2017 CARBONDALE
CLIMATE & ENERGY ACTION FULL PLAN

Working today towards a carbon-neutral future
and a thriving clean-energy economy.

2017 Carbondale
Climate & Energy Action Plan

Executive Summary

The Carbondale community has made great strides since the development of the Carbondale Energy & Climate Protection Plan in 2006. The 2017 Carbondale Climate & Energy Action Plan builds on and accelerates that progress. Key progress since 2006 includes:

- More than 1.2 megawatts (MW) of solar power generation has been installed around town, including 1 MW on public buildings and facilities.
- 10 percent of households and 32 percent of commercial buildings have gained energy efficiency improvements or were built green from the start.
- Town government and schools have cut energy use at various facilities by 15 to 50 percent.
- Carbondale was the first community on the Western Slope to adopt a green commercial building code.
- The Carbondale community has a high percentage of residents who bike, walk or ride public transportation as their first choice of getting around.
- Electric vehicle charging stations have been installed at five public locations, offering 11 charging plugs.

The 2017 Carbondale Climate & Energy Action Plan is the result of the work of a 30-member citizen task force, the Carbondale Environmental Board, nonprofit energy organizations CLEER and CORE, business owners and interested citizens.

The 2017 plan focuses on five key areas to continue Carbondale's climate protection success, and sets goals for further progress in all five areas:

- Energy Use in Buildings: Continue to improve energy efficiency in existing government, commercial and residential buildings; work for energy positive and high performance buildings.

- Energy Supply and Renewable Energy: Accelerate use of renewable energy sources, both on-site in Carbondale and by working with utilities for greater use of renewables.

- Transportation: Continue to decarbonize transportation by encouraging more widespread use of walking, biking and transit. Continue to strengthen transportation options.

- Waste Reduction and Reuse: Make re-use, recycling and composting of garbage, garden and food waste easier for residents, businesses and construction sites.

- Local Food Production and Purchasing: Increase local food availability by supporting local growers and businesses that sell locally grown produce, dairy, eggs and meat.

Carbondale is strongly positioned as it embarks on this next phase of carbon reduction. Carbon emissions from building energy use across Carbondale decreased 36 percent between 2004 and 2014. This success stems from state voter approval of the Renewable Energy Portfolio Standard governing electric utilities, combined with local actions to carry out the 2006 plan, which resulted in significant energy improvements in Carbondale.

The 2017 Carbondale Climate & Energy Action Plan is our community's roadmap for the next decade. We strive to become a net-zero community by 2050, with the systems, policies and practices in place that will allow our community to thrive without leaving a carbon footprint.

Acknowledgements

This plan would not be possible without the participation of the following elected officials, community members, and organizations.

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Funding for this plan was provided by the Town of Carbondale, CLEER and CORE.

Introduction

Over the last two decades, the Town of Carbondale has been a leader on climate action and sustainability. Addressing the community's carbon footprint can secure energy independence, spur greater economic development, create good jobs, increase tourism, support clean air and water, and support a more thriving, sustainable community.

The 2006 *Carbondale Energy and Climate Protection Plan* was the first climate plan for Carbondale. In 2016, the Town of Carbondale asked Clean Energy Economy for the Region (CLEER) and the Community Office for Resource Efficiency (CORE) to update that plan.

Over the course of four months and several workshops, a Citizens Advisory Board, comprised of community members and experts, developed new targets and identified appropriate actions to meet those targets. The Board rallied around the goal of carbon neutrality and brainstormed actions across five key strategy areas:

- Energy Use in Buildings
- Energy Supply and Renewable Energy
- Transportation
- Waste Reduction and Reuse
- Local Food Production and Purchasing

The *2017 Carbondale Climate & Energy Action Plan* is a roadmap to a sustainable future for the entire community. Let's be clear — Carbondale, like many other communities with similar goals, has yet to identify the exact path to take to reach carbon neutrality. The *2017 Climate & Energy Action Plan* embraces a host of strategies that can lead to significant emissions reduction over the next 10 years and get our community much closer to the carbon-neutral destination we seek.

Background: We Are Not Starting from Scratch

Significant work has already been done to reduce Carbondale's emissions. The Town of Carbondale and many of the people who live here have worked to prioritize climate-friendly policies by adopting emission reduction goals, building bike paths and lanes, purchasing solar power, upgrading the efficiency of municipal and other public buildings, and passing progressive energy codes. **Appendix B** of this plan provides more detail about the strides Carbondale has made since 2006.

The Vision

This 2017 plan raises the bar on the already high goals set in 2006 by challenging our community — residents, businesses, nonprofit and educational institutions and the town government — to go further, faster. The plan seeks carbon neutrality, and imagines a community with a thriving economy in which:

- All buildings have net-zero emissions
- All energy is powered by renewable sources
- The majority of trips are made by walking, biking or public transit, and all the vehicles we use run on low-carbon fuels

- All waste is recycled or reused
- An abundance of locally raised foods and products are available

What is certain is that collective action is needed: every individual, business and neighborhood needs to be engaged. Encouragingly, Carbondale has proven its ability to cut emissions. With this new plan to guide action, Carbondale is taking the next step towards carbon neutrality.

The Time to Act is Now

Communities around the world are showing continued leadership to meet the urgent challenge of climate change. There is widespread consensus among scientists and in many communities that the accumulation of greenhouse gases (GHGs) in Earth's atmosphere are changing the climate and that this poses a significant threat to our natural and human systems on all continents and across the oceans.

Scientists agree that everyday human activities, such as the burning of fossil fuels (coal, natural gas, gasoline) to heat homes and power vehicles, are the dominant source of non-natural GHG emissions. At the same time, they are optimistic we have the tools to slash GHG emissions.

According to a survey of the Carbondale community taken in 2016, residents are concerned about climate change and support taking action. Results from Carbondale's 2016 Energy and Environment Survey include:

- 93% agree that Earth is getting warmer. The climate is changing.
- 87% agree that human-caused emissions are resulting in climate change.
- 83% agree that technology alone will not solve climate changes without any changes in individual behavior.
- 81% agree that government should be involved in addressing climate change.
- 84% agree that governments should offer voluntary programs that enable residents and businesses to reduce climate change.
- 77% agree that governments should enact legislation and regulations to reduce climate change.
- 89% agree with the statement: "I feel a personal obligation to reduce greenhouse gas emissions."

Preparing for Climate Change

Locally, climate change could mean shorter and warmer winters, drier summers, disrupted water cycles and elevated risks of wildfire. All of these impacts would put extra pressure on water providers and users, harm the recreation economy, and threaten other sectors of the Carbondale community and economy.

These projections have led Carbondale to engage in resiliency planning to make sure it is equipped to address climate-related vulnerabilities. While outside of the scope of this report, it is important to mention these efforts, which include:

- Carbondale's participation in the Colorado Local Resilience Project identifies actions that could make communities more resilient to climate change-related risks.
- Water studies performed by the Colorado Water Conservation Board examine the availability and flow of water under different climate scenarios.

Multiple Benefits of Climate Action

Again and again, reducing emissions leads to multiple benefits that extend beyond measurable carbon reductions. In particular, clean energy is a major source of jobs and Carbondale is well prepared to take advantage of the clean energy economy. In 2016, the number of solar industry jobs in the United States was greater than the number of fossil fuel industry jobs.

Carbondale has at least 38 companies that performed energy efficiency or clean energy projects across the region between 2010 and 2015. These companies range from general contractors and architects who have learned building science principles and efficiency practices, to solar design and installation companies, and to innovative efficiency technology developers.

Other community benefits and economic opportunities include:

- Lower utility bills: The community spends more than $7 million every year paying for electricity and natural gas. When families save on utility bills, they are more likely to spend that money locally. When businesses save on utility bills, they likely invest those savings to expand their businesses, create more jobs, and make technological or capital investments that increase productivity.

- Safer, more comfortable, and more affordable buildings: Initiating energy efficiency upgrades in buildings can have a big impact.

- Increased access to public transit and alternative transportation: Fewer car miles reduces air pollution and cuts road congestion.

- Improved alternative transportation infrastructure: Bicycle and pedestrian safety are enhanced, with the added public health benefit of getting more people moving.

Why Should We Act on Climate Change?

At the first community workshop help to shape this plan, participants cited a variety of positive reasons for taking action to deal with climate change. Here are the reasons most frequently mentioned:

- Our future and our children's future
- Cleaner air and water
- Positive health impacts
- It's less expensive to mitigate now
- The economic vitality of our valley relies heavily on healthy natural resources and a healthy snowfall
- Economic benefits of clean energy
- Frustration with climate denial
- A desire to put my energy into proactive, positive change
- It is exciting to witness the transformation

Carbondale's Energy Picture

We measure progress because once something gets measured, it can be managed. Carbondale has been measuring its carbon footprint since 2004. However, it's important to note that many factors affect greenhouse gas (GHG) emissions in a community. Weather, the economy, and local building trends can all impact emissions.

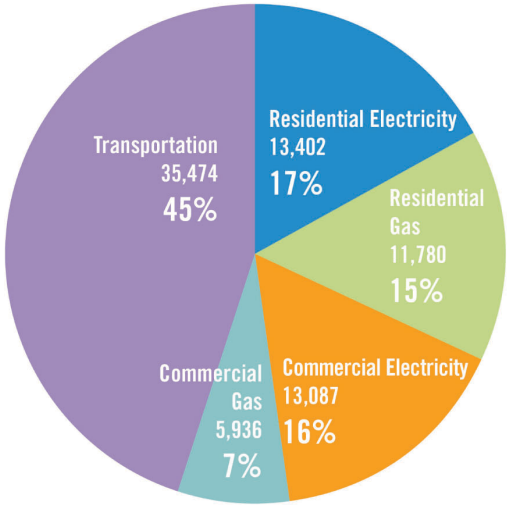
Additionally, the availability of standardized and complete energy data from utilities has changed over time, and transportation data collection is complex and therefore limited. Groups conducting energy inventories have attempted to track this data to the best of their ability, but want the community to understand the inherent limitations.

In 2014, the Carbondale community was responsible for emitting 79,679 metric tons of carbon dioxide ($MTCO_2$) from the energy used to heat and power buildings and from fuel used for transportation.

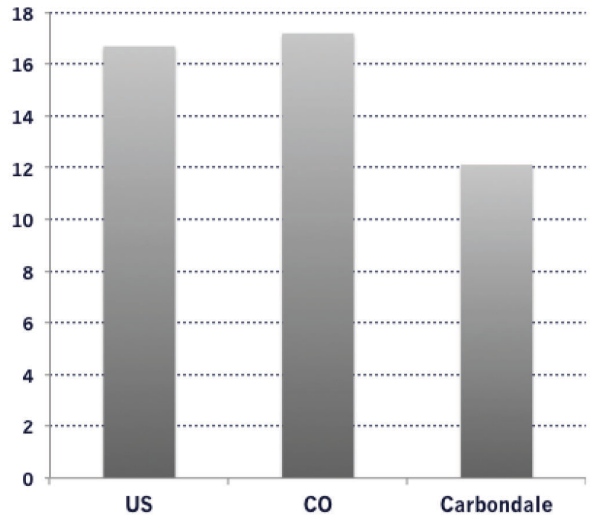
Emissions from the buildings sector contributed 55 percent of emissions compared to 45 percent from the transportation sector. Carbondale's emissions on a per capita basis are lower than national and state averages.

Community-Wide Carbon Footprint, 2014-2015

1. 2015 Carbondale Emissions (metric tons of CO2e)

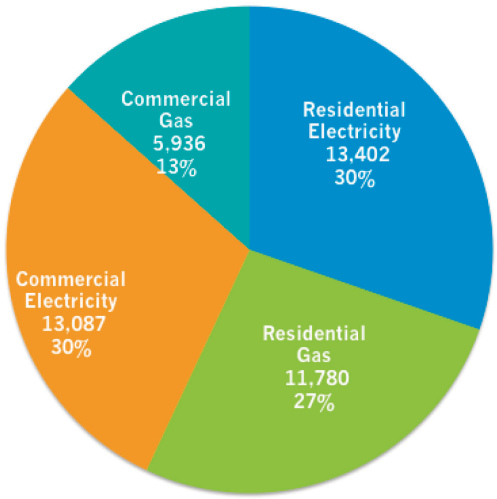


2. Emissions per capita, 2014 (bldgs & transp.) Metric tons of CO_2

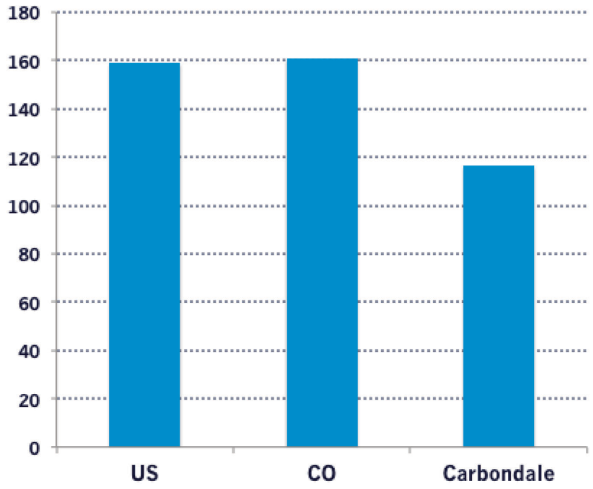


Homes Generate a Greater Share of Emissions than Businesses

3. Building Emissions by Sector, 2015 Metric Tons of CO_2



4. Residential Energy Use Per Household, 2014 mBtu



In looking solely at energy use in the buildings sector, apart from transportation energy, Chart 3 shows that residential energy use generates more emissions, around 57 percent for electricity and natural gas combined, compared to businesses and other large buildings in the community, such as schools and town government facilities.

In order for Carbondale to reach its emission reduction goals, it is imperative that households become more energy efficient. However, it's important to note that Carbondale households already use less energy than the average household in both the U.S. and Colorado, as shown in Chart 4.[1]

This is most likely because homes in Carbondale do not need air conditioning for summertime cooling. Air-conditioning uses a great deal of energy, and is used across most of the country and in the lower-elevation, more populated regions of Colorado. In order to maintain these savings, it will be important for Carbondale households to continue to use low-carbon technologies to keep their homes cool during the warm summer months.

[1] U.S. and Colorado Data sources for Chart 1 and Chart 4 are: U.S. Energy Information Administration: Carbon Emissions by State: *www.eia.gov/environment/emissions/state/analysis*, Colorado State Demographer's Office: Population and Household Estimates for Colorado Counties and Municipalities, 2014: *bit.ly/COCountyMuniHousing2014*

The Carbondale Community Spent $7.7 Million on Building Energy in 2015

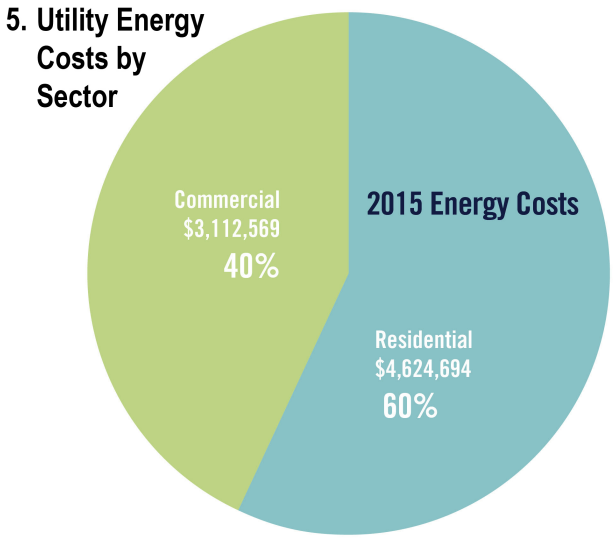


Chart 5 shows that Carbondale households, businesses and governments spent a total of $7,737,263 on electricity and natural gas utility costs in 2015. Reducing energy usage can also reduce utility energy costs. When the community saves on utility bills, those savings can be spent on other local purchases.

