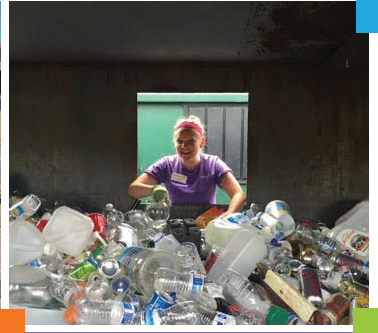

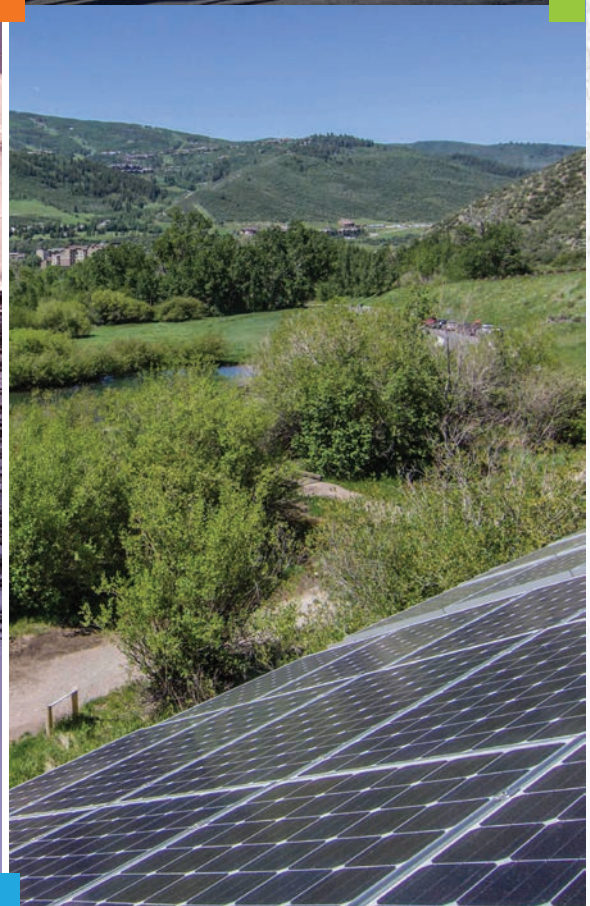

CLIMATE ACTION PLAN

FOR THE EAGLE COUNTY COMMUNITY

December 2016

Our Mountain Community is at Risk

› Winters are getting warmer and shorter

- There are now 23 fewer days with freezing temperatures than before the 1980s
- Scientists predict we'll have 30 more days without freezing temperatures by 2060
- Spring snow packs are declining and less predictable

› Summers are getting hotter

- The last 15 months have been the hottest on record globally
- Warmer average summer temperatures are on the rise
- With every 1.0°F increase in temperature, we'll see a 3-4% decrease in water supply

› Mountain ecosystems are changing

- Increasing insect pests are changing our forests
- Scientists predict more extreme events – wildfires, droughts, and floods
- Wildlife is on the move, adapting to changes in habitat
- Rising temperatures lead to declining runoff in creeks and rivers

TABLE OF CONTENTS

PROTECTING COMMUNITY VALUES

Our Community Health and Well-Being

We can help prevent community health threats like increasing insect-borne diseases, increasing allergies, smoke waves from wildfires, and other forms of air and water pollution.

Our Environment and Recreation

We can protect the places we play, reduce the risk of catastrophic fires in our forests, and reduce flooding in our streams and rivers.

Our Economy and New Jobs

Investing in energy efficiency, solar arrays, electric and hybrid vehicles, smart growth, and creating new green jobs will position us as leaders in the coming 'post-carbon economy'.

ACKNOWLEDGMENTS

Stakeholders
Terry Armistad, Town of Minturn
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Jeanne McQueeney, Chair
Kathy Chandler-Henry, Commissioner
Jillian H. Ryan, Commissioner

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EAGLE COUNTY

Introduction

Climate change is disrupting the basic operating system of our planet. Mountain regions are particularly vulnerable due to their hydrology, ecology, and recreational economies. In the past 30 years, the annual average temperature in Colorado has increased by 2.0°F (Lukas et al., 2014), and Eagle County's natural environment is feeling the effects. The timing of snowmelt and peak runoff has shifted earlier in the spring, and there are more frost-free days (days with minimum temperatures above freezing) than there were before the 1980s. These fewer days of freezing temperatures impact the water storage in our snow pack, alter the timing and amount of river runoff, hamper the ability to make snow for skiing, debilitate the health of our forests and wildlife, increase the threat of forest fires and flooding, and subsequently, put at risk the very basis of our recreational economy and daily lifestyles.

