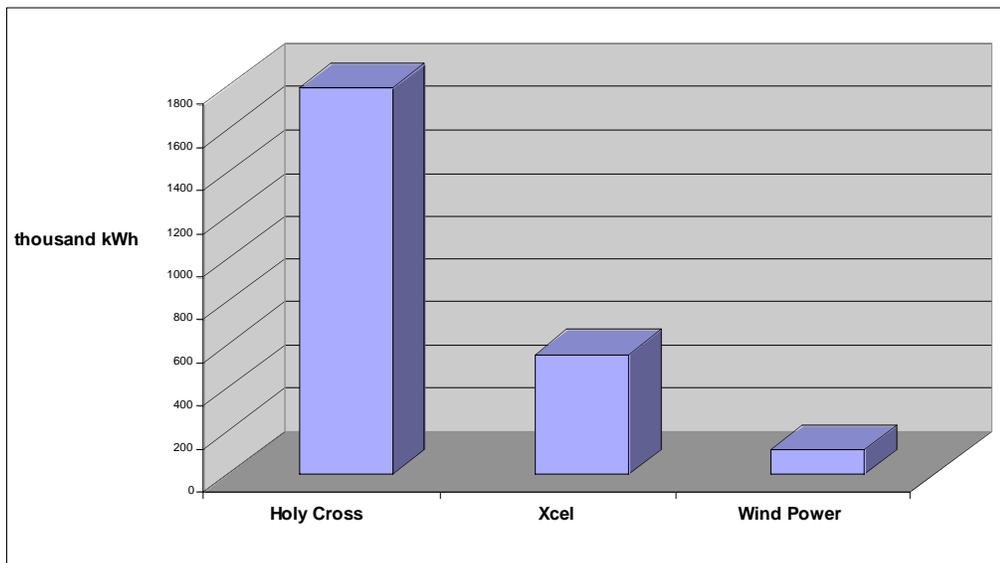
The fuel source breakdown for GHG is as follows:

Fuel	Tons CO2	Percent
Electricity	2600	74.7
Natural Gas	540	15.5
Diesel	25	0.8
Gasoline	316	9
Total	3500	100

The largest fuel source of GHG in municipal operations is from electricity used. Electricity is almost 75% of the GHG for the town. While the community as a whole obtains 90% of its electricity from Xcel, Holy Cross is the primary supplier to the town municipal operations, supplying over 80%. Xcel provides the balance.

Electricity Source:

In 2004 the town did not produce any of the electricity it used. The town purchased 4.6% of its electricity from wind power through Holy Cross. The GHG emissions avoided by purchasing wind power are approximately 200 tons.



Detailed Report of Emissions by Buildings:

	GHG tons	GHG tons	GHG tons	GHG
Building	Electricity	Natural Gas	Total	Percent of Total
Parks/Rec	58	2	60	1.7
Pool	57	43	101	2.9
Public Works	56	27	83	2.4
Town Hall	127	53	180	5.1
Total Buildings			425	12.1

Detailed Report of Emissions by Vehicle Fleet:

Fuel	GHG tons	GHG Percent of Total
Diesel	25	0.7
Gasoline	97	2.8
Total Vehicle Fleet	122	3.5

Detailed Report of Emissions by Water Sewage Operations

Operation	GHG tons Electricity	GHG tons Natural Gas	GHG Total	GHG Percent of Total
Waste water	1603	395	2000	57.2
Water	540	22	561	16.1
Total WW and Water	2140	417	2561	73.3

Other Emissions:

Other Operations	GHG tons	GHG Percent of Total
Street lights		5
Xcel	120	
Holy Cross	52	
Employee Commute	219	6.3

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Appendix B: Example Emission Reduction Targets

Los Angeles, CA adopted a target of reducing community GHG emissions by 30% below 1990 levels by 2010.

Fort Collins, CO adopted a target of reducing community GHG emissions by 30% below predicted worst-case 2010 levels by 2010.

Sebastopol, CA adopted a target of reducing its municipal operations GHG emissions by 30% between 2000 and 2008.

Chapel Hill, NC has been considering adopting a target of reducing emissions by 60%, basing their approach on the goals set for deep climate reduction in the United Kingdom Carbon Reduction project. <http://www.cred-uk.org>

Seattle City Light, the city's municipally owned utility, has established a goal of becoming climate neutral as a utility company.

Newcastle, England is going carbon neutral: <http://www.newcastle.gov.uk/carbonneutral>.

Stockholm, Sweden is aiming to be fossil fuel free by 2050.

Intergovernmental Panel on Climate Change (IPCC) has suggested the goal required to stabilize climate change is equal a 60-80% emissions reduction from present levels. One useful analysis on this topic has been developed by the UK Department of Trade & Industry's Energy Group: <http://www.dti.gov.uk/energy/whitepaper/index.shtml>. According to their white paper: "A reduction in carbon dioxide emissions of 60% by 2050 is consistent with the level of reduction likely to be needed by developed countries in order to move towards stabilisation of carbon dioxide concentrations in the atmosphere at no more than 550 ppm, taking account of a realistic assessment of emissions growth in developing countries. This is set out in more detail in the Defra paper *The scientific case for setting a long term emission reduction target*, available at www.defra.gov.uk/environment/climatechange."

3M pledges to reduce total U.S. GHG emissions by 30 percent from 2002 to 2007.

Advanced Micro Devices, Inc. pledges to reduce global GHG emissions by 40 percent per manufacturing index from 2002 to 2007.

Hasbro, Inc. pledges to reduce total U.S. GHG emissions by 30 percent from 2000 to 2007.

Lockheed Martin pledges to reduce U.S. GHG emissions by 30 percent per dollar revenue from 2001 to 2010.

Santa Fe New Mexico passed a resolution to eliminate fossil-fuel power from all city buildings by 2030. As well, targets include that the fossil fuel reduction standard for all new buildings be increased to: 60% in 2010; 70% in 2015; 80% in 2020; 90% in 2025; and carbon-neutral by 2030. <http://www.headwatersnews.org/stories/redirect.php?id=33102>