Between 2004 and 2015, Emissions from Building Energy Use Declined Approximately 36 percent

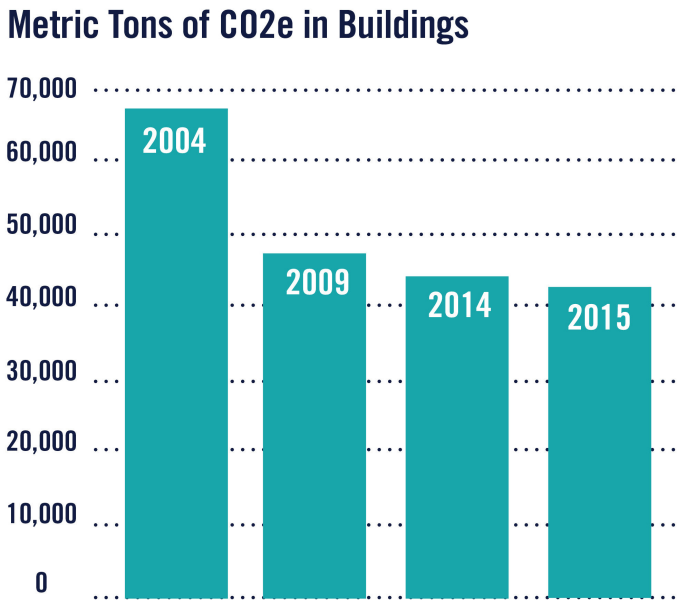


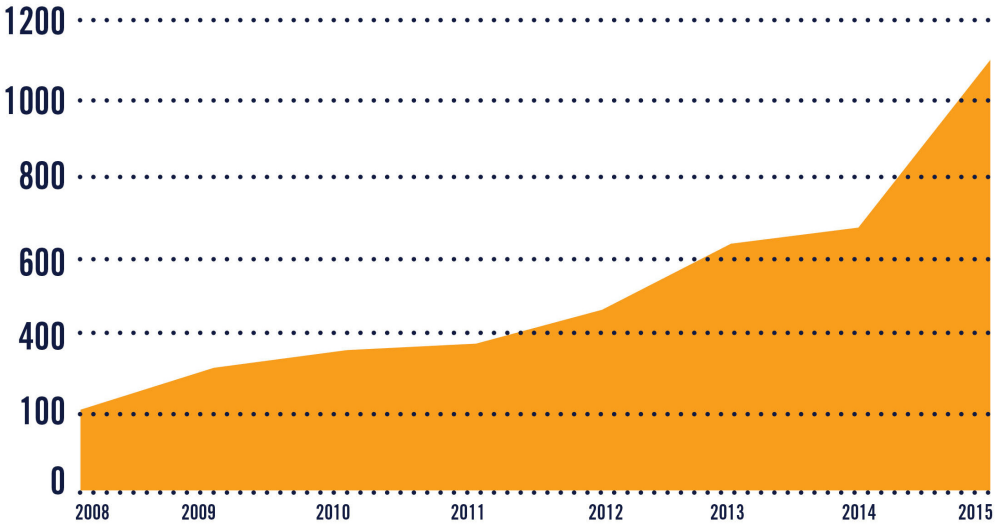
Chart 6 shows that overall buildings sector emissions fell from 67,600 $MTCO_2$ in 2004 to 42,600 $MTCO_2$ in 2015. The primary cause for the reduction in emissions in the time period from 2004 to 2009 is the impact of state renewable energy policies on the electric grid. In addition to the state policies, which are described below, local sustainability programs have continued and maintained the emissions reductions, even as the economy has grown and more homes and businesses are being built.

Carbondale Invested in Solar Energy

Chart 7 shows the growth of solar installations within the town limits of Carbondale since 2008, from 200 kilowatts of total capacity in 2008 to more than 1 megawatt of capacity by 2015.

This data includes large arrays powering government buildings and facilities, along with as many of the residential and commercial projects that could be reported within the legal limits of data access. These local installations contribute to the reduction in emissions from the built environment.

7. Solar Installations (kW)



Grid Electricity Has Gotten Cleaner

Since the 2004 inventory of emissions, statewide policy has helped spur cleaner, less-carbon intensive sources of electricity and utilities have added more renewable energy sources to their fuel mix.

In November 2004, Colorado voters passed the Renewable Energy Portfolio standard (RPS), requiring that investor-owned utilities, such as Xcel Energy, supply a minimum of 10 percent of their retail electric sales from renewable sources by 2020. This was the first RPS passed by a ballot initiative in the United States.

Since then, the Colorado Legislature increased the RPS three times, including applying the standard to rural electric cooperatives, such as Holy Cross Energy, and increasing the requirements for rural electric co-ops to 20 percent and investor-owned utilities to 30 percent. While utilities fought the initiative in 2004, they have since embraced renewables as an important power source in their energy portfolios.

Chart 8, next page, shows the carbon emissions in electricity supplied by Holy Cross Energy from 2005 through 2015. The overall emissions reduction of 22 percent was achieved through the purchase of more renewable energy from the grid, opening the door for community solar gardens, and providing incentives for customers to install distributed renewable energy systems and make energy efficiency improvements to buildings.

8. Holy Cross Emissions, CO_2 Intensity lb/MWh

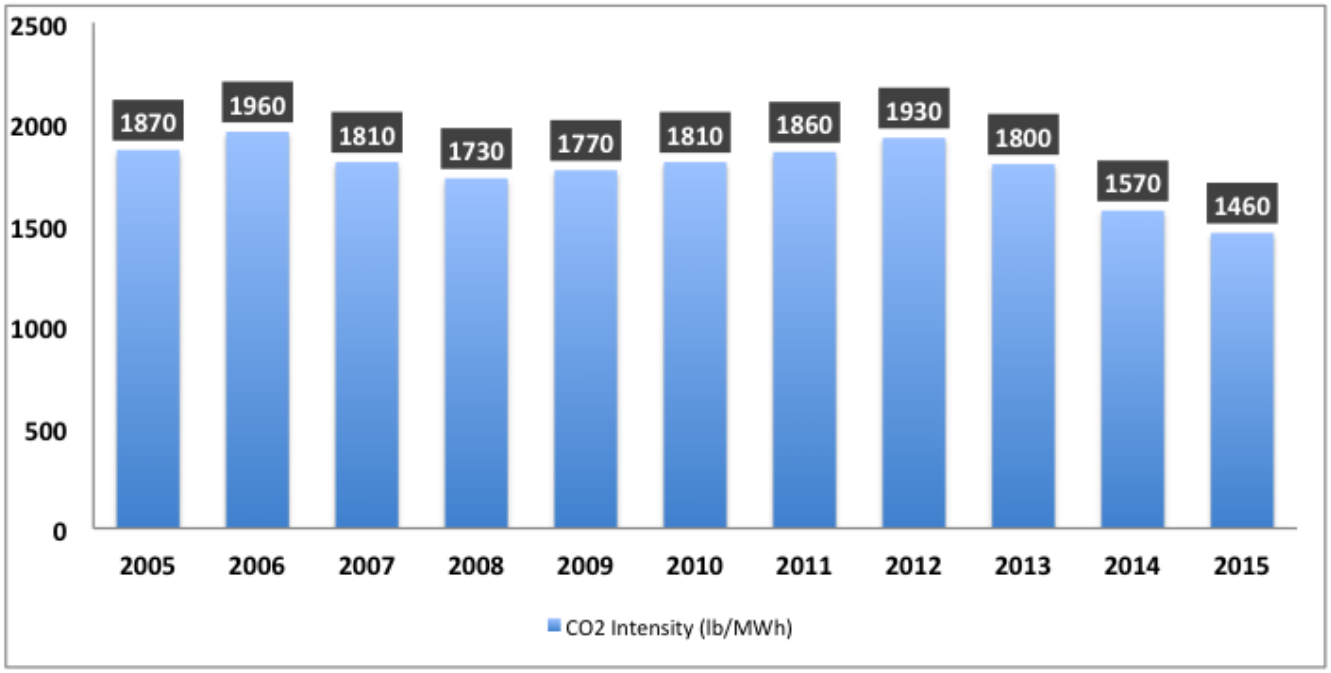
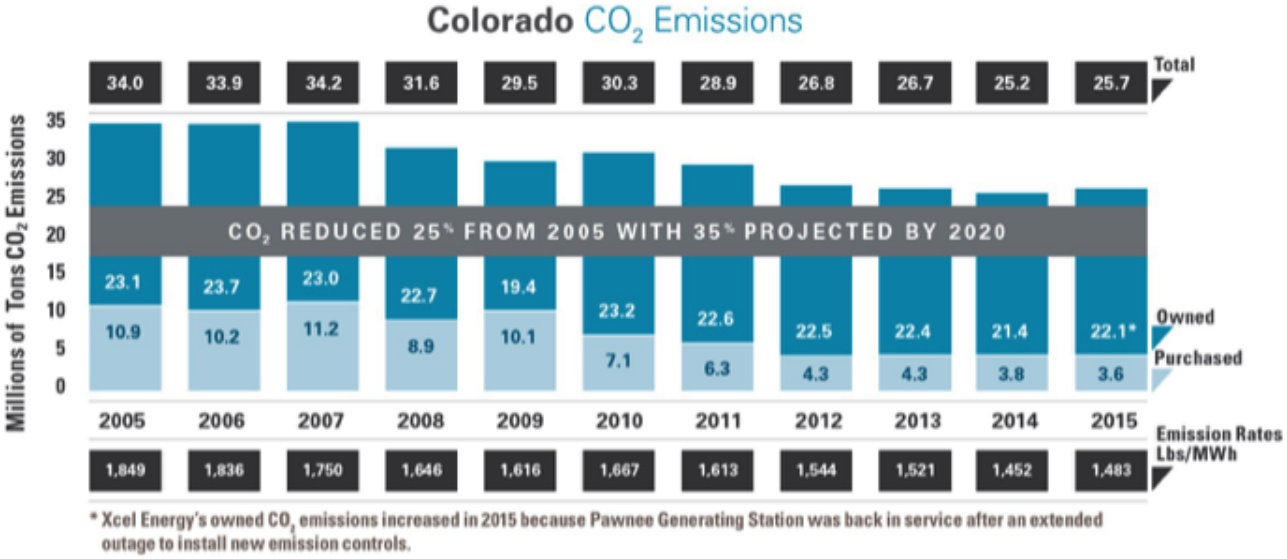


Chart 9 illustrates the 25 percent reduction in carbon emissions achieved since 2005[2] by Xcel Energy, using a similar package of incentives and opportunities.

9. Xcel Energy Emissions Colorado



[2] Xcel Energy Corporate Responsibility Report:
https://www.xcelenergy.com/company/corporate_responsibility_report/library_of_report_briefs/climate_change_and_greenhouse_gas_emissions

Transportation Sector Emissions Largely Come From Light-Duty Vehicles

Chart 1 (page 7) showed that 45 percent of overall emissions in Carbondale come from transportation.

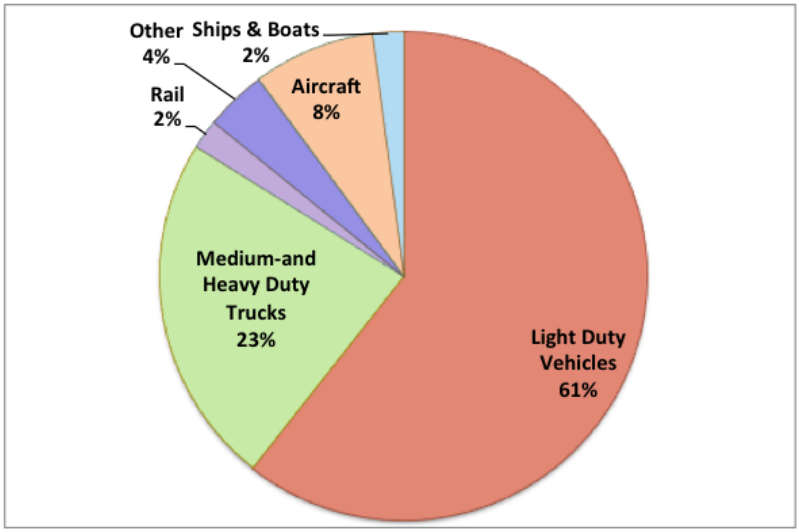
To calculate motor vehicle energy use, the research team determined that the best available method was to use Colorado Department of Transportation traffic statistics for Garfield County. Since Carbondale is 10 percent of the county's population, we attributed 10 percent of transportation fuel to Carbondale. CDOT data does not include county roads or city streets. Because of this missing information, this inventory's estimate is inherently conservative and very likely an underestimate of total transportation energy use.

While transportation data is difficult and expensive to gather for small localities, better data is available on the national level.

Chart 10 shows U.S. transportation sector emissions by source, in metric tons of CO_2e, for 2013.[3] Within the transportation sector, light-duty vehicles (including passenger cars and light-duty trucks) were the largest category, responsible for 60 percent of emissions. Medium- and heavy-duty trucks are the second largest category, with 23 percent of emissions.

Between 1990 and 2013, transportation sector emissions nationwide increased more in absolute terms than any other sector: electricity generation, industry, agriculture, residential, or commercial. Light-duty vehicles are the passenger vehicles that people use every day for work and recreation. As communities work on efficiency strategies, getting people out of their cars needs to be a priority.

10. U.S. Transportation Sector Emissions by Source Metric Tons of CO_{2e} for 2013

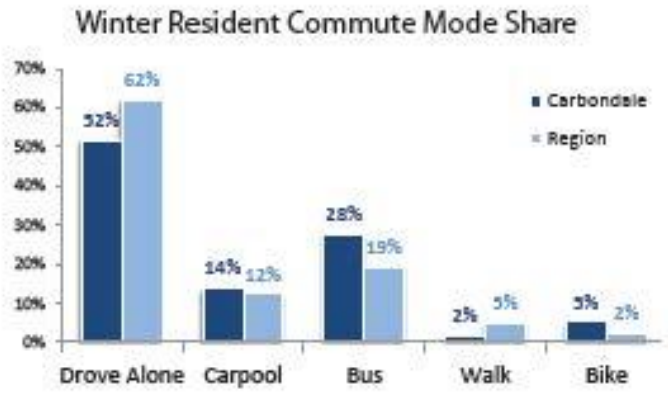


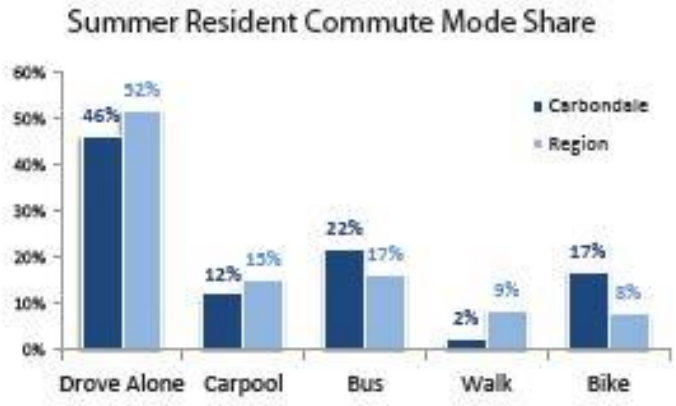
[3] Fast Facts U.S. Transportation Sector Greenhouse Gas Emissions 1990-2013, Office of Transportation and Air Quality (EPA-420-F-15-032) October 2015

Carbondale Residents Drive Less and Use Transit and Bicycles More

Carbondale residents use public transit, biking and walking at rates higher than the national average. According to the Roaring Fork Transportation Authority's *2014 Regional Travel Patterns Study*, slightly more than half of Carbondale residents, 52 percent, get around by driving alone in a car.