Local climate change takes place within the context of global climate change and greenhouse gas (GHG) emissions. Carbon dioxide (CO_2), a potent GHG, has increased by 40% from 280 parts per million (ppm) in the pre-industrial era to 400 ppm today, a level that the earth has not seen in at least 800,000 years, due primarily to the burning of fossil fuels (Lukas et al., 2014). Each of us has a responsibility to take action to reduce GHG emissions and prevent increasing negative impacts of climate change. We can be proactive and embrace the challenge of climate change. We can learn to change; we can take action and innovate; and, we can each do our part to ensure a sustainable future for our Eagle County community.

Each of us has a responsibility to take action to reduce GHG emissions and prevent increasing negative impacts of climate change.

This *Climate Action Plan for the Eagle County Community* is the culmination of a year-long effort that included more than 30 community stakeholders. Their tasks were to develop targets for the reduction of GHG emissions for the entire community within Eagle County and to identify and prioritize projects and policies by sector that will help the community achieve those targets. The plan calls for aspirational, yet achievable, targets for overall GHG emission reductions: 25% by 2025, and a minimum of 80% by 2050. The 2050 target is in alignment with the recent recommendation of the Intergovernmental Panel on Climate Change (IPCC, 2014). In order to meet the established targets, this plan also contains project recommendations for the community, including the county government, towns, businesses, nonprofits, and other partners to begin immediate climate action, as well as plan for the future.

Stakeholders hard at work discussing solutions.

The stakeholders met regularly from March to November 2016, and each meeting included educational components, as well as activities to engage and solicit stakeholder feedback on critical elements of the plan. The stakeholders represented a diverse and engaged group of community leaders, county and municipal government employees, and representatives from key industries in the community. Guest speakers added technical expertise and an outside perspective to the process. Collectively, the plan reflects the strong values of the Eagle County community including our health and well-being, our natural environment and recreational economy, and our potential as leaders in creating a robust post-carbon economy. Highlights of the plan were shared at three public open house meetings during September 2016. A survey was available at the open house sessions and on the Walking Mountains Science Center website to solicit feedback and public comments. The stakeholders recommended the final plan for adoption by the Board of Eagle County Commissioners and other elected officials in December 2016.

Recommended GHG emissions reduction targets:

25% by 2025, minimum of 80% by 2050.

Summary of Recommendations for Climate Action

Education and Outreach

- Establish climate education team
- Create county-wide marketing campaign
- Enhance Eco-Schools for K-12 schools
- Expand Actively Green business trainings and certifications
- Leverage special event platforms to change behaviors

Commercial Buildings Sector

- Reduce GHG emissions 25% by 2025
- Focus on energy efficiency
- Provide incentives
- Adopt "above building code" standards
- Promote and incentivize efficient use of water

Waste and Landfill Sector

- Set a waste diversion goal that is above the national average
- Develop a plan to increase waste diversion through recycling and composting
- Install waste-to-energy methane capture system at landfill
- Provide residential and commercial composting services

Residential Building Sector

- Reduce GHG emissions 25% by 2025
- Focus on energy efficiency
- Expand Energy Smart Colorado program and incentives
- Adopt "above building code" standards
- Promote and incentivize efficient use of water

Transportation and Mobility Sector

- Reduce local GHG emissions 10% by 2025
- Include local commuter train or bus rapid transit
- Expand use of electric vehicles
- Encourage multi-modal transportation systems
- Strive for efficient land use patterns with housing in proximity to workplaces

Energy Supply Sector

- Expand local exterior energy offset programs (Eco-Build example)
- Identify locations for local solar arrays
- Encourage energy utilities to set aggressive GHG emission reduction goals

As the impacts of climate change become evident around the world and international efforts to curb GHG emissions are more prevalent, many local communities have begun serious climate action planning to be part of the solution. The Eagle County Board of County Commissioners made "climate action planning" a priority in the County's 2016 strategic plan, and Walking Mountains Science Center's Sustainability and Stewardship Programs Department was contracted to convene and facilitate a stakeholder and community-driven climate action plan.

The resulting *Climate Action Plan for the Eagle County Community* reflects a strong commitment to reduce the community's GHG emissions by a minimum of 80% by 2050, an amount in alignment with that of the Intergovernmental Panel on Climate Change (IPCC, 2014). Local, regional, and state efforts have become the cornerstone of climate action because national and international energy policy and emissions reduction efforts are slowed and often stifled by policy, politics, and bureaucratic processes. Furthermore, local governments and communities are often in a better position to engage citizens and have an immediate and direct impact toward reducing GHG emissions.

This climate action plan is specifically focused on mitigation. Climate *mitigation* is defined as efforts that reduce or prevent GHG emissions. Climate *adaptation* is defined as efforts that help the community prepare for and adjust to the current and future impacts of climate change. Although this plan does not specifically address climate adaptation, other efforts are being taken throughout the Eagle County community to prepare for the changing climate. The stakeholders believe that future climate action planning initiatives should integrate both mitigation and adaptation.