However, it's notable that a significant portion of the community relied on alternative transportation: 14 percent carpooled, 28 percent rode the bus, 2 percent walked and 5 percent biked. The summer commute mode share reflects an even greater reliance on walking, at 3 percent, and biking at 17 percent.





Source: Carbondale Profile, Roaring Fork Transportation Authority 2014 Regional Travel Patterns Study

Carbon Neutral Community

Carbon Neutral Community = The **net** greenhouse gas emissions associated with a community equals zero.

With this Climate Action Plan, Carbondale is setting a goal of becoming a Carbon Neutral Community.

Carbondale is not alone in this effort. Communities around the world have made similar commitments. For most communities, a carbon neutral commitment provides a vision and framework for long-term action. As these plans materialize, Carbondale will benefit from the examples and studies performed by other cities and communities.

Organizations such as the Carbon Neutral Cities Alliance (CNCA) promote best practices to help communities achieve aggressive carbon reduction goals. The CNCA has set an "80x50" target, shorthand for an 80 percent reduction in carbon emissions by 2050. A CNCA planning document notes:

> "No city has detailed strategies and plans for getting all the way to the 80x50 target yet, and there are large gaps in what cities know about exactly what will need to be done to reach the ambitious 2050 targets. There is wide recognition among the cities that doing so will require a fundamental, transformational redesign of core systems and the development of new technologies." [4]

Meeting the carbon neutral vision and measurable targets requires strategies in five key sectors:

- Energy Use in Buildings: All buildings have net-zero emissions
- Energy Supply and Renewable Energy: All energy is provided by renewable sources
- Transportation: The majority of trips are made by walking, biking, and public transit, and all vehicles use low-carbon fuels
- Waste Reduction and Reuse: Make re-use, recycling and composting of garbage, garden and food waste easier for residents, businesses and construction sites
- Local Food Production and Purchasing: An abundance of local foods, products, and services are available

To better indicate progress, we have developed clear, quantifiable baseline numbers and targets for 2030 and 2050 for three of these strategy areas: Energy Use in Buildings, Renewables and Energy Supply, and Transportation. As better baseline indicators become available, we will develop targets for the other two strategy areas.

The baseline figures and targets for 2030 and 2050 are shown in the tables on the next page.

[4] John Cleveland and Pete Plastrik, "Framework for Long-Term Deep Carbon Reduction Planning," 2014.

Baselines, Visions and Targets

Energy Use in Buildings strategy area
Vision: All buildings have net-zero emissions

Indicator	Baseline	2030 Target	2050 Target
Decrease community-wide emissions from building energy usage	47,957 metric tons CO_2e (2009)	50% decrease	100% decrease
Decrease emissions from town government facilities	2,081,876 lbs of CO_2 (2016)	75% decrease	100% decrease

Energy Supply and Renewable Energy strategy area
Vision: All energy is powered by renewable sources

Indicator	Baseline	2030 Target	2050 Target
Increase local renewable energy generation	1.2 megawatts (mW) of installed local capacity (2016), 0.08% of total community usage	3 mW of installed local capacity (150% increase), 20% of total community usage	7.5 mW of installed local capacity (480% increase), 50% of total community usage
Increase the supply of renewable energy to town-owned buildings	35% powered by renewable energy (2016)	75% powered by renewable energy	100% powered by renewable energy

Transportation strategy area
Vision: The majority of trips are made by walking, biking, and public transit, and all vehicles use low-carbon fuels

Indicator	Baseline	2030 Target	2050 Target
Increase the percent mode share of travel by walking, biking and/or public transit	48% of residents commute by foot, bicycle or transit (RFTA transportation study, 2014)	Increase to 60% of residents	Increase to 75% of residents
All vehicles use low-carbon fuels	Fewer than 1% of registered vehicles use low-carbon fuels	40% of registered vehicles use low-carbon fuels	100% of registered vehicles use low-carbon fuels

The Path to Carbon Neutrality

No single action can be deployed to reach carbon neutrality. The actions listed here work together to form a comprehensive plan. The *2017 Energy and Climate Action Plan* identifies more than 70 actions for the community. Actions take the shape of changing daily behaviors, such as walking or driving; of bigger decisions, such as energy efficiency retrofits in commercial and government buildings; and larger policy changes, such as implementing strong building codes that move the community away from use of fossil fuels.

All actions included in this plan were selected using a thorough evaluation process. Recommendations were well researched and collaboratively developed, relying on input from key stakeholders, including the Environmental Advisory Board, the Citizens Advisory Group and energy experts.

Some of the listed actions build on or accelerate existing programs, while others identify new opportunities to reach carbon neutrality. The majority of the listed actions are voluntary efforts accompanied by incentives, which has been a proven means of accomplishing goals. In instances when voluntary initiatives do not produce the desired results, mandates may be recommended.

It should be noted that this plan and these actions are intended to be a “living document.” These actions set an agenda for the next five to ten years, and will continue to evolve with input from stakeholders, development of new technology, and available resources.

Funding

The proposed actions will require funding, obtained by leveraging existing resources and by identifying and securing new funding sources. Unlocking new funding will be key to building and sustaining projects. This will require a mixture of approaches to internal and external funding sources, including grants.

The Town of Carbondale has recognized that funding climate action is a good investment, for these key reasons:

- The savings earned from lower energy bills and fuel cost savings tend to be reinvested back into the community.
- The costs of not acting on climate change would be much greater compared to taking action now.
- Projects that yield energy savings, such as bike lanes, expanded transit options and comfortable, energy-efficient buildings, are good for our town and community.

The Town of Carbondale has been investing in energy management and efficiency programs since the adoption of its original climate plan in 2006.

Tracking and Measurement

Regular tracking, evaluation, and monitoring is important to ensure successful implementation of the emissions reduction strategies. Measuring emissions levels is essential. Measurement provides the data to assess progress in reducing emissions and provides information on overall trends in emissions.

At a minimum, the Town of Carbondale will perform a comprehensive update of the community emission inventory every four years. A progress report on the emissions from energy use will be performed annually. The progress reports will report on emissions trends as well as factors that may have influenced emissions.

This tracking, evaluation and monitoring will allow for adjustments prior to the next Energy and Climate Action Plan, as well as to help structure E-board work plans and regional clean energy work.

These reports will be shared with the public. To further encourage public participation, creative strategies will be pursued to engage the public, such as a display or “thermometer” to show progress.

Energy Use in Buildings

> Goals: Continue to improve energy efficiency in existing government, commercial and residential buildings. Work for energy positive and high performance buildings.
> Vision for 2050: All buildings have net-zero emissions.

The energy used in buildings is the single biggest slice of Carbondale's emissions pie, accounting for 55 percent of overall emissions. Here's the good news: energy efficiency projects (using less energy for the same service) and everyday behavior changes (such as turning off lights when you leave a room) have already helped Carbondale cut emissions.

These energy projects and behavior changes in homes and businesses are key to meeting Carbondale's goals. In fact, increasing the energy efficiency of buildings is often the simplest and most cost-effective solution to reducing greenhouse gas emissions. Existing programs such as energy assessments and energy efficiency coaching must be expanded. In addition, new programs and new outreach tactics must be created to increase participation.

We need to upgrade existing buildings to meet current energy efficiency standards, but we also need new homes and buildings to embrace green building. Integrating new construction techniques and sustainable building materials can help to reduce the amount of energy a building will use.

Progress to date

- Availability of technical support and local financing for energy efficiency work, including cash-back rebates, a low-interest revolving loan fund, and a low-income program.
- Between 2010 and early 2017, more than 70 small businesses took advantage of these efficiency programs, saving businesses over $76,000 a year on utility bills.
- Energy consumption and energy expenses are tracked at major town facilities.
- From 2009 to 2016, the wastewater treatment plant reduced energy costs by 50 percent, saving the town $80,000 a year on utility bills. These savings were achieved through behavior changes, close monitoring of operations, and adjusting controls, proving that savings can be achieved without costly capital improvements.
- The Residential Efficient Building Program and the 2012 International Green Construction Code have been adopted.

Strategies

- Lead by example. Improve energy efficiency of town buildings.
- Boost energy efficiency in existing commercial and residential buildings.
- Encourage sustainable energy choices through education, market demand and community campaigns.
- Build it right from the start. All new buildings should be highly efficient.
- Increase the number of quality builders and contractors to ensure buildings are energy efficient, durable, and safe.

Strategy 1: Lead by example. Improve energy efficiency of town buildings

Effectively manage municipal energy use	
Tactics	*Background/Additional Details*
Adopt an energy and resource efficiency target for municipal operations	Commit to sustainability targets and regularly assess progress towards meeting municipal sustainability actions. Efforts could focus on motivating wise energy-use behaviors, as well as establishing procurement requirements for new equipment, appliances and office supplies.
Build all new municipal buildings to achieve net-zero energy use	Adopt policies to ensure that high standards of building efficiency are enforced for all new municipal government construction.
Continue to measure, monitor, and manage energy use	Continue to use the Building Energy Navigator to monitor energy performance, drive energy projects (both behavioral and operational), and verify energy savings. The data-driven approach has resulted in dramatic savings. Currently, energy use is monitored in 11 buildings: Recreation Center, Town Hall, Public Works, Third Street Center, John Fleet Pool, Wastewater Treatment Plant, Nettle Creek Water Plant, Crystal Well Water Plant, Roaring Fork Water Plant, Rodeo Riding Arena Building, and the Utilities Administration Building. See data online.
Increase energy efficiency and energy performance of municipal operations	
Tactics	*Background/Additional Details*
Maximize energy efficiency improvements, building on gains to date	Continue to dedicate funds to retrofit existing buildings so they perform as efficiently as possible.
Use energy audits to strategize improvement projects	To plan for upgrades, consult the engineering-level energy assessments that were performed at nine municipal facilities to identify opportunities for energy-saving projects.
Upgrade all lighting to LED	The decreased costs of LED bulbs means that they likely represent a fast return on investment. As compared with traditional bulbs, LED bulbs use significantly less energy and last a lot longer, which results in savings on utility bills and maintenance.
Develop a capital replacement plan for major equipment	This will help ensure that replacements are made with approved, energy efficient equipment. In addition, replacing equipment before it fails saves in costs.
Incorporate efficiency measures into the ditch water irrigation system	Efficiency measures can reduce the use of treated water for irrigation, and therefore the amount of water that is treated at the wastewater treatment plant.

Strategy 2: Boost energy efficiency in existing commercial and residential buildings

Continuously improve, expand and accelerate existing building energy programs	
Tactics	*Background/Additional Details*
Target the biggest users for energy monitoring to facilitate reductions in energy demand	Based on national patterns, grocery stores and marijuana growers may be among the biggest private sector energy users. Energy monitoring may offer a large savings opportunity for these large users.
Continue to promote new energy efficient technologies using existing rebate programs	Continue to introduce new technology that enables more participation in energy efficiency, such as "smart" or "wi-fi enabled" thermostats. Rebate programs, such as those available from the Energy Smart program at CORE and from utility providers, help incentivize these technologies.
Increase new participation in energy efficiency programs	Education, outreach and engagement campaigns will continue to be an important tool to spur greater participation in the existing energy efficiency programs. An example engagement campaign could include "neighborhood blitzes" to target neighborhoods and the development of case studies showcasing energy retrofit successes.
Increase energy assessment uptake to reach more homes and businesses	An energy assessment (or "energy audit") is the best way to learn how a home or building uses energy, helps occupants learn how to use less energy, and often provides a plan for cost-effective energy upgrades. Note: The Town of Carbondale has provided free assessments for up to 20 new homebuyers a year.
Promote existing financing options for energy efficiency projects	For homes, the Garfield Clean Energy Residential Revolving Loan Fund offers low-cost financing for energy efficiency projects. For businesses, Colorado Commercial PACE is available. These programs are designed to ensure that the upfront costs of energy efficiency projects are not a barrier to implementation. To better increase uptake in these programs, Carbondale could provide educational presentations to local business organizations, such as the Chamber.
Introduce new building energy programs	
Tactics	*Background/Additional Details*
Implement a sustainability training and certification program for businesses	A business training and certification program would share sustainability best practices and recognize businesses that exceed the energy standards. An example is Walking Mountain Science Center's Actively Green program for Eagle County.
Evaluate requiring energy code compliance with remodel permits	Many homes and businesses undergo remodel projects, offering an opportunity to bring older buildings up to current code standards. The 2015 IECC has added a section on how to address additions, renovations, remodels and repairs for residential and commercial buildings. This section specifies thresholds and limits for action on existing construction.
Connect Energy Coaching professionals with builders and owners for remodels	Develop a "matchmaking" service for homeowners and efficiency professionals. During the permit process for remodels, the building department should refer the builder or owner to a local Energy Coach for guidance on available rebates and best practices.

Designate carbon-neutral or net-zero districts and target areas of town, one neighborhood at a time	A neighborhood approach lays the foundation for future community-wide action. Select one area, ideally with mixed use and mixed housing stock, and engage those owners and renters in strategies (see strategies listed below) to create a net-zero district. In addition to building efficiency and adding renewables, this carbon neutral district would also be targeted for electric vehicle infrastructure and conversion. The Fort Collins Net Zero Energy District, FortZED, could serve as inspiration.
Energy performance disclosure at point of sale for homes	A Home Energy Score, or other energy performance rating, discloses energy efficiency information to buyers and brokers. A rating allows buyers to compare energy costs and performance between homes, understand existing energy efficiency features, and calculate the potential of energy improvements. Portland, Ore., requires Home Energy Scores at residential point of sale. See ordinance.
Address the tenant-landlord "split incentive" issue for efficiency upgrades on rental units	
Tactics	*Background/Additional Details*
Provide education on green leasing to help property owners and tenants work together to save money and energy	Green leases are rental agreements that allow tenants and landlord to work together to save money and energy. Tenants commit to energy conservation and other sustainable actions. The Institute for Market Transformation is a repository of information on green leases.
Evaluate a policy to require rental housing to meet minimum energy standards	A new policy could require a policy to upgrade rental units to meet energy efficiency or energy performance standards. An example is the SmartRegs program in Boulder.