This *Climate Action Plan for the Eagle County Community* includes a vision for success–what success looks like, and how it can be achieved. The actions recommended in the plan are broken into six sectors: 1) education and outreach, 2) residential buildings, 3)commercial buildings and industrial operations, 4) transportation and mobility, 5) waste and landfill, and 6) energy supply. Detailed actions and projects have been identified by the stakeholders to support GHG emission reductions in each of the sectors.

The plan also includes recommendations for decision makers at all levels within the community, ranging from needed policy changes to on-the-ground activities. Broader public comment on the plan was solicited during September 2016 at three open house sessions, and the community's ideas were incorporated into the final plan. This final plan has been approved by the stakeholders with a strong recommendation for adoption by all local governments, including special districts, businesses, nonprofits, educational institutions, and neighborhood associations, the goal is that GHG reduction targets are consistent with the ability of each entity to select the strategies and actions that are most appropriate for their situations.

The plan includes a vision for success – what success looks like, and how it can be achieved.

Why Climate Action? Why Now?

We live in a county that is heavily dependent upon climatic conditions. As the climate warms, we enter an era of uncertainty. Imagine our ski and snowboard season starting a month later and ending a month earlier than it does now. Imagine hotter summers affecting our daily activities and our recreational opportunities. Imagine Western Slope ranchers and farmers facing severe droughts without enough water for crops and livestock

Scientific research indicates there will be increasing changes to the flows of our streams and rivers. There will be earlier snowmelt in the mountains and an increase in wildfire on our surrounding open lands. There is also evidence of future changes to our daily health and well-being due to increases in insect-borne diseases like West Nile virus, Lyme disease, and the length and intensity of allergy season.

Due to these local effects of climate change, communities across the state of Colorado and the U.S. are creating their own climate action plans and making significant commitments to reduce GHG emissions.

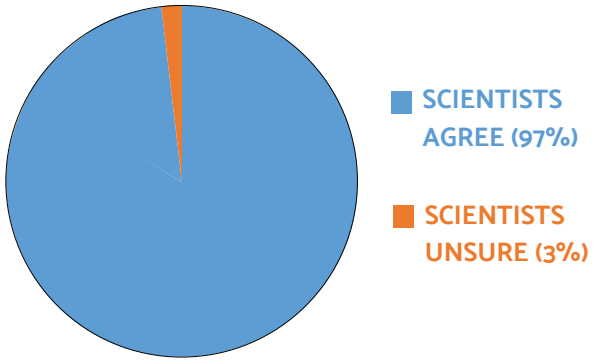
"Reducing greenhouse gases requires honesty, courage, & responsibility… There is a nobility in the duty to care for creation through daily actions."

~Pope Francis

"Scientific evidence for warming of the climate system is unequivocal." Intergovernmental Panel on Climate Change (IPCC, 2014)

"Earth-orbiting satellites and other technological advances have enabled scientists to see the big picture, collecting many different types of information about our planet and its climate on a global scale. This body of data, collected over many years, reveals the signals of a changing climate. The heat-trapping nature of CO_2 *and other gases was demonstrated in the mid-19th century. There is no question that increased levels of greenhouse gases must cause the earth to warm in response."* NASA (2016)

SCIENTIFIC CONSENSUS ON CLIMATE CHANGE

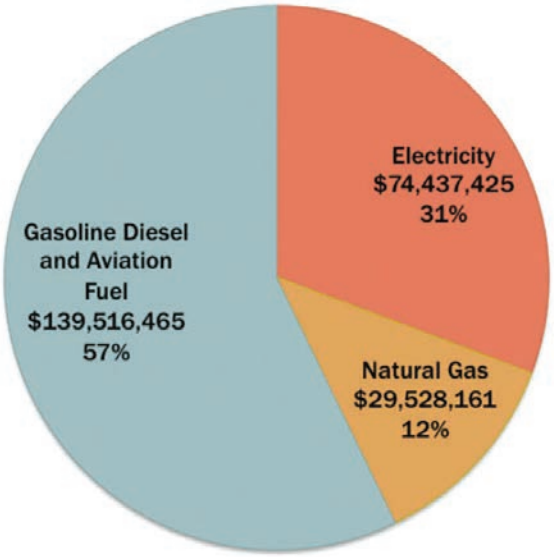


CO_2 is a heat-trapping GHG. As we burn more coal, natural gas, and oil, the "blanket" of GHGs in the atmosphere gets thicker, and the earth gets hotter.

"Climate change has and will continue to impact the state's resources in a variety of ways, including more rapid snowmelt, longer and more severe droughts, and longer growing seasons." (Gordon and Ojima, 2015)

References: IPCC (2014) and Doran and Zimmerman (2009)

2014 Eagle County Energy Costs by Source
Total energy costs: $243.5 million



**More than half of energy costs in 2014 were for transportation fuels, primarily from passenger vehicles on Interstate-70.
Source: Eagle County Energy Inventory, 2016.