Strategy 3: Encourage sustainable energy choices through education, market demand and community campaigns

Develop campaigns aimed at "doing your part" to support individual and community-wide engagement	
Tactics	*Background/Additional Details*
Collaborate with youth and schools to promote climate friendly energy choices	Incorporate energy conservation and energy efficiency education into school curriculum or school energy clubs to raise awareness of energy issues. Conservation lessons can extend to how students can practice these methods at home and in their community.
Encourage healthy competition and peer pressure to make saving energy a social norm and community value	For the residential sector, develop programs that create healthy competition between neighbors or neighborhoods. For the commercial sector, consider "Business of the Year" contests that showcase businesses making changes to save energy.
Educate energy users about time-of-use utility rates	Time-of-use rates can be optimized for utility bills savings. A time-of-use rate plan can help reduce utility bill costs: the utility offers lower rates for use when demand is low and higher rates when demand is high. This program is currently available through Holy Cross Energy and will become available through Xcel Energy.

Ensure all education campaigns and materials address entire community	Work to better ensure community awareness campaigns target the entire community, which includes renters, multi-family residences, non-English speakers and others.

Strategy 4: Build it right from the start: All new buildings should be highly efficient

Ensure all new construction achieves energy standards	
Tactics	*Background/Additional Details*
Continue to adopt the most recent building code standards for energy	Leverage building energy codes to ensure a minimum level of energy efficiency in new construction.
Develop opportunities to incentivize above-code buildings	In addition to financial incentives, rewards could include discounted or delayed permit fees, priority code processing and review, expedited plan approvals, priority field inspections, or discounted utility hook-up fees. An example is the Zero Energy Home grant offered by CORE.
Increase the number of new buildings that achieve green building or energy efficiency certifications	Encouraged certifications and rating systems include Energy Star certification, U.S. Green Building Council's Leadership in Environmental and Energy Design (LEED) certification, the Department of Energy's Zero Energy Ready certification, and others.
Recognize achievement in new construction	
Tactics	*Background/Additional Details*
Showcase exemplary performance in new projects	Publicize achievements in new construction to recognize owners and builders for their work and inspire others to take similar actions.

Strategy 5: Increase the number of quality builders and contractors to ensure buildings are energy efficient, durable and safe

Promote a qualified workforce and good green jobs	
Tactics	*Background/Additional Details*
Add a continuing education requirement for contractors and builders	Evaluate how to leverage existing mechanisms, such as the contractor licensing requirement, to add continuing education requirements. Recognize qualified contractors, architects and consultants through a listing service.
Establish a regional certification program	Recognize and support builders and contractors who provide a high level of energy performance services, based on attendance at workshops and webinars.
Evaluate options to incentivize advanced training and certifications	Support professional development for those in the construction and energy workforce through training, education, and certification support.

Provide necessary resources on green building and building energy science	
Tactics	*Background/Additional Details*
Develop a network to provide technical assistance	Facilitate informal sharing of information and best practices among practitioners.
Ensure access to educational resources	Bring educational information to the workforce. This may include educational posters at construction sites and mobile apps such as “Construction Instruction.”
Host and/or promote workshops and trainings	Conduct outreach to workforce on workshops and trainings. Educational topics may cover energy efficiency concepts, code requirements, financing opportunities such as PACE, and more.

Energy Supply and Renewable Energy

> Goals: Accelerate use of renewable energy sources, both on-site in Carbondale and by working with utilities for greater use of renewables.
> Vision for 2050: All energy is powered by renewable sources.

Reaching carbon neutrality in buildings calls for a two-pronged approach: reducing the amount of energy used (see Buildings and Energy sector for strategies) and making a transition to renewable energy.

Studies are clear: the most cost-effective way to meet future clean power needs is to reduce energy usage.[5] Efficiency paves the way for a more cost-effective and feasible transition to clean energy.

Electricity is responsible for 34 percent of Carbondale's overall emissions. The opportunities to expand renewable energy are many: rooftop solar photovoltaic (PV) systems, solar thermal (or “solar hot water”) systems, micro or pico-hydroelectric systems, and biomass power generation.

On-site renewable energy systems will get us part of the way towards generating fewer emissions, but the fuel mix provided by utilities has to become more clean as well. The electricity provided by Holy Cross Energy and Xcel Energy is still largely dominated by fossil fuels, including coal-fired power plants.

Progress to date

- As of June 2016, more than 1 megawatt of solar PV was in place on public buildings, including Town Hall, Sopris Park, Recreation Center, Third Street Center and Carbondale Senior Housing.
- The 385-kilowatt solar array at the Roaring Fork High School covers 100 percent of school’s electric usage.
- The Town of Carbondale purchased 45.5 kilowatts from the Clean Energy Collective community solar Sunnyside array to offset usage at the wastewater treatment plant.
- In 2017, the Town of Carbondale subscribed to 200 kilowatts from the MicroGrid community solar array, to be built in 2018, which will offset remaining usage at town meters within Xcel Energy service area.
- Between onsite solar arrays and ownership in community solar arrays, the town government offsets about 50 percent of its total electrical use with solar energy.
- Carbondale was awarded the Solar Friendly Community designation to recognize its achievements in removing regulations that serve as barriers to solar installations.

Strategies

- Lead by example: Expand the amount of renewable energy delivered to town government buildings
- Accelerate the installation of renewable energy systems on homes and businesses
- Pursue the concept of zero energy districts
- Advocate for comprehensive renewable energy policies at the regional and state level

[5] Energy Efficiency is the Cheapest Energy Resource *http://aceee.org/press/2014/03/new-report-finds-energy-efficiency-a*

Strategy 1: Lead by example: Expand the amount of renewable energy delivered to town government buildings

Supply a greater percentage of municipal building energy from renewable sources	
Tactics	*Background/Additional Details*
Continue to seek out renewable energy sources	Explore opportunities to expand renewable capacity on government buildings. This could include on-site renewable energy and utility-scale solar farms.
Continue to use financing mechanisms to fund more renewable energy systems	Continue to leverage power purchase agreements at remaining sites.
Pursue hydro-power, and additional micro-hydro and pico-hydro opportunities	Continue to explore opportunities for more generation, with emphasis on run-of-river hydropower, at Nettle Creek and other viable locations.

Strategy 2: Accelerate the installation of renewable energy systems on homes and businesses

Expand incentives and participation in programs	
Tactics	*Background/Additional Details*
Pilot a group-buy campaign for solar PV and/or for solar thermal	A group-buy program can reduce installation costs. Under these programs, a group of buyers can purchase at a negotiated wholesale price. Solar Energy International's Solarize North Fork Valley campaign resulted in 22 projects and more than 120 kW of solar installed in 2015. An increase in arrays may also build community momentum, since solar is contagious.
Expand solar programs for low-income households	Expand access for low-income households and affordable housing units to renewable energy. GRID Alternatives Colorado works to provide no-cost solar PV to these households. One GRID Alternatives system is already installed in Carbondale.
Encourage and develop incentives for battery backup	Batteries are improving every year. Battery technology can power a house or feed power to the grid when requested. Explore the Sonnen battery and other alternatives.
Continue to streamline the process for installation of rooftop solar systems	The ease and the affordability of the permit process can play an important role in ensuring that solar installations can keep pace with demand. Efforts could include sustaining Carbondale's Solar Friendly Community designation.
Identify and address barriers to solar thermal installation	Convene a roundtable with solar thermal installers to strategize how to overcome barriers, such as how to make systems smaller or more simple.
Education and promotion of available financing mechanisms	
Tactics	*Background/Additional Details*
Develop resources to connect households and businesses with information on renewable energy systems and financing	Include information on system types, financing, tax credits and incentives. This should include Property Assessed Clean Energy (PACE) as an available financing mechanism.

Strategy 3: Pursue the concept of zero energy districts

Use innovative energy projects to provide heat and power	
Tactics	*Background/Additional Details*
Pilot a micro-grid development project	Partner with utilities to identify and pilot a micro-grid project in Carbondale. The project should include efficiency, load control, on-site solar and storage, and possibly residential and commercial zones.
Consider the feasibility of district heating systems	District heating systems connect buildings in an area to a shared energy source, such as geothermal heating and cooling. Such systems are most cost-effective for new development, and a feasibility study could be required for new developments larger than a certain threshold.
Advance concept of zero-energy districts.	Explore options and implement the concept of a combined approach for reducing carbon among multiple buildings at once.

Strategy 4: Advocate for comprehensive policies at the regional and state level

Influence, partner and support policies to expand renewable energy	
Tactics	*Background/Additional Details*
Advocate for improved utility infrastructure and battery storage	Work with utilities to ensure that the grid can meet all of Carbondale's needs. Encourage battery storage of local power generation for improved supply of electricity to the local and regional grid.
Advocate for higher renewable energy standards and incentives	Support initiatives that seek to strengthen Colorado's Renewable Energy Portfolio Standard to increase grid-supplied renewable energy. Advocate for renewable energy and energy storage incentives at the state and federal levels.
Advocate for more community solar arrays	Support community solar array proposals within town limits and in the wider region. Community solar offers households and businesses a viable way to invest in renewable energy in lieu of on-site solar.
Support joint efforts on state climate and energy policy	Join with other organizations and communities to support overall utility and state policy that can support Carbondale's climate goals.

Transportation

> Goals: Continue to decarbonize transportation by encouraging more widespread use of walking, biking and transit. Continue to strengthen transportation options.
> Vision for 2050: The majority of trips are made by walking, biking or public transit, and all vehicles run on low-carbon fuels.

Already, walking and cycling are popular ways to get around. Largely, Carbondale residents agree that bicycling in Carbondale is safe and convenient, with easy access to bike paths (75% of survey respondents). [6] Accordingly, pedestrians and bicyclists are commonly seen around town. Strategies listed here address improvements in safety and convenience, as well as making these active transportation modes fun.

Progress to date

- EV infrastructure and charging stations are expanding. Since 2010, public charging stations have been installed at several locations, including Town Hall, Colorado Mountain College, Third Street Center, Roaring Fork High School and the RFTA Bus Rapid Transit (BRT) Station.
- Community programs continue to build and celebrate bike culture such as Ride Garfield County and Carbondale Bike Week.
- Highway 133 improvements were designed with bikes and pedestrians in mind. The project improved safety, particularly with the new west-side trail, which has fewer driveway crossings.
- The Rio Grande Railroad Corridor, which includes the Rio Grande Trail, makes it possible for Carbondale residents to bike and walk to Glenwood Springs and Basalt. Some Carbondale residents commute by bicycle to other towns in region.
- RFTA continues to diversify fuel sources for its transit bus fleet, including clean diesel, compressed natural gas (CNG) and assessment of battery electric buses.

Strategies

1. Lead by example: Invest in low-carbon vehicles, support RFTA, provide safe walking and biking routes
2. Accelerate in-town and regional efforts to encourage biking, walking, telecommuting, use of transit and carpooling (Regional Transportation Demand Management)
3. Continue to accelerate adoption of cleaner vehicles and lower-carbon options, including electric vehicles (EVs)
4. Continue progress on land-use/mobility linkages and community design strategies that support biking and walking and reduce need for driving.

[6] RFTA. *CARBONDALE Travel Patterns Community Profile*.

Strategy 1: Lead by Example: Invest in low-carbon vehicles, support RFTA, provide safe walking and biking routes

Demonstrate a commitment to low-carbon transportation options	
Tactics	*Background/Additional Details*
Fleet replacement decisions should consider low carbon vehicles	Weigh the cost benefits of shifting to electric vehicles or CNG vehicles when replacing or adding vehicles to the town fleet. The Colorado Department of Local Affairs may continue to offer grants to offset higher vehicle costs.
Support alternative transportation efforts for staff	Offer facilities such as bike lockers, personal lockers and showers for bicycle commuters. Allow telecommuting if it makes sense for the job.
Continue support and collaboration with RFTA	Currently, $0.01 of town sales tax is dedicated to RFTA. Carbondale has signed the RFTA IGA and a Carbondale Trustee sits on the RFTA governing board.
Continue to maintain streets and sidewalks to provide safe options for all modes of travel	Design and implement street and sidewalk upgrades that include safe bike lanes, wide sidewalks, bike parking, and allow adequate turning radii for buses.
Continue to explore and adopt related new technology	For example, paving projects could use asphalt and concrete that contains recycled material.

Strategy 2: Accelerate in-town and regional efforts to encourage biking, walking, telecommuting, use of transit and carpooling (Regional Transportation Demand Management)

Grow bike culture by organizing and hosting events, promotions, and campaigns	
Tactics	*Background/Additional Details*
Continue to promote and expand community bike events	Secure consistent funding for the annual Carbondale Bike Week. Promote the full moon bike rides and other community bike events. Continue partnering with Garfield Clean Energy on Ride Garfield County and its bike and transit promotional campaign.
Sustain biking year-round	Start a winter bike commuting campaign and create media coverage of winter bike commuters to encourage year-round biking.
Maintain Carbondale's "gold" status as a Bike Friendly Community	Work with the League of American Cyclists to maintain gold status, and explore requirements for upgrading to top-level platinum status at next renewal interval.
Make biking and walking the first choice for transportation	
Tactics	*Background/Additional Details*
Encourage pedestrian mobility and enhance the pedestrian experience	The Unified Development Code (Sec. 5.5 Transportation and Connectivity) speaks broadly to the pedestrian experience in terms of new developments and redevelopments.
Promote biking and walking as the preferred form of transport to major community events	For community events such as First Fridays, Mountain Fair, Five Point Film Festival and others, consider incentives for those who walk or bike. Provide adequate and safe bike parking lots.

Partner with schools and parents to promote biking and walking by students	Promote neighborhood “bike train” leaders to help kids all ride bikes to school safely. Discuss options for students to take their bikes to school on the bus so they can bike home or to after-school activities. Restart Bike to School week. This campaign was previously funded with CDOT Safe Routes grants. Identifying a new and sustainable funding avenue is key.
Continue to increase bike ownership and access to bikes	Support and partner with the Bonedale Bicycle Project to help the program serve more youngsters and adults who need bikes. Explore other community programs that help all kids get a bike, such as the Kids on Bikes program in Colorado Springs. Build a fleet of “public” bikes that can be used by people who commute into Carbondale for in-town travel. For example, the Third Street Center now has two bikes for general use.
Promote electric bikes, cargo bikes and other transportation-oriented bikes	Organize a “Multi-Use Bike Show” to bring cargo bikes, pedi-cabs, e-bikes and other bikes to Carbondale so people can try them out.
Continue to ensure best practices in bicycle / pedestrian infrastructure	
Tactics	*Background/Additional Details*
Continue to identify areas in town where bike and pedestrian infrastructure can be improved for safety and accessibility	Ensure that the design for the new City Market fully supports access by foot and bicycle, along with safe and convenient bicycle parking. Involve shoppers who walk and ride bikes to review the site plan to confirm that getting to and from the store by bike and on foot is convenient and pleasant. Draw good ideas from bike/ped plans being developed elsewhere, such as Aspen’s bike/ped master plan update.
Stay involved with related RFTA planning efforts	Work closely with RFTA on its bicycle-pedestrian planning and support implementation to create safe routes for walkers and cyclists to access transit.
Upgrade Carbondale’s rating and reputation as a Bike Friendly Community	Work with the League of American Cyclists to at least maintain gold status, and explore requirements for upgrading to top-level platinum status at next renewal interval.
Create a bike share program that can serve key first mile and last mile locations.	A bike share program can extend the reach of transit and walking trips. RFTA is helping WeCycle expand its public bike share system. Kiosks exist in Aspen, Basalt, El Jebel and Willits. WeCycle is interested in expansion into Carbondale.
Promote carpooling, transit, and telecommuting	
Tactics	*Background/Additional Details*
Actively participate in regional transportation demand management (TDM) programs	Transportation Demand Management (TDM) programs were part of the planning for RFTA’s BRT system. Advocate for strengthening these programs in Carbondale and the region.
Work with RFTA to improve in-town transit.	Hold a work session with CAP group and Carbondale Trustees to develop a proposal for an expanded Carbondale Circulator route to better serve RFTA Park and Ride and other locations in town. Aspen’s in-town bus routes illustrate efficacy and network scale. Include bike share discussion (details above) in this planning.
Explore options for a regional car-share program or service.	Work with Aspen to explore options for expanding its car-share program to Carbondale. (Car-share programs need economies of scale. Carbondale is too small to have its own program.) Offer multiple types of vehicles, including EVs. As another option, consider a town-owned EV that community residents can reserve.