As a mountain resort community, much of Eagle County is made up of second homes, hotels, and energy-intensive tourism and recreation facilities. The amount of money that leaves the local economy due to high energy expenses is a compelling reason alone to tackle this issue and create solutions. The Eagle County community releases 1.4 million metric tons of CO_2 each year, at a cost of $243.5 million (Eagle County, 2016).

Based on 2014 energy costs, if we achieve a 25% reduction in GHG emissions by 2025, we could retain $60 million annually in the local economy and create new jobs in the sustainability industry. Our per capita rate of CO_2 emissions, 25 metric tons per person per year, is 30% higher than the national average.

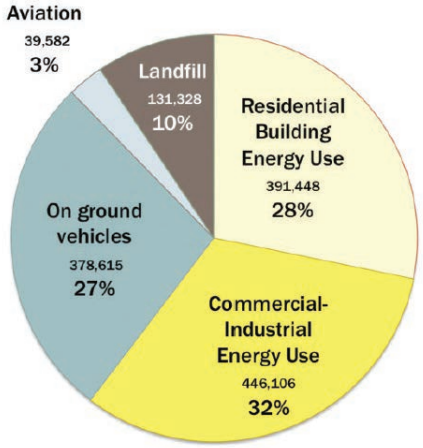
One of the challenges to solving climate change is that GHGs are invisible. It can be helpful to think of one metric ton of CO_2 as the equivalent of one full hot air balloon. For the Eagle County community, we can imagine 1.4 million hot air balloons floating up from the county each year.

If we achieve a 25% reduction in GHG emissions by 2025, we will retain $60 million annually in the local economy.

KEY FINDINGS

From the 2014 Eagle County Energy Inventory

Inventory: Emissions by Sector

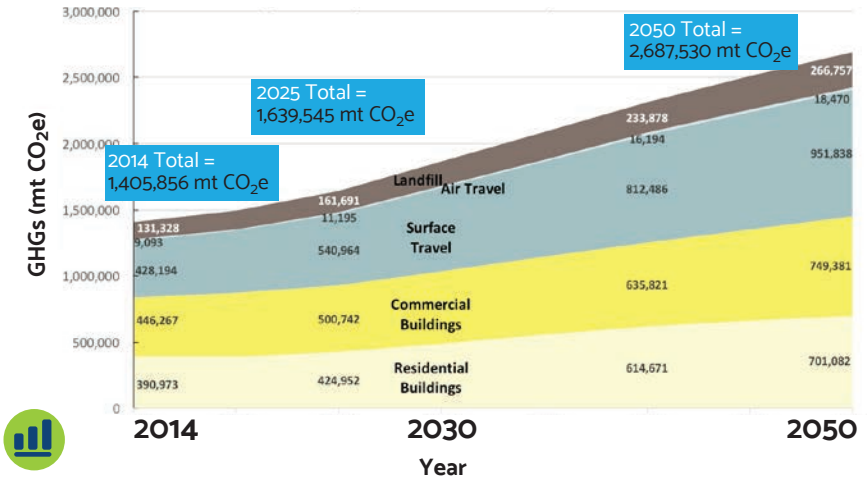


- Buildings and commercial energy uses in our community had larger emissions (60%) than on-ground vehicles (27%) or landfill (10%)
- The single largest source of emissions, at 39%, was from generation of electricity used to power residential and commercial buildings and facilities
- About 22% of electricity was generated from renewable sources, and of that, 1% from solar. The bulk of our electricity during 2014 was produced from coal-fired power plants (62%) and natural gas generation (16%)
- In the vehicles category, 79% of emissions were from SUVs and passenger cars; 21% were from trucks and tractor trailers. Only 9% of total transportation emissions was from aviation