Encourage workers to use carpooling and transit options.	Work with regional partners to strengthen employer outreach to employees to encourage carpooling and transit.
Encourage employers to provide telecommuting options for workers.	Work with the Chamber and large employers to promote telecommuting examples and best practices for local businesses.

Strategy 3: Continue to accelerate adoption of cleaner vehicles and lower carbon options, including electric vehicles (EVs)

Increase EV charging infrastructure	
Tactics	*Background/Additional Details*
Increase EV charging infrastructure	Incorporate EV charging infrastructure into new construction and major remodels. Work to install fast charging stations at multiple sites around town. Encourage local gasoline fueling stations to install DC fast charging systems. Continue to provide free public EV charging at Town Hall.
Encourage use of alternative fuels and EVs	
Tactics	*Background/Additional Details*
Increase awareness of climate advantages of alternative fuel and EV vehicles	Easy access to information about options for alt-fuel vehicles and operational comparisons will help consumers understand how a vehicle purchase can impact greenhouse gas emissions. Include state and federal tax credit incentives.
Continue to adopt and implement green fueling options for transit buses and circulators	Work with RFTA to pursue funding for transit vehicle options such as an electric in-town shuttle. Explore developing technologies by using demonstration vehicles.

Strategy 4: Continue progress on land-use/mobility linkages and community design strategies that support biking and walking and reduce the need for driving.

Pursue transit oriented development projects: mitigating additional growth of emissions with future developments	
Tactics	*Background/Additional Details*
Promote development of affordable housing near transit and bike paths.	Find partners and developers who are able to create affordable housing near transit stops and along bike paths. Locate potential sites and identify incentives, support or funding partnerships that could be used. Community housing requirements are included in the UDC (Sec. 5.11), including location preferences and prioritizations, although there are no specific guidelines or incentives for developing community housing near transit routes and stops.
Reference UDC guidelines for transit-oriented development	The UDC includes guidelines for transportation connectivity in all zone districts (Sec. 5.5) The Transit zone district is reserved specifically for the Rio Grande corridor. Confer with Planning Department to consider adding more inclusive transit oriented development guidelines to the UDC.

Identify and remove barriers to more efficient use of land in town	The Carbondale UDC now allows Accessory Dwelling Units (ADUs) in all Residential Zone Districts and Mixed Use Zone Districts. Some PUDs in Carbondale still prohibit ADUs by covenants, which are not regulated by the town government. Update restrictions that impede ADUs.

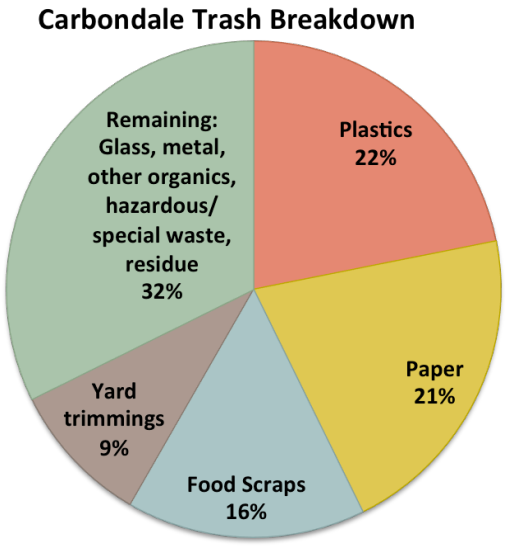
Waste Reduction and Reuse

> **Goals**: Make re-use, recycling and composting of garbage, garden and food waste easier for residents, businesses and construction sites.
> **Vision for 2050**: All waste is recycled or reused.

Carbon neutrality imagines a system in which there is no waste: all materials are continually repurposed so that no trash is sent to the landfill. Under this zero waste vision, debris from construction projects (wood and concrete) and discarded household goods (old electronics and furniture) are viewed as resources, as the goods and their valuable materials can be recovered, reused, recycled and repurposed. This cycle uses less water and energy compared to mining virgin materials and keeps organic items, which produce greenhouse gas emissions, out of landfills.

Carbondale's solid waste is largely comprised of materials that could be diverted from the landfill. According to a 2016 analysis of the community's waste stream, organic materials (yard trimmings, food scraps and paper) together comprise 46 percent of all waste sent to a landfill.[7] When organic waste is buried in a landfill, methane gas forms and is released over time. Methane is a powerful greenhouse gas, two to three times more potent and damaging than carbon dioxide.

When organic waste is instead separated and allowed to decompose in a compost pile, carbon dioxide is released, limiting the amount and potency of greenhouse gas emissions generated. Composted waste can also be converted into nutrient-rich soil for gardens.



Source: Roaring Fork Valley Comprehensive Waste Diversion Plan.

[7] Weaver Consultants Group. "Roaring Fork Valley Comprehensive Waste Diversion Plan." 2016.

Progress to date

- A single use plastic bag ordinance was approved by voters in 2012, levying a $0.10 fee on paper bags and eliminating plastic bags at grocery stores 3,500 square feet or larger (Ordinance No. 6, 2012)
- The Town supports annual community-wide recycling events and drop-off days, including Waste Diversion Day and Spring Clean Day.
- Mountain Fair, one of Carbondale's largest public festivals, promotes a zero-waste culture with reusable cups, compostable dishware, and waste sorting stations staffed by volunteers.
- Education campaigns target proper waste disposal, including the production and distribution of the "Roaring Fork Valley Recycling Guide."

Strategies

1. Lead by example: Practice reducing, reusing, recycling and composting in town departments
2. Decrease the amount of recyclable and compostable materials entering the landfill
3. Reduce waste by expanding reuse and repair initiatives
4. Make it simple for everyone to participate in waste programs and waste goals

Strategy 1: Lead by example: Practice reducing, reusing, recycling and composting in town departments

Reduce waste and increase waste diversion in town government operations and at facilities	
Tactics	*Background/Additional Details*
Increase recycling and composting	Expand recycling and composting, including electronic waste recycling.
Enact an environmentally responsible purchasing policy	Include purchase requirements for recycled paper and Energy Star-certified equipment.
Require events held at town facilities to be zero waste	Town of Carbondale currently recommends that events on Town property adopt zero waste practices. Zero waste could become a requirement rather than a recommendation.

Strategy 2: Decrease the amount of recyclable, compostable, and reusable materials entering the landfill

Make recycling easy and convenient	
Tactics	*Background/Additional Details*
Evaluate a single-stream recycling policy	Instead of sorting recyclables into separate bins, all approved materials are combined into one bin. The recyclable materials are then sorted at the collection facility. The ease of this approach has been shown to increase recycling rates. Some, but not all, of curbside recycling in Carbondale is single-stream. Boulder, Aspen, and many other communities have single stream policies in place.
Evaluate a universal recycling ordinance	Require waste haulers to offer recycling as part of the basic trash service package. Aspen's ordinance requires that the cost of recycling is included in trash bills.

Evaluate a volume-based disposal program	Sometimes called Pay as You Throw, this program treats garbage pick-up like a utility, like water or energy, charging customers a fee based on the amount of garbage generated. In Lakewood, this program increased the volume of recycling by more than 50 percent.[8] More than 7,000 communities nationwide use this system.[9] Fort Collins passed a PAYT ordinance in 1995. Since then, almost 95 percent of residents recycle, and more than half of the community's waste is recycled or composted.
Evaluate an equal space ordinance for trash and recycling storage and collection	Use building codes to ensure that buildings have trash enclosures with adequate space for collection and storage of recycling and organic materials. Communities across Colorado have adopted these policies, including Boulder, Broomfield, Superior, Fort Collins and Lafayette.
Evaluate voluntary waste audits for commercial buildings	A waste audit is a systematic analysis of a building's waste operations and waste stream. The results can help inform waste reduction activities.
Align waste policies and codes	For consistency, ease of use and effectiveness, strive to align town, county and regional solid waste policies and codes wherever possible.
Ensure everyone has the opportunity to compost at home, at work, and everywhere else they go	
Tactics	*Background/Additional Details*
Expand public composting bins and infrastructure	Identify and address gaps in public waste infrastructure. Position compost bins alongside trash and recycling bins for easy participation.

Strategy 3: Reduce waste by expanding reuse and repair initiatives

Increase the salvage and reuse of construction and demolition (C&D) waste	
Tactics	*Background/Additional Details*
Continue to require recycling of C&D waste	Include requirements for recycling construction and demolition waste in future adoptions of the town's building code.
Develop an education campaign at worksites	Develop resources to support material recycling at building sites, such as posters that advertise valuable reuse items.
Facilitate the reuse of construction materials through exchange networks	Develop an online network to promote the availability of recycled construction materials, as well as a public, local "reuse yard" for contractors and the community, and through the regional Habitat for Humanity ReStore.
Expand reuse initiatives	
Tactics	*Background/Additional Details*
Expand the hard-to-recycle market	USAgain (based in Denver) has a partnership with the Pitkin County Landfill to address used textiles. Boulder's CHaRM facility accepts a wide variety of hard-to-recycle items.

[8] City of Lakewood Sustainability Plan 2015
[9] Community Zero Waste Roadmap

Promote thrift stores, reuse programs, fix-it clinics and community share programs	Ensure access to facilities which can recycle, reuse, or repair a wide range of materials. Portland, Oregon spearheaded a "Be Resourceful Campaign" and website to promote reuse, repair and sharing. A example program is a "tool library" to facilitate sharing of equipment among community members.
Increase diversion of "seconds" and "ugly produce" to community	Develop program to collect blemished food, soon-to-expire items, and overstocked food from large grocers and redistribute to local restaurants, shelters, school, food pantries, etc. Boulder Food Rescue delivers food to community sites.
Make produced compost accessible to residents	Ensure that community members, gardeners and landscapers have access to compost produced from waste diversion programs.
Shift the marketplace toward more sustainable products and away from disposal packaging	
Tactics	*Background/Additional Details*
Encourage businesses to reduce use of single use shopping bags	Establish incentives to encourage the use of durable rather than disposable bags. Highlight businesses that have voluntarily removed bags from their store.
Encourage the use of reusable water bottles and mugs	Market Carbondale's quality mountain-fed tap water, provide information on where to refill water bottles, and encourage shops and restaurants to sponsor water bottle filling stations.
Encourage the use of sustainable food service packaging	Discourage the use of Styrofoam boxes and address food service packaging policies.

Strategy 4: Make it simple for everyone to participate in waste programs and waste goals

Ensure easy access to information about how to reduce waste and adopt sustainable disposal habits	
Tactics	*Background/Additional Details*
Develop outreach materials and education campaigns to promote waste resources	Include information on waste haulers, recycling policies, and waste collection facilities. The "Roaring Fork Valley Recycling Guide," developed by Waste Free Roaring Fork and the Carbondale E-Board, is a good example. Offer materials in Spanish and English.
Educate the community on sustainable disposal habits	Distribute information using the town website and other channels to educate residents, businesses, and waste haulers. Continue to distribute and update the "Roaring Fork Valley Recycling Guide," which identifies recycling and waste policies. Use community art projects to inspire, engage, and educate, such as San Francisco's "The Art of Recology"
Ensure all waste signage is consistent and simple	Education materials and signage should use consistent colors, designs, and terminology. San Francisco has a signmaker program to encourage effective and consistent signs.
Build participation in programs through education, inspiration and convenience	
Tactics	*Background/Additional Details*
Collaborate with schools	Teaching children proper waste habits from a young age will help extend the practices past the school and into the community. Ensure that all campuses have composting and recycling facilities, and incorporate practices into the curriculum. Schools across the U.S. introduce waste-related concepts into curriculum using programs such as TerraCycle.

Promote community and neighborhood waste collection events for hard-to-recycle items	Continue to promote Waste Diversion Day, Household Hazardous Waste Day and other community collection events to support the proper disposal of hard-to-recycle items such as electronics, tires, batteries, yard waste, and metals. Host events on a consistent and seasonally appropriate schedule. Work with neighborhoods to host collection events.
Encourage events to be zero waste	Work with event producers to encourage events to be zero waste. Showcase successful zero-waste events.
Ensure all education campaigns and materials address entire community	Make sure community awareness campaigns target the entire community, which includes renters, multi-family residences, non-English speakers, and other sectors.
Develop reporting and tracking standards to measure success over time	
Tactics	*Background/Additional Details*
Develop measurement standards to assess program effectiveness	Data collection could focus on how many tons are entering the landfill, calculating the waste diversion rates, and other metrics. Boulder County has adopted an ordinance on waste hauler reporting.

Local Food Production and Purchasing

> **Goals**: Increase local food availability by supporting local growers and businesses that sell locally-grown produce, dairy, eggs and meat.
> **Vision for 2050**: An abundance of locally raised foods and products are available.

Buying local is not a new idea in Carbondale -- it's part of the culture. Residents are eager to buy and grow sustainable, local food and Carbondale boasts a high concentration of local businesses, artists, and artisans. What you eat, and what you buy, matters.

Local and Sustainably Produced Food

The food system -- production, transportation, and consumption – is critical to sustainability movements. These movements have commonly targeted the fossil fuels used to transport food from far-flung places and to keep food cold during transport. Most carbon emissions occur when and where the food is grown. In particular, dairy and meat produce greater emissions per calorie of food compared to non-animal products. This is due to the water and grains necessary for raising livestock, and methane emissions generated by cattle. Some sources say a widespread adoption of a vegetarian diet could cut emissions dramatically.[10]

Local Businesses, Artists, and Artisans

Choosing local goods and services and hiring local talent stimulates a sustainable and prosperous local economy. Smaller-scale local producers often have more control over supply chains and business practices. They can implement green practices, such as cutting the carbon emissions associated with manufacturing and transportation of goods, or using sustainable waste practices. Supporting local craft breweries, artisan workshops and artist collectives encourages economic vitality, and has the potential to reduce emissions.

Progress to date

- Dandelion Day promotes sustainability and features local food and local companies.
- The Roaring Fork Food Alliance, formed in 2012, fosters collaboration and planning across diverse sectors of the local food system.
- Dandelion Market, the community food co-op, continues to offer local produce.
- In 2016, the State of Colorado officially recognized Carbondale as a "Creative District" due to the more than 200 creative organizations, businesses, artists and artisans residing and working here.
- Carbondale supports a heritage orchard at Thompson House, and planted fruit trees and bushes at the nature park by the Roaring Fork Water Treatment Plant.