***See Appendix C for "2014 Eagle County Energy Inventory"*

If we don't take action, GHG emissions will increase

Eagle County Community *Business as Usual* GHG Forecast Results



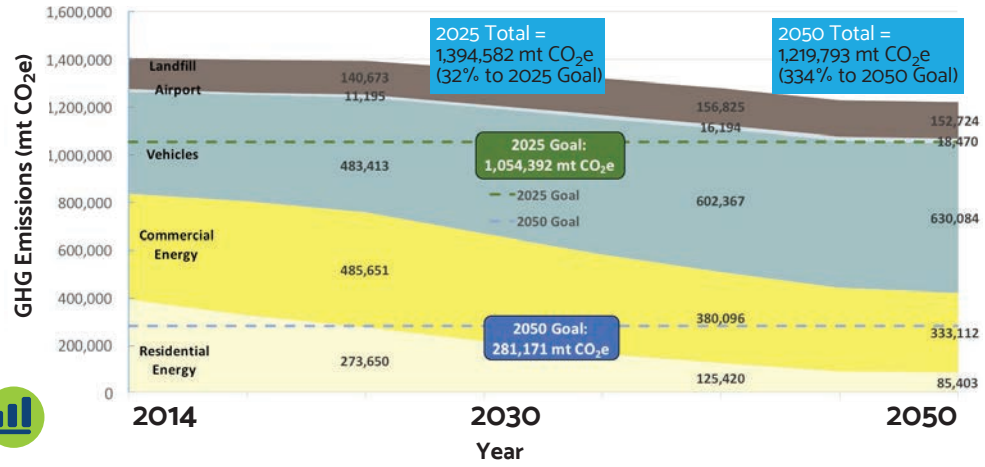
In order to demonstrate scenarios of future GHG emissions for the Eagle County community, the Western State Colorado University Center for Environment and Sustainability was consulted. Expert data analyst Dr. Abel Chávez used the 2014 energy inventory to forecast the community's 'business as usual' GHG emissions to the year 2050. The forecast accounts for several key drivers, including demographic, economic, and technical variables.

Western State Colorado University
Learning, Elevated.

If we take action, we can reduce our GHG emissions

Increasing the efficiency of our homes, commercial buildings and facilities is our biggest opportunity.

Eagle County GHG Emissions with Hypothetical Mitigation Actions



This graph demonstrates that positive measures can be taken by the Eagle County community to reduce GHG emissions. Included in this graph are energy efficiency in residential and commercial buildings, more renewable energy from utilities, climate-friendly transportation, and reductions to waste in the landfill. Even with future population growth, the Eagle County community can be successful at climate action. The actions forecasted in this graph are a good start to climate action, but more actions will need to be included in order to meet the 25% by 2025 and minimum of 80% by 2050 GHG reduction targets.

How YOU Can Cut One Ton of Carbon Pollution:

Switch out 25 incandescent lights with LED

Reduce single car use by 2,400 miles / year

Replace 5 old fridges with Energy Star models

Install 1 KW of Solar Electric (3 panels)

Shut off lights, work stations, and equipment when not needed

Get help from Energy Smart Colorado, and make improvements to your home or business

The Eagle County Community is Ready to Take Action

The stakeholders involved in creating this plan believe that the Eagle County community is now ready and committed to undertake climate action. Involvement in the following existing programs is a good demonstration of peoples' engagement and interest:

- Over 50 local businesses are certified "**Actively Green**" in sustainable business best practices, and awareness of the program is increasing as businesses realize the financial, environmental, and marketing benefits of engaging employees and customers in sustainability. More and more local businesses are also participating in the Colorado Environmental Leadership Awards program.

- Through the **Energy Smart Colorado** program, more than 1,000 homes in the county have received energy assessments, and more than 600 homes and 200 businesses have completed energy efficiency and renewable energy improvements, resulting in over 6,000 metric tons of carbon emission reductions annually.

- Many more homes are adding rooftop solar; the number of LEED (Leadership in Energy and Environmental Design) certified buildings in the community is increasing; and, new community "solar gardens" are becoming a popular way for homes and commercial buildings to attain renewable energy.

Holy Cross Energy board members and community volunteers installed a new solar array in Gypsum.

- Many community events now incorporate "zero waste" collection of recyclables and compostables while educating participants and diverting the majority of potential waste from the landfill.

- New electric vehicle charging stations are being added throughout the community, and more people are taking advantage of state and federal incentives for new purchases and leases on electric vehicles.

- Across the Eagle County community, there is a growing desire and demand for sustainable infrastructure and systems that will engage and enable people to participate in reducing GHG emissions.

Another major reason why action should be taken now is that population growth in Eagle County is increasing. The state census found that there were 52,831 residents in the county in 2014. In less than 25 years, the county residential population is expected to increase to 94,000 people, or more than 40% by 2040 (DOLA, 2016). The growing population will result in more cars on the road, more homes being built, and more support services such as schools, stores, water infrastructure, and other utilities–all of which consume more energy and generate more GHG emissions.

Increasing GHG emissions into the future will contribute to escalated climate change and create negative impacts on the natural environment around us. The projected temperature increases, changes to snowpack and local water resources, health effects on residents and visitors, impacts to the recreation-based economy, increasing population growth, and demands on energy supply are compelling reasons to take climate action seriously. There is an urgent call-to-action for the Eagle County community and local decision makers to collaboratively undertake decisive, meaningful policy and programmatic changes in the areas of energy use in homes and commercial buildings, transportation, waste, energy supply, water conservation, and climate change education.

Goals for the Climate Action Planning Effort

Set meaningful, feasible GHG emission reduction targets

Identify projects and policies to achieve targets

Educate and engage the community about climate change

Build on the knowledge and commitment of the stakeholders

Collaborate across towns, agencies, and organizations

Support and reflect state goals and regional efforts

Serve as a model for other communities

Targets for GHG Emissions Reduction

25% by 2025

50% by 2035

70% by 2045

80% by 2050

**from 2014 Baseline (See 2014 Eagle County Energy Inventory - Appendix C)*

There are three main types of targets found in climate action plans: (1) directional (i.e., up or down from a baseline), (2) analytical (i.e., based on extensive modeling and projections), and (3) aspirational, (i.e., set to achieve something great). The stakeholders set an aspirational target for the year 2050, with interim targets, as well. These aspirational targets are realistic with concerted community action, and yet, they are high enough to have considerable impact and significance. The reduction targets refer to the 2014 Eagle County Energy Inventory data as a baseline. The climate action plan calls for the community to measure and monitor reductions on a regular basis, such as every three years.

By 2050, the Eagle County community will reduce GHG emissions by a minimum of 80%. This target is in alignment with the Intergovernmental Panel on Climate Change's recommendation for reductions of GHG emissions by industrialized nations (IPCC 2014). The stakeholders agree that, while challenging, this aspirational target is a goal that must be achieved in order to foster a significant set of actions to reduce GHG emissions. In addition, collaborative impact would be greater by assuming a target that is in alignment with what the IPCC set, as many other local, regional, and state goals align with the target of 80% reduction by 2050. The science behind this aspirational target has been well-vetted by thousands of climate scientists, and it doesn't need to be defended or re-calculated. Lastly, this robust target will outlast changes in local political leadership that will naturally occur between now and 2050.

By 2025, the Eagle County community will reduce GHG emissions by 25%. The stakeholders set an interim target that will require considerable efforts and hard decisions, but it also allows adequate time to achieve results. This target is consistent with goals set by other communities. By setting a considerable reduction–one quarter of the emissions the community emits now–some actions beyond the "low-hanging fruit" will be required. The aim is to get moving quickly on making annual GHG reductions throughout the community. The stakeholders also feel that the slogan "25% by 2025" would be compelling and effective for early communication efforts throughout the community.

Using these targets, other interim reductions were calculated using a linear approach. The stakeholders agreed that a linear projection of emissions reduction would be the most understandable by the public, even though in reality, there might be large reductions followed by periods of fewer reductions as actions are put into place in different sectors at various times.

Recommended GHG Reduction Goals & Strategies by Sector

One of the most common ways that communities assess where gains can be made in reducing GHG emissions is by breaking down the source of emissions into understandable categories. These categories, or sectors, make decisions and actions for reducing GHG emissions easier during plan implementation.

This plan contains six "sectors" that correspond to the particular climate action opportunities throughout the Eagle County community: 1) education and outreach to help inform sustainable climate-friendly behaviors, 2) residential buildings, 3) commercial buildings and industrial uses, 4) transportation and mobility, 5) waste and landfill, and 6) energy supply.

Listed in the following section are the top goals and strategy recommendations for each climate action sector. A full list of ideas generated by stakeholders is provided as Appendix A.

Education and Outreach

Greater community awareness and understanding of climate change is needed so that people can participate in climate-friendly sustainable behaviors in their daily lives at home, at work, and throughout the community. Effective community engagement in climate action strategies requires partnerships between multiple sectors, targeted education and outreach methods, and continual evaluation of program successes.

Education and Outreach: Top Recommended Strategies

- Use social-science research on climate change communications and education to inform strategies.
- Create a climate action 'tool kit' to share throughout the community.
- Develop a cross-sector Eagle County climate education team and education plan to reach all ages and demographics in Eagle County. Include Eagle County Schools, private K-12 schools, Colorado Mountain College, Walking Mountains Science Center, and other partners.
- Create a county-wide marketing campaign to raise awareness to engage the community in projects and programs. Include regular announcements through e-newsletters and social media.
- Ensure community equity so that climate action is all-inclusive and provides equitable social, economic, and health benefits.
- Utilize special event platforms to share messages, provide resources, and engage participants in behaviors such as zero waste events and bike-to-work days.
- Incorporate soil-health education to improve carbon sequestration and engage the community in stewardship.
- Expand and enhance existing educational programs:
  - Actively Green sustainable business training and certification program,
  - Energy Smart Colorado energy efficiency coaching for homeowners, businesses, contractors, and realtors
  - Colorado Mountain College Certificate in Sustainability Leadership and Bachelor of Arts in Sustainability Studies
  - Eco-Schools program for K-12 schools, supporting student learning and measurable GHG reduction through energy education and behavior change at schools
  - Colorado State University Extension Service programs and resources.