Strategies

1. Lead by example: Purchase local foods, and local products
2. Increase production, availability and consumption of locally grown food
3. Increase production, availability and consumption of local products and services

[10] World Resources Institute. "Shifting Diets for a Sustainable Food Future." (2016)

Strategy 1: Lead by example: Purchase and promote local foods and local products

Support initiatives that expand local food	
Tactics	*Background/Additional Details*
Enact a purchasing policy for local food	Such a policy could require a minimum percentage of food served at town events is locally sourced.
Use town-owned land for community gardens	Identify and develop town-owned land for community gardens. For instance, Town Hall's irrigated land could be used to grow vegetables.
Adopt the Integrated Weed Management Plan for town lands and promote recommendations to the community	Have town staff consult with local farmers and beekeepers to understand the impact of chemical herbicides and pesticides. Work with the Parks and Recreation Dept. to manage weeds in town parks with minimal chemical use. Look at Durango's Organically Managed Land Program for example guidelines.

Strategy 2: Increase production, availability and consumption of locally grown food.

Make it simple for residents to buy local food through expanding access	
Tactics	*Background/Additional Details*
Increase the reach of the Carbondale Farmers Market	Evaluate opportunities to increase access to farmers markets on more than one day per week, such as adding a Farmers Market on Sundays during "Music in the Park" events.
Increase participation of local farmers at the Carbondale Farmers Market	Strategies to encourage the participation of local farmers could include a rotating local spot sponsored by the Town of Carbondale.
Promote community supported agriculture (CSA) shares offered by local farmers	Under a CSA, consumers receive a share of seasonal produce throughout the farming season. Local and regional farmers offer this service, which brings local food to the doorsteps of participating households.
Ensure low-income residents have access to local foods	The relatively high cost of local food may be a barrier to purchasing. Explore opportunities to address the high cost, such as making the Double Up program (which matches the value of SNAP, or the Supplemental Nutrition Assistance Program) available at farmers markets and other local food distribution locations.
Create a local food hub	A local food hub works to bring local farm products to market. Hubs may provide a distribution center and market, and address community engagement through workshops, cooking classes, farmer apprenticeships, and other innovative approaches. Any development of a food hub should be inclusive, with participation by Latino-owned markets and food trucks. Examples include the Local Food Hub in Charlottesville, Virginia and The Source in Denver.
Increase food availability by supporting local growing efforts	
Tactics	*Background/Additional Details*
Expand community gardens	Evaluate a policy that requires new developments, especially high density, to include community gardens in their green space requirements.

Establish a yard swap program for gardening	This voluntary program allows homeowners to publicize that their yard is available for local gardener or farmer who would like to convert it for food production. For example, CMC partners with Mountain Family Health to care for gardens onsite.
Support the planting of fruit trees and fruit-bearing perennials	Encourage the development of agro-forestry systems and edible landscaping by planting fruit trees, bushes and other perennials. This effort could leverage both town property and private property.
Assess local farming policies	A comprehensive assessment would reveal how local policies support or hinder agricultural production. In particular, it could examine the impact of land use regulations and protections on local agriculture.
Preserve the health of town ditch water	Implement the Source Water Protection Plan to preserve the cleanliness of ditch water in Carbondale.
Promote the benefits of local food and opportunities for residents to get engaged	
Tactics	*Background/Additional Details*
Create an online directory and map of regional food resources	Connect the community to local farmers, as well as to opportunities to learn about food production, storage, and processing. For example: Local Food Colorado Springs App.
Promote Carbondale's reputation as a hub for community agriculture	Create marketing materials to highlight agro-tourism in and around Carbondale, including farm-to-table dining, catering, retailing and food cart vending.
Celebrate and promote the local food movement	Continue support for Dandelion Day, and expand support for similar community events. Provide a forum for local food conversations, such as a speaker series or films.
Increase agricultural science and gardening education in local schools	Encourage schools to develop gardens and programs to engage students in growing food. Develop curriculum about the importance of local food, and encourage schools to serve local food in the cafeteria.
Get young people interested in an agricultural career path	This could include vocational classes on horticulture and food growing and processing.

Strategy 3: Increase production, availability and consumption of local products and services

Identify existing local products and services, and identify gaps in key products and services that are currently not available.	
Tactics	*Background/Additional Details*
Promote locally available products and services	Partner with the Creative District and the Carbondale Chamber to remind residents about the importance of shopping locally and the availability of local products.
Identify and fill gaps in current key products and services	Appoint a work group to identify gaps in key products and services that could be provided locally. Approach existing businesses and local entrepreneurs to fill the gaps, or identify outside businesses to recruit. Partner with CMC's business and sustainability programs to foster entrepreneurship in these identified areas.

Index to Appendices A, B, C and D

Appendix A: Inventory Data and Tools

1. Data Summary

    Carbondale Data for Per Capita and Per Household Information
    Emissions Per Capita in U.S., Colorado and Carbondale
    Residential Energy Use Per Household in U.S., Colorado and Carbondale
    Residential Energy Costs Per Household in U.S., Colorado and Carbondale
    Residential Electricity Use Per Household in U.S., Colorado and Carbondale
    Residential Electricity Costs Per Household in U.S., Colorado and Carbondale

2. Town of Carbondale data from Garfield County Countywide Energy & Emissions Inventory

    2009 data
    2014 data
    2015 data

3. Garfield County data from Tri-County Energy and Emissions Inventory:
    Ground Transportation Fuel 2014

Carbondale Data for Per Capita and Per Household information

Carbondale Total Emissions	79,678	MT CO2e
Carbondale # residents	6,574	
Carbondale # of households	2,468	
Carbondale # of electric meters	2,392	

*Colorado State Demographer's Office: Population and Household Estimates for Colroado Counties and Municipalities, 2014

Carbondale Residential Energy Use	287,255	mBtu
Carbondale Residential Costs	$4,744,310	
Carbondale Residential Electricity	19,264,241	kWh
Carbondale Residential Electricity Costs	$2,233,856	

Emissions Per Capita in US, CO and Carbondale (buildings, transportation - excl. landfill)

US	16.7
CO	17.2
Carbondale	12.12

*U.S. Energy Information Administration: Carbon emissions by state:www.eia.gov/environment/emissions/state/analysis

Residential Energy Use per Household US, CO, Carbondale (mBtu)

US	159
CO	161
Carbondale	116

*U.S. Energy Information Administration: U.S. & Colorado energy comparisons

Residential Energy Costs per Houshold

US	$1,879
CO	$1,611
Carbondale	$1,922.33

Residential Electricity Use per Household

US	11
CO	8
Carbondale	8

Residential Electricy Cost per Household

US	$1,344
CO	$944
Carbondale	$905.13

Town of Carbondale

County-wide Energy & Emissions Inventory, 2009

Summary

	Physical Units		Energy Units		Cost		CO2e Equivalent		Percent of Total
	kWh, therms, gallons		million Btu	Percent	$	Percent			Percent
Utility Energy: Electricity									
Residential									
Electricity (Xcel Energy)	17,738,137	kWh	60,523	5.2%	$ 1,951,195	10.3%	13,077	tons CO2e	13.0%
Electricity (Holy Cross Energy)	3,105,987	kWh	10,598		$ 286,508		2,450	tons CO2e	
Commercial									
Electricity (Holy Cross Energy)	3,217,038	kWh	10,977	0.9%	$ 242,914	1.3%	2,538	tons CO2e	2.5%
Electricity (Xcel Energy)	16,589,368	KWh	56,603		$ 1,170,590		12,230	tons CO2e	
Electricity (methane)	438	tons CH4	1	0.0%		0.0%			0.0%
Total Electricity	**24,061,162**	**kWh**	**138,701**	**11.9%**	**$ 3,651,207**	**19.4%**	**30,295**	**tons CO2e**	**30.2%**
Utility Energy Natural Gas									
Residential - Source Gas	2,244,781	therms	224,478	19.2%	$ 2,222,333	11.8%	11,937	tons CO2e	11.9%
Commercial - Source Gas	1,076,633	therms	107,663		$ 1,065,866		5,725	tons CO2e	
Natural Gas (methane)	678	tons CH4	32,418	2.8%		0.0%			0.0%
Total Natural Gas	**3,322,092**	**therms**	**364,559**	**31.2%**	**$ 3,288,199**	**17.4%**	**17,662**	**tons CO2e**	**17.6%**
Total Utility Energy	**various**	**units**	**503,260**	**43.1%**	**$ 6,939,406**	**36.8%**	**47,957**	**tons CO2e**	**47.7%**
Motor Vehicle Energy (estimated from CDOT VMT data)									
Total Motor Vehicle Energy	**5,154,291**	**gallons**	**663,949**	**56.9%**	**$ 11,921,864**	**63.2%**	**52,499**	**tons CO2**	**52.3%**
Total	**various**	**units**	**1,167,209**	**100%**	**$ 18,861,270**	**100%**	**100,456**	**tons CO2e**	**100.0%**

*All data from 2009 was collected during the Garfield Clean Energy inventory process

**Transportation Data compiled by Rick Heede in separate spreadsheet.

Town of Carbondale

Summary

County-wide Energy & Emissions Inventory, 2014

	Physical Units		Energy Units		Cost		CO2e Equivalent		Percent of Total
	kWh, therms, gallons		million Btu	Percent	$	Percent			Percent
Utility Energy: Electricity									
Residential									
Electricity (Xcel Energy)	16,438,570	kWh	56,088	6.1%	$ 1,919,144	10.5%	11,373	tons CO2	14.3%
Electricity (Holy Cross Energy)	2,825,671	kWh	9,641		$ 314,712		2,029		
Commercial									
Electricity (Holy Cross Energy)	3,349,716	kWh	11,429	1.3%	$ 310,322	1.7%	2,406	tons CO2	3.0%
Electricity (Xcel Energy)	15,438,570	KWh	52,676		$ 1,758,080		10,681		
Electricity (methane)	438	tons CH4	1	0.0%		0.0%			0.0%
Total Electricity	**22,613,957**	**kWh**	**129,837**	**14.2%**	**$ 4,302,258**	**23.6%**	**26,489**	**tons CO2e**	**33.2%**
Utility Energy Natural Gas									
Residential - Source Gas	2,215,245	therms	221,525	24.3%	$ 2,510,454	13.8%	11,780	tons CO2e	14.8%
Commercial - Source Gas	1,116,221	therms	111,622		$ 1,127,654		5,936	tons CO2e	
Natural Gas (methane)			-	0.0%		0.0%			0.0%
Total Natural Gas	**3,331,466**	**therms**	**333,147**	**36.5%**	**$ 3,638,108**	**20.0%**	**17,716**	**tons CO2e**	**22.2%**
Total Utility Energy	**various**	**units**	**462,984**	**50.8%**	**$ 7,940,366**	**43.6%**	**44,204**	**tons CO2e**	**55.5%**
Motor Vehicle Energy (estimated from CDOT VMT data)									
Total Motor Vehicle Energy	**3,496,599**	**gallons**	**449,044**	**49.2%**	**$ 10,280,990**	**56.4%**	**35,474**	**tons CO2**	**44.5%**
Total	**various**	**units**	**912,028**	**100%**	**$ 18,221,356**	**100%**	**79,678**	**tons CO2e**	**100.0%**

Town of Carbondale

Summary

County-wide Energy & Emissions Inventory, 2015

	Physical Units		Energy Units		Cost		CO2e Equivalent		Percent of Total
	kWh, therms, gallons		million Btu	Percent	$	Percent			Percent
Utility Energy: Electricity									
Residential									
Electricity (Xcel Energy)	16,001,889	kWh	54,598	6.0%	$ 1,816,318	10.1%	10,817	tons CO2	13.8%
Electricity (Holy Cross Energy)	2,662,304	kWh	9,084		$ 297,922		1,774		
Commercial									
Electricity (Holy Cross Energy)	3,496,277	kWh	11,929	1.3%	$ 320,803	1.8%	2,330.00	tons CO2	3.0%
Electricity (Xcel Energy)	14,865,756	KWh	50,722		$ 1,664,112		10,049		
		tons CH4	-	0.0%		0.0%			0.0%
Total Electricity	**22,160,470**	**kWh**	**126,333**	**13.9%**	**$ 4,099,155**	**22.8%**	**24,970**	**tons CO2e**	**31.9%**
Utility Energy Natural Gas									
Residential - Source Gas	2,215,245	therms	221,525	24.4%	$ 2,510,454	13.9%	11,780	tons CO2e	15.1%
Commercial - Source Gas	1,116,221	therms	111,622		$ 1,127,654		5,936	tons CO2e	
			-	0.0%		0.0%			0.0%
Total Natural Gas	**3,331,466**	**therms**	**333,147**	**36.7%**	**$ 3,638,108**	**20.2%**	**17,716**	**tons CO2e**	**22.7%**
Total Utility Energy	**various**	**units**	**459,480**	**50.6%**	**$ 7,737,263**	**42.9%**	**42,686**	**tons CO2e**	**54.6%**
Motor Vehicle Energy (estimated from CDOT VMT data)									
Total Motor Vehicle Energy	**3,496,599**	**gallons**	**449,044**	**49.4%**	**$ 10,280,990**	**57.1%**	**35,474**	**tons CO2**	**45.4%**
Total	**various**	**units**	**908,525**	**100%**	**$ 18,018,254**	**100%**	**78,159**	**tons CO2e**	**100.0%**

*Source Gas data for 2014 was used for 2015 due to Source Gas not providing the data after 12 months of requests being made

Tri-County Energy & Emissions Inventory: Ground Transportation Fuel 2014: Garfield County

CMS fuel & emissions model based on CDOT VMT data

7-Jan-16
Andi Staley
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970-683-6278

Richard Heede
Climate Mitigation Services
Snowmass, Colorado
File started 28-Jan-16
File last modified 29-Jan-16

Limitations: CDOT VMT data excludes vehicle travel on I-70 and numbered Colorado roads thus excluding VMT on local roads, in towns and cities.
CDOT has no data on VMT on local roads.
While this makes it simple to update, how much fuel and we not accounting for?
Truck allocation, fuel & emissions based on "Aspen VMT Study"
"Vehicle-miles traveled does not capture fuel use during gridlock

CDOT VMT statistics
www.dot.state.co.us/App_DTD_DataAccess/Statistics/dsp_folder/Roadway/2008/2008DVMTbyCounty.htm
CDOT (2010) "I-70 West Parachute Exchange Environmenal Review," www.parachutewestinterchange.net/EA.html

	Annual VMT (Cars)	% AnnVMT
Pitkin	141,451,235	9.8%
Garfield	546,542,902	37.8%
Eagle	756,138,608	52.4%
Total PGE	1,444,132,744	100.0%

	Annual VMT (Trucks)	% AnnVMT
Pitkin	4,933,840	4.3%
Garfield	50,195,292	43.5%
Eagle	60,161,832	52.2%
Total PGE	115,290,963	100.0%

Table 1 — Personal & light vehicle fuel & emissions

CDOT data

	Pitkin County vehicle type survey	Percent of light vehicles	Vehicle miles traveled	Fuel economy	Fuel consumed	Energy content	Fuel cost	Emission factor	Carbon dioxide	Carbon
			VMT (miles)	mpg	gallons/yr	million Btu	$/yr	CO2/gallon	tons CO2/yr	tonnes C/yr
		Annual VMT	546,542,902			125,000	$ 2.920	gasoline EF		
						Btu/gallon (gasoline)	$/gallon (gasoline)			
Cars (sedans, small SUV, crossover) (gasoline)	38.1%	40.5%	221,589,833	24.4	9,085,888	1,135,736	$ 26,530,792	19.59	89,014	22,033
Cars (sedans, small SUV, crossover) (diesel)	0.4%	0.4%	2,042,773	25.0	81,791	11,344	$ 245,470	22.38	915	227
Truck (med/large, SUVS, pickup, van minivan) (gaso	50.0%	53.2%	291,027,910	17.9	16,215,932	2,026,992	$ 47,350,523	19.59	158,867	39,322
Truck (med/large, SUVS, pickup, van minivan) (diese	4.4%	4.7%	25,889,707	17.6	1,471,146	204,048	$ 4,415,168	22.38	16,462	4,075
Motorcycles	1.0%	1.1%	5,992,678	43.5	137,623	17,203	$ 401,859	19.59	1,348	334
Total Non-Truck fuel & emissions	**93.9%**	**100%**	**546,542,902**	**na**	**26,992,380**	**3,395,323**	**$ 78,943,812**	**na**	**266,608**	**65,990**

Aspen vehicle distribution
(Aspen VMT Study, 2015)

Table 2 — Truck fuel & emissions

CDOT data (Aspen VMT Model) / CDOT data (Vehicle miles traveled)

	Aspen VMT Model	Percent of heavy vehicles	Vehicle miles traveled	Fuel economy	Fuel consumed	Energy content	Fuel cost	Emission factor	Carbon dioxide	Carbon
	Heavy vehicle %		VMT (miles)	mpg	gallons/yr	million Btu	$/yr	CO2/gallon	tons CO2/yr	tonnes C/yr
		Garfield Truck VMT	50,195,292			138,700	$ 3.001	gasoline & diesel EF		
		Truck VMT percent	8.4%			Btu/gallon (diesel)	$/gallon (diesel)			
Single-unit truck (& other bus) (gasoline)		11.6%	5,803,936	7.35	789,705	98,713	$ 2,305,939	19.59	7,737	1,915
Single-unit truck (& other bus) (diesel)		23.1%	11,607,872	7.35	1,579,410	219,064	$ 4,740,088	22.38	17,677	4,375
Combination trucks (semi, tractor-trailer) (diesel)		65.3%	32,783,484	5.85	5,604,491	777,343	$ 16,820,064	22.38	62,714	15,523
RFTA Bus (standard) (B5 biodiesel)	see separate sheet			4.25						
RFTA Bus (BRT) (CNG)	see separate sheet			5.75						
Total Non-Truck fuel & emissions	**8.4%**	**100%**	**50,195,292**	**na**	**7,973,606**	**1,095,120**	**$ 23,866,090**	**na**	**88,128**	**21,813**

CDOT %Trucks, Garfield 2014

Table 3 — Total vehicle fuel & emissions

	Vehicle miles traveled	Fuel economy	Fuel consumed	Energy content	Fuel cost	Emission factor	Carbon dioxide	Carbon
	VMT (miles)	mpg	gallons/yr	million Btu	$/yr	CO2/gallon	tons CO2/yr	tonnes C/yr
Total vehicle fuel & emissions	**596,738,193**	**na**	**34,965,987**	**4,490,443**	**$ 102,809,902**	**na**	**354,735**	**87,803**

Cell: F12
Comment: Rick Heede:
CMS downloaded CDOT VMT estimates for Garfield County roadways for 2009 (see URL below, and data reproduced in the background worksheet "CDOT Garfield stats"). CMS converts Daily VMT by roadway type into Annual VMT cited below).

CDOT: "The static highway reports available through this page are generated on a yearly basis and are the official statistics generated by the Division of Transportation Development (DTD). The totals are generated by mileage certification data received annually from cities and counties for Highway User Tax Fund (HUTF) reporting purposes. Mileage is reported for all city streets and county roads that are open, used, and maintained. The reports are published on July 1st of each year and reflect changes reported by DTD through December 31st of the previous year."

Cell: E18
Comment: Rick Heede (Jan16):
CDOT CORA data from Andrew Hogle (andrew.hogle@state.co.us) and Leo Livecchi, CDOT Denver.

Cell: C19
Comment: Rick Heede (Apr10):
CMS and Pitkin County staff conducted traffic surveys at and near the entrance to Aspen in August 2008 for the City of Aspen fuel and emissions inventory. The survey iincluded a non-technical classification of 6,793 vehicles by type and percentage distribution. While this non-technical survey was of too short duration, with a limited sample, a simple classification scheme, and untrained personnel -- it represents the only data of which CMS is aware that does offer data on vehicle types in western Colorado.

Until more reliable data is presented, CMS uses this vehicle distribution, coupled with EPA fuel economy ratings for the vehicle classes, to estimate fuel usage (see columns "F" and "G").

Cell: D19
Comment: Rick Heede:
CMS normalizes the vehicle distribution in column "C" to 100 percent of light vehicles.

Cell: F19
Comment: Rick Heede:
Jan16: MPG data from The Aspen VMT Study, Charlier Associates, 2015. Original data from ORNL Transportation Energy Data Book, and/or ICLEI Protcol (Charlier is unclear).
Original Garfield notes, 2009:
New vehicle fuel economy data are used in combination with average fleet fuel economy data. This leads to two conservatisms: 1. older vehicles may get poorer fuel economy, and 2. actual driving experience suggests that fuel economy is ~10 percent worse than EPA's fuel economy tests. Furthermore, snowy roads increase fuel consumption. Data from ORNL and Federal Highway Administration (see below).
Passenger cars in use average 22.1 mpg. TEDB Table 4.1 (average fuel economy of passenger automobiles in use, 2002 datum from US DOT/Federal Highway Administation (2002) Highway Statistics 2002, Table VM-1; www.fhwa.dot.gov). New passenger cars average 28.7 mpg (TEDB, Table 4.7).
New small SUVs (25.4 mpg) and small pick up trucks (21.7 mpg) averaged to 23.55 mpg. (Table 4.8); in order to reflect actual vehicle stock mpg and the average in-use fuel economy, the new vehicle average of 23.55 is factored by the average new truck mpg of 20.5 (table 4.8) divided by average in-use truck of 17.6 mpg: 17.6/20.5 = 0.8585. Thus the Aspen vehicle population of small SUVs/light trucks is 23.55 mpg times 0.8585 = 20.22.
New large and medium SUVs (17.6 mpg and 21.3) and new large pick up trucks (18.3 mpg) and new small and large vans (23.5 and 18.3 mmpg) are averaged to 19.8 mpg. As above, this new SUV/truck fuel economy is adjusted to reflect the lower mpg of the average vehicle population in use: 19.8 mpg * 0.8585 = 17.0 mpg. Note: propably conservative, considering the weight driven around by the typical SUV and pick-up truck and work van in Aspen. This category also contains Hummers (10-13 mpg, practical experience is closer to 8 mpg), Suburbans, Ford 350s, and similar brontomobiles.
2-axle medium-duty trucks (10-14,000 lb) average 10.4 mpg (Table 5.4).
3-axle trucks single-unit trucks (dump trucks, garbage trucks, etc) average 7.4 mpg (TEDB Table 5.1).
Semis or combination trucks (33,000 lb +) average 6.1 mpg (Table 5.4), 5.2 mpg in Table 5.2, and 5.5 mpg (Table 5.5); we use 5.6 mpg as the average.
Davis & Diegel (2004) Transportation Energy Data Book 2004, Tables 4.1, 4.8, and 5.4, Oak Ridge National Laboratory, USDOE.
Motorcycles: EIA uses 50 mpg (Energy Information Administration/2001 National Household Travel Survey, p. K-37).

Cell: H19
Comment: Rick Heede:
Energy content from EPA sources.

Cell: I19
Comment: Rick Heede (Apr10):
CMS estimates fuel cost on EIA's Monthly Energy Review data on fuel costs in Colorado, by month, 2009, excluding taxes; CMS adds the Colorado and Federal excise taxes (22.0 and 18.4 cents per gallon, respectively), and averages the year to $2.295 per gallon.

Cell: J19
Comment: Rick Heede:
Emission coefficients from EPA sources.

Cell: C36
Comment: Rick Heede:
The Aspen VMT Study, Charlier Associates, has apparently adopted ORNL transportation data for national transportation statistics. Which leads to a much higher ratio for semis and combination trucks compared to single-unit trucks than actual in the Aspen area (internal or external to the EIB: Emission Inventory Boundary). Using their data, 72% of truck VMT is attributed to semis -- clearly false.
In this January 2016 update, we adopt the CDOT data for 2014, in which total truck AADT (and presumably VMT) is 68.7% single-unit and 31.3% semis. We allocate 1/3 of single-unit trucks to gasoline, and 2/3 to diesel. RFTA buses are removed from this calculation, and made in a separate worksheet. We adopt mpg data from the Aspen VMT study.

Cell: D36
Comment: Rick Heede:
Percent of Garfield County heavy trucks by single-units and combination trucks; CDOT data.

Cell: E36
Comment: Rick Heede:
VMT data from CDOT CORA data for 2014, for single-unit and combination truck data. Based on relative AADT data, VMT is calculated for trucks.

Cell: F36
Comment: Rick Heede:
MPG data from The Aspen VMT Study, Charlier Associates, 2015. Original data from ORNL Transportation Energy Data Book, and/or ICLEI Protcol (Charlier is unclear).

Cell: I38
Comment: Rick Heede (Apr10):
According to the EIA, diesel fuel (ULS <15 ppm: $2.473/gallon) cost an average of 2.78 percent more than conventional gasoline ($2.406/gallon) in 2009. CMS does not have Colorado statistics on diesel fuel costs, and use this average US multiplier.

Cell: D41
Comment: Rick Heede:
CDOT Garfield data 2014 for single-unit trucks; one-third assumed to be gasoline, two-thirds diesel)

Appendix B: Status of 2006 action steps, progress to date

1. Town Government Actions: 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.

Status Update:

- The Town used energy performance contracting, rebates, and grants to finance energy efficiency improvements and renewable energy projects at municipal buildings,
- Town staff has given a great deal of attention to managing energy use at Town facilities, primarily using the Garfield Building Energy Navigator platform.
- Since the creation of the Plan, the wastewater treatment plant (the largest energy user) has seen a 50% reduction in energy costs.
- Town facilities track and monitor energy use - in 2006 there was no system in place to track energy data; individual facility energy use was not easy to track.

Programs & Projects	**Status Update Details**
Establish a program for energy efficiency retrofits in municipal buildings	The Town adopted the Active Energy Management resolution in 2012, making a commitment to increasing energy efficiency in Town facilities.
Measure and track annual energy consumption and expenses in municipal buildings	The Town has been tracking energy consumption at major buildings and facilities since 2009 using the Energy Navigator. Actual bill data is tracked for all the buildings currently on the Energy Navigator. For the largest consuming facilities, 15-minute interval data is tracked at the Roaring Fork Water Treatment Plan, Rec Center, Town Hall, Public Work and Waste Water Plant. The public can view data at: garfield.buildingenergynavigator.org
Conduct energy audits of municipal buildings to identify opportunities for saving energy and money.	Engineering-level energy assessments were completed as part of energy performance contracting at nine facilities/buildings in 2010. Walk-through energy assessments were completed at all municipal buildings in 2011/2012.
Invest in energy efficiency improvements (especially low-hanging fruit with fast payback)	The Town has installed higher efficiency lighting (such as LEDs), higher efficiency rooftop units, and updated control systems across nine facility/building sites. (Includes water treatment facilities and Town buildings).
Address energy efficiency improvement opportunities at the wastewater treatment plant (the highest municipal consumer of energy).	From 2009 to 2016, the wastewater treatment plant (WWTP) has reduced energy costs by 50%. Energy efficiency at the WWTP has been improved by implementing behavioral changes, closely monitoring the operations, and adjusting controls.

All new town vehicle purchases strive for the most fuel-efficient models.	The town has focused more on including Electric Vehicles (EVs) and compressed natural gas (CNG) technology in new vehicle purchases.
The Town will support alternative transportation efforts for staff.	Town employees are encouraged to rely on bicycles for in-town trips. Bikes are available for employees to use; a bus pass system was implemented (and then cancelled).

2. Change the rules that influence energy use

Many aspects of energy use are the result of rules (policies, ordinances, regulations). Change these rules and we significantly change how we use energy. Our public policies can increase energy efficiency, increase use of renewable energy, encourage more friendly approaches to mobility and access, and reduce dependence on oil.

Status Update:

- The Town of Carbondale has been a leader in the RFV on adopting residential codes and green commercial codes.
- In 2010, the town has adopted energy goals along with other member municipalities of Garfield Clean Energy: (1) increase energy efficiency by 20% by 2020 (2) reduce petroleum consumption 25% by 2020 (3) obtain 35% of energy from renewable sources by 2020. There have been efforts to track progress towards this goal through 2009 benchmark and 2014 update.
- The Town of Carbondale passed a resolution dedicating 20% of severance tax and federal mineral lease funding to fund progress toward clean energy targets.
- There is a Transit Oriented Development policy that encourages development around transit
- Carbondale voters had the opportunity to invest in clean energy through the “Climate Action Tax” (spring 2016). The tax would have assessed a small surcharge on electricity and gas usage in homes and businesses in Carbondale town limits.

Programs & Projects	**Details**
Upgrade the building code to encourage greater energy efficiency and use of renewable energy in all new buildings constructed in town.	The Residential Efficient Building Program (REBP) addresses new residential construction. To address new commercial construction the Town adopted the 2012 International Green Construction Code (IGCC) in 2013, and is moving to adopt the 2015 IGCC in 2016. This adoption will include the 2015 International Energy Conservation Code (IECC).
Increase transit mode share by working regionally to upgrade transit	RFTA has successfully implemented Bus Rapid Transit (BRT) service. This service began in 2013. According to the 2014 RFTA Travel Pattern Study, 23% of commuters in Carbondale now use the bus, compared to only 7% in 2004.
Utilize a Town Task force to advise on energy independence goal.	Carbondale Environmental Board (E-board) is a citizens committee that meets monthly to address energy and sustainability efforts.

A regional roundtable for local food production will be held.	The Roaring Fork Food Alliance was formed in 2012 to serve as a regional food hub. In addition, the Dandelion Market (Carbondale's Community Food Coop) has been in existence since 2007.
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 and walking.	The Carbondale bike community has been voluntarily hosting Bonedale Bike Week for the last 3-5 years. Bike/Walk Challenges in schools have taken place across Garfield County and in recent years, there has been the county-wide *Ride Garfield County* program. Town of Carbondale has also been designated a Bike Friendly Community, recognizing safe accommodations for bicyclists and education efforts.
Actively work with other communities and any statewide efforts to improve regional, statewide, and national policies and laws influencing energy use and a more climate friendly transportation system.	GCE has worked with Colorado Energy Office (CEO) to get EV charging stations across the region. CLEER has also worked with CEO to develop CNG infrastructure and vehicle purchases across the county.

3. Create programs to remove barriers to wiser energy use

Partner with utilities and others to accelerate the transition to a clean energy future, offering programs to households and businesses that combine financing, technical assistance, and education.