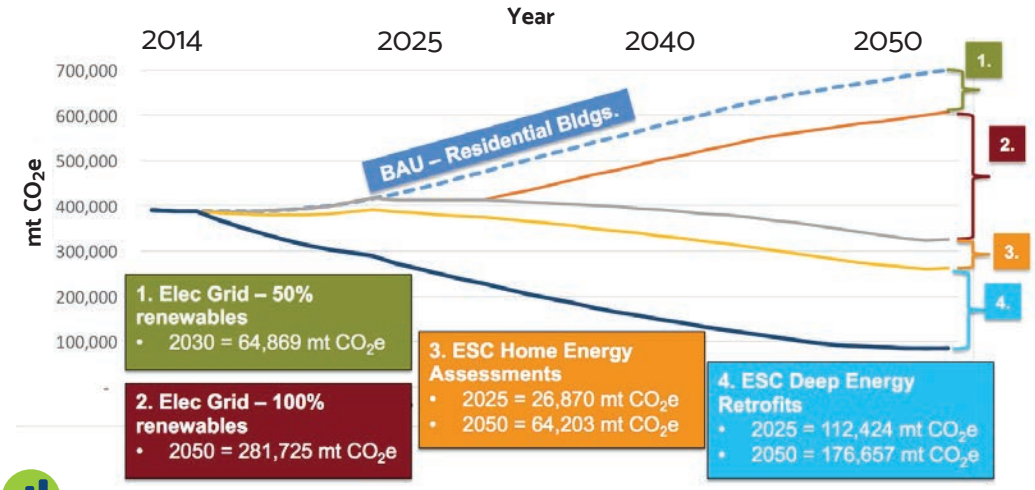
Reducing Emissions: Residential

Residential homes create 24% of the total GHG emissions generated in Eagle County. There is a significant opportunity to reduce residential energy use with increased energy efficiency and conservation efforts. The Colorado State Demographer reports that of Eagle County's 31,675 housing units (this figure does not include commercial lodging properties), 38% were considered "vacant" or unoccupied in 2014. Energy efficiency retrofits from local programs, such as Energy Smart Colorado, can reduce a home's energy use by 20-30% and save residents hundreds of dollars on their annual energy bills.

Residential Buildings Sector: Top Recommended Goals and Strategies

- Reduce GHG emissions 25% below 2014 levels in the residential buildings sector by 2025.
- For existing residential buildings, expand the local Energy Smart Colorado energy efficiency program and incentives in order to reduce GHG emissions in 25% of all residential buildings in Eagle County by 2025, 50% of all residential buildings by 2035, and 100% by 2050.
- Provide support and incentives for rental units to be updated with energy efficiency improvements.
- For new residential buildings, adopt "above building code" standards and provide incentives, including "net zero" codes, that are consistent across jurisdictional boundaries throughout Eagle County.
- Update Eagle County Eco-Build mitigation fees to include all energy-use for large homes over the average Eagle County home size of 3,700 sq. ft., not just offsetting heated exterior surfaces and pools.
- Promote and incentivize efficient use of water in interior and exterior of residential buildings.
- Continue partnerships with local energy utilities in order to leverage more economic incentives.

Residential Buildings Sector Mitigation Wedges



This graph was developed by Dr. Abel Chávez using "EMiTT" (Effective Mitigation Transition Tool) to help visualize, model, track, and quantify climate action mitigation targets. This graph is a hypothetical scenario that includes the following GHG abatement pathways: 1) electricity from the grid would include 50% renewable energy by 2050 and 100% renewable energy by 2050, and 2) Energy Smart Colorado would reach the recommended goal of 100% of homes in Eagle County receiving home energy assessments, and half of those homes would complete deep energy retrofits. This graph illustrates that the Eagle County community can take climate action and make significant GHG emission reductions. Fixing aging, leaky buildings is a great start toward effective climate action, but more actions will be needed to reach recommended targets. (BAU = Business As Usual)

Reducing Emissions: Commercial

Commercial buildings and facilities account for the top sources of GHG emissions in Eagle County. A large amount of energy waste occurs due to inefficient buildings, high energy demands, deferred maintenance, inattention to building performance, and inefficient behavior on the part of occupants. Given current advances in energy efficiency technology and financing programs, there can be up to 40-60% reduction in building-generated GHGs (American Council for an Energy Efficient Economy, 2014). The commercial buildings that exist today will be inhabited into the foreseeable future; therefore, maximizing building efficiency will help ensure reduced energy demands well into the future.