Status Update:

- The Town of Carbondale became a member of the state's first clean energy authority – Garfield Clean Energy – a 10 member government collaborative that provides energy efficiency and clean energy and petroleum reduction services to homes, businesses, and governments throughout Garfield County
- The Town of Carbondale is also a member of CORE, and through CORE membership they receive access to the Renewable Energy Mitigation Program (REMP) funding, technical assistance on energy, waste, and water.
- CORE and CLEER (using the Energy Smart Colorado platform) partner to make access to financing, rebates, and technical information for energy projects simple and convenient. These entities collaborate with the Town and utility providers to communicate these programs with the public through the rebate brochure, performing outreach at public events, and more. The financing and Energy Smart Colorado platform were developed thanks to federal funding from a Department of Energy grant.
- To address the lack of financing for energy efficiency work and the high upfront costs of some energy efficiency work, a low-interest revolving loan fund program (DOE funding) and a cash-back rebate program has been implemented (DOE funding in 2010-2013 and CORE REMP funding since 2004).
- To address the lack of information, complementary energy coaching, home energy assessments and walk-through assessments for businesses have been implemented.
- EV charging stations in Carbondale: Since the first station (with 2 plugs) has been installed at Town Hall, there are now charging stations at CMC, Third Street Center, RFHS, and the RFTA Park and Ride. (GCE assisted to secure grant funding from Colorado Energy Office).
- The Roaring Fork School District schools & Colorado Mountain College facilities are tracking energy usage

Programs & Projects	Details
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.	Great deal of outreach has been delivered through CORE and GCE programs since 2009. The joint Energy Resource Center was opened at the Third Street Center in 2014 to be a one-stop-shop for information on programs and rebates. It is a hands-on spot the public can engage with energy concepts.
Advise local contractors/architects/engineers through outreach	GCE/CLEER/CORE have sponsored annual contractor workshops since 2011 with utilities presenting and staffing booths to share their programs and incentives.
Create an income-qualified program	An income-qualified program was launched in 2015. Town of Carbondale dedicates funds to support this effort and has identified this program as a high priority in future plans. Utility rebates and Energy Outreach Colorado are leveraged support this program.

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.

Status Update:

- In 2010, along with other member municipalities of Garfield Clean Energy, the town adopted the goal of obtaining 35% of energy from renewable sources by 2020
- The Town of Carbondale has significantly increased solar on public buildings. As of June 2016, there is over 1MW of solar on public buildings. These buildings include: Town Hall, Sopris Park, Rec Center, Third Street Center, Carbondale Senior Housing (Crystal Meadows), Roaring Fork High School, Roaring Fork Water Treatment Plant, Public Works Building, Carbondale Branch Library and Roaring Fork High School. (Part of Third Street Center and Crystal Meadows was part of the DOLA New Energy Communities Grant, the remainder have been funded by Power Purchase Agreements).
- Town of Carbondale has purchased into the Clean Energy Collective solar arrays to offset usage at the Wastewater Treatment plant.
- Carbondale was awarded the Solar Friendly Community designation by Colorado Solar Energy Industries Association to recognize achievements in removing regulations that serve as barriers to developing on-site renewable energy generation projects.

Programs & Projects	Details
Actively encourage installation of renewable energy systems on private property through financing mechanisms and community campaign.	Rebates for solar thermal and solar PV systems have been available since the early 2000s.
Town will consider purchases of green power to reduce GHG.	The Town participated in Xcel's WindSource program for a couple of years, investing an additional $11,000 each year. The Town decided to withdraw from the program in 2011 and instead to dedicate that $11,000 to local projects.

Evaluate a micro hydro (25-40 kW) project at Nettle Creek	A technical assessment was completed; the actual size will be 10KW. Currently, waiting for renewal of lease with BLM, late 2016 or early 2017.

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.

Status Update:

- In 2016, Chamber created a community map of Carbondale and many green businesses are highlighted.
- Carbondale's green values have been incorporated into its regional reputation

Programs & Projects	**Details**
Develop the current Carbondale Elementary School site to provide a campus for sustainable energy education and a business incubator for sustainable businesses.	Renovation of the Third Street Center was completed in 2010 to serve as a green center and offer affordable space for local and regional non-profits, and artists. The Energy Resource Center is located at the Third Street Center.
Partner with sustainable energy businesses and the Chamber to create a green brand for the Town.	Green businesses have been highlighted by the Chamber. More could be done here.
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.	CLEER/CORE partnered with the Sierra Club to host Solar Home Tours across Garfield County, with 2-3 sites from Carbondale included annually (2010-2012). In 2014, CLEER/CORE partnered with Sunsense Solar to host a bike tour featuring local solar projects.
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.	Garfield County communities, including the Town of Carbondale, were included as featured partners in the 2015 Colorado Climate Action Plan. More effort could be dedicated to actively pursue national recognition.

Appendix C: Connection to Local, Regional and Statewide Commitments

Ending global carbon emissions is not a challenge that Carbondale can solve alone, but Carbondale can be part of the solution.

Coordination of local, regional, state, federal, and global action, as well as partnerships, are required to address the climate challenge. In particular, local governments serve an invaluable role in modeling replicable solutions and helping its citizens take action. When communities work together, they become a powerful force.

This report focuses on how the Town of Carbondale can reduce emissions locally, but acknowledges the additional significant work being done elsewhere. The efforts of the United States, Colorado, and neighboring communities can drive and enhance local efforts. For example, statewide action will reduce the carbon content of electricity through the Renewable Energy Standard, including the electricity provided to Carbondale homes and businesses. The cleaner energy resulting from this effort will be fundamental in supporting the emissions reduction efforts in Carbondale.

This section does not represent a comprehensive list of climate action efforts, but illustrates how Carbondale's efforts can support, and be supported by, federal, state, and regional efforts. Addressing climate change is most successful through partnerships, with the initiatives below providing inspiration how collaboration can drive deeper reductions.

United States Goals and Initiatives

In 2016 the United States ratified the Paris Agreement, committing to hold global temperature rise to "well below 2 degrees Celsius" above pre-industrial levels. Following the agreement, the U.S. submitted a national plan for curbing greenhouse gas emissions. Specifically, the U.S. plan pledges to reduce greenhouse gas emissions 26 percent to 28 percent by 2025 (as compared to a 2005 baseline).[1]

One of the centerpieces of is the Clean Power Plan, which set national standards on reduction carbon pollution from existing power plants. Both the international accord and the Clean Power Plan are under threat: the Trump administration is working to withdraw the U.S. from the Paris Agreement and repeal the Clean Power Plan.

Additionally, the Environmental Protection Agency has used its authority under the Clean Air Act to regulate emissions through fuel efficiency standards, and more.

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[1] Source: http://www4.unfccc.int/submissions/INDC/Published%20Documents/United%20States%20of%20America/1/U.S.%20Cover%20Note%20INDC%20and%20Accompanying%20Information.pdf

Colorado Goals and Initiatives
Colorado has adopted statewide legislation to address climate change and reduce greenhouse gas emissions.

Colorado Emissions Goals
Governor John Hickenlooper issued an executive order in 2017 committing to the following goals:

- Reduce statewide greenhouse gas emissions by more than 26 percent from 2005 levels by 2025;
- Reduce carbon dioxide emissions from the electricity sector by 25 percent by 2025 and 35 percent by 2030 from 2012 levels; and
- Achieve electricity savings of two percent of total electricity sales per year by 2020.

Colorado Climate Action Plan
The Colorado Climate Action Plan was developed in 2015 to meet the requirements of Colorado House Bill 12-1239. This plan articulates a strategy to reduce greenhouse gas emissions at the state agency level through state level legislation , as well as improve Colorado's ability to adapt to future climate change impacts.

Milestone greenhouse gas emissions legislation includes the following:

- Renewable Energy Standard (2004) -- a first-in-the-nation initiative to require that electricity providers obtain a minimum percentage of their power from renewable energy sources.
- Emissions Reduction Commitment (2008) -- formally declared emissions reduction goals of 20% by 2020 and 80% by 2020 (below 2005 levels)
- The Clean Air Clean Jobs Act (2010) -- convert coal-fired power plants to natural gas and other lower emitting sources
- Regulation of methane emissions (2014) -- measures for methane emissions from the state's oil and gas industry

Local Goals and Initiatives
The Town of Carbondale has demonstrated a commitment to climate action, starting with pledges and efforts made over two decades ago. The *2017 Climate and Energy Action Plan*, and its more aggressive emission reduction goal, is the latest in a series of actions and represents advances in the strategies on how to best address climate change. Below is a summary of the energy and climate protection targets the Town has adopted.

Mayor's Climate Protection Agreement (2005)
The Town of Carbondale joined the Cities for Climate Protection Campaign by adopting the US Mayor's Climate Protection Agreement. The Agreement outlined the threat posed by climate change, and the preventative steps cities could take, resulting in a commitment to developing an emissions reduction strategy.

Community Office for Resource Efficiency membership (2005)
The Town of Carbondale became a member of CORE in 2005 and has continued this membership through in 2017. CORE helped the town as it began its initial endeavors in energy efficiency and renewable energy, and continues that assistance today. The Town joined other communities including the City of Aspen, Holy Cross Energy, Pitkin County, Snowmass Village and KN Energy (now Black Hills Energy) in guiding development of CORE's programs and policies.

Membership provides the Carbondale community access to financial and technical incentives. For homeowners, cash back rebates are provided for energy efficiency upgrades and renewable energy systems. For businesses, public entities, and nonprofit organizations, rebates and grants are available for carbon reduction projects.

In addition a Town Trustee sits on the CORE Board of Trustees.

Energy and Climate Protection Plan (2006)
In 2006 the Town moved forward developing and adopting an emissions reduction strategy, the Energy and Climate Action Plan.

Through community meetings involving over 150 citizens, the following goals were developed to guide emission reduction efforts:

- Reduce emissions directly attributable to Town facilities and Town operations by 25% by 2010 through increasing energy efficiency in all buildings and operations, 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 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 and electricity from renewable sources by 2015.
- Develop a resource-efficient building ethic in Carbondale to serve as a model for other communities.

Garfield Clean Energy (2009)
Garfield Clean Energy Collaborative (which, grew out of Garfield New Energy Communities Initiative) is an intergovernmental authority which uses energy efficiency, renewable energy and alternative fuels to build a more resilient economy. In addition to the Town of Carbondale, GCE is comprised of the following members: Garfield County, the Town of Parachute, City of Rifle, Town of Silt, Town of New Castle, City of Glenwood Springs, Roaring Fork Transportation Authority and Colorado Mountain College.

As a member of Garfield Clean Energy, the town adopted the following goals:

1. Increase per capita energy efficiency by 20% by 2020 over a 2009 baseline.
2. Reduce petroleum consumption 25% by 2020 over a 2009 baseline.
3. Obtain 35% of energy from renewable sources by 2020 over a 2009 baseline.

All as a means to a stronger, more resilient, energy-secure economy.

Garfield Energy Action Plan (2017)

The Energy Action plan launched energy efficiency and renewable energy action planning county-wide. Through Xcel Energy's Partner in Energy Savings program, this plan was developed with input from all municipalities in Garfield County, CLEER, utilities, and local contractors. The adoption of this plan commits Carbondale to the following goals:

Collaborating with local governments, utilities, non-profit organizations, and businesses, GCE's overarching goal will be to achieve 20 percent increase in energy efficiency over the Garfield 2015 baseline by 2030 and to obtain between 35 and 50 percent of energy from renewable sources by 2030

RESOLUTION NO. 5
SERIES OF 2017

A RESOLUTION SUPPORTING A CLEAN ENERGY FUTURE, ADOPTING THE 2017 CLIMATE AND ENERGY ACTION PLAN AND CLEAN ENERGY TARGETS

WHEREAS, the Board of Trustees of the Town of Carbondale understands that leadership on climate action is required at all levels of government; and

WHEREAS, Carbondale has an important historical connection to coal mining and the economy was very dependent on coal jobs and has since made the transition to a diversified economy; and

WHEREAS, the Carbondale community cares deeply about clean water, clean air, protecting our public lands including protecting the Thompson Divide and the Town of Carbondale has actively engaged in protecting the Thompson Divide and realizes that clean energy is a root solution to protecting lands from gas development; and

WHEREAS, the community of Carbondale spent $17 million in 2015 on energy bills and vehicle fuel and by reducing carbon emissions the community will save money every year, creating a more resilient economy; and

WHEREAS the Town of Carbondale has become a hub of clean energy businesses and organizations and has been a leader on environmental measures and climate action for over two decades and the Town of Carbondale adopted the Carbondale Climate and Energy Protection plan in 2006; and

WHEREAS the Board of Trustees of the Town of Carbondale finds and determines that it is in the best interests of the Town and its citizens to collaboratively update the 2006 Carbondale Climate and Energy Plan with its citizens and nonprofit organizations; and

WHEREAS since the 2006 Carbondale Climate and Energy Plan the community has installed over 1.2MW of solar, most of that on public buildings, the Town government and schools have reduced energy use in their facilities by 15 to 50 percent, the Town was the first community on the Western Slope to adopt the green commercial code, 10 percent of households have made energy improvements, 32 percent of the 391 commercial businesses have made improvements or built green from the start and the community has increased biking, walking and ridership on RFTA buses, proving that the community and the local governments can work together to achieve targets; and

WHEREAS the Carbondale Environmental Board along with over 30 Carbondale residents volunteered their time and expertise to set the recommended goal, strategies and actions in the updated 2017 Climate and Energy Plan; and

WHEREAS, the utility companies that serve Carbondale citizens have adopted carbon emission reduction targets that complement the work of community making the goals more achievable; and

WHEREAS communities around the country and the world are taking action and have signed onto the Paris Climate Accords, which is a non-binding international agreement that is important to the growth of clean energy economy in Colorado and the United States; and

NOW THEREFORE BE IT RESOLVED BY THE BOARD OF TRUSTEES OF THE TOWN OF CARBONDALE, COLORADO,

THAT the Town of Carbondale adopts a goal to create a thriving carbon neutral community and achieve a 100 percent reduction of carbon emission by 2050 by increasing efficiency of all buildings, decarbonizing transportation, increasing the amount of waste that is recycled, reused or composted, increasing local renewables and storage, supporting an abundance of local food, products and services; and

THAT the Town of Carbondale adopts the 2017 Climate and Energy Action Plan as a framework for achieving the goal of a 100 percent reduction in emissions; and

THAT the Town of Carbondale adopts the Garfield Clean Energy Action Plan and the goal to achieve 20 percent increase in energy efficiency over the Garfield County 2015 baseline by 2030 and to obtain between 35 and 50 percent of energy from renewable sources by 2030 as a way to help reach regional goals and as part of the path to reaching the 2050 goals; and

THAT the Town of Carbondale will continue investing resources to implement the actions in the adopted plan and achieve the stated goal; and

THAT the Town of Carbondale urges the Governor of Colorado, state legislators and the state's congressional delegation to be clean energy leaders for our citizens; and

THAT the Mayor of the Town of Carbondale will sign the Mayor's National Climate Agenda showing our local action aligns with international action.

INTRODUCED, READ, AND PASSED this 13th day of June, 2017.

TOWN OF CARBONDALE

By: _____
Dan Richardson, Mayor

ATTEST:

_____
Cathy Derby, Town Clerk

TOWN OF CARBONDALE
SEAL
COLORADO