Commercial Buildings Sector: Top Recommended Goals and Strategies

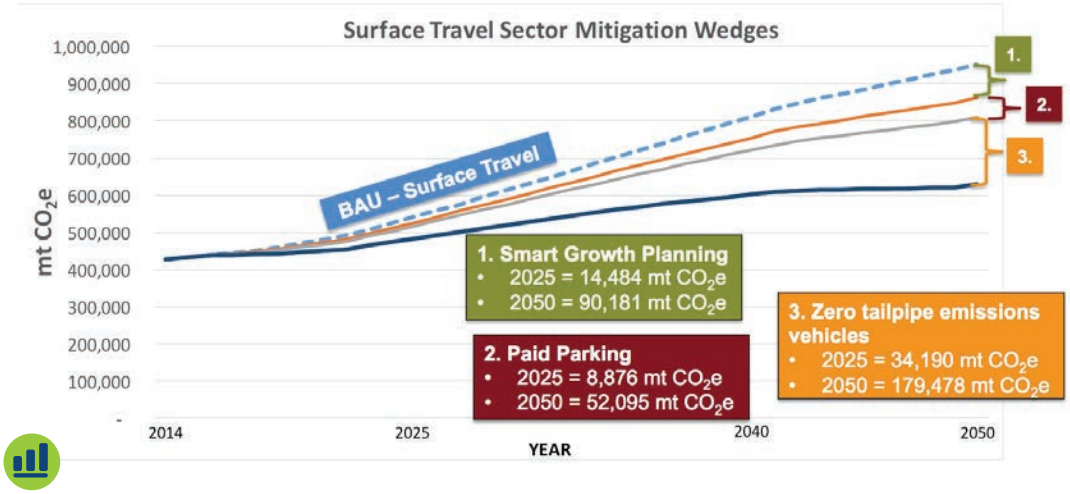
- Reduce GHG emissions 25% below 2014 levels in the commercial buildings and facilities sector by 2025.
- For existing commercial buildings, expand the Energy Smart Colorado energy efficiency program and incentives in order to reduce GHG emissions in 25% of all commercial buildings in Eagle County by 2025, 50% of all commercial buildings by 2035, and 100% by 2050.
- Provide support and incentives for buildings over 10,000 square feet to measure and track their energy use through CLEER's Energy Navigator, the Energy Star Portfolio Manager, or other energy monitoring tools.
- For new and newly remodeled commercial buildings, adopt "above building code" standards and incentives, including "net zero" codes that are consistent across jurisdictional boundaries throughout Eagle County.
- Promote and incentivize efficient use of water.
- Continue partnerships with local energy utilities in order to leverage for more economic incentives.

Transportation and Mobility

The majority of GHG emissions from transportation are generated from passenger vehicles. The Eagle County community faces a significant challenge due to Interstate-70 and the many vehicles that pass through the county. Nevertheless, significant improvements in local transportation, mobility systems, and infrastructure can reduce locally generated GHG emissions dramatically, while engaging residents and visitors in healthy climate-friendly lifestyles.

Transportation and Mobility Sector: Top Recommended Goals and Strategies

- Reduce GHG emissions 10% below 2014 levels in the transportation and mobility sector by 2025. Consider FREE bus service and expanded services throughout the county.
- Continue to pursue rail transit opportunities to utilize the existing railroad tracks from Dotsero to Leadville.
- Expand the network of electric vehicle charging stations and promote state and federal incentives for purchasing electric vehicles.
- Incentivize and encourage multi-modal transportation, including park-and-ride locations and safe county-wide bike commuting paths and lanes.
- Strive for compact mixed-use communities and land-use patterns with affordable workforce housing in close proximity to job centers to enable walking, biking, and transit.



This graph is a hypothetical scenario that includes the following GHG abatement pathways: 1) 1% of the Eagle County population annually adopts driving a zero emission at tailpipe vehicle/electric vehicle, 2) increase in paid-parking, reducing the number of people who drive a car to work, 3) all new population growth to the year 2050 lives and works in transit-oriented neighborhoods and workplaces. (BAU = Business As Usual)

Waste and Landfill

The waste and landfill sector refers to methane GHG emissions that result from anaerobic decomposition of organic waste in the landfill. During the first 20 years after its release into the atmosphere, methane gas is 84 times more potent as a GHG than CO_2. The 2015 Eagle Valley waste diversion rate was 19.6%, and the recycling rate was 26.9%. There is an effort at the national and state levels to transition away from disposal and towards materials management. The greatest positive impacts in this sector can be realized through reducing materials altogether through more sustainable purchasing practices.

Waste and Landfill Sector: Top Recommended Goals and Strategies

- Meet and exceed the current Eagle County landfill waste diversion goal of 30% diversion rate by 2030, and set an inspiring and achievable waste diversion target that is above the national average.
- Divert 30% of organics currently landfilled by 2030 through increased composting infrastructure and services.
- Support sustainable purchasing policies and practices, and incorporate supply chain management systems.
- Add new programs and infrastructure to increase recycling and composting in public areas that are currently deficient, and address hard-to-recycle items like, construction waste and mattresses.
- Support and incentivize recycling and composting services for multi-family buildings which often face challenges, such as high resident turnover and contamination of recycling containers.
- Integrate local waste diversion plan and solutions with the 2016 Colorado Integrated Solid Waste & Materials Management Plan, designed to provide guidance, cost analysis, strategies, and recommendations to communities and local governments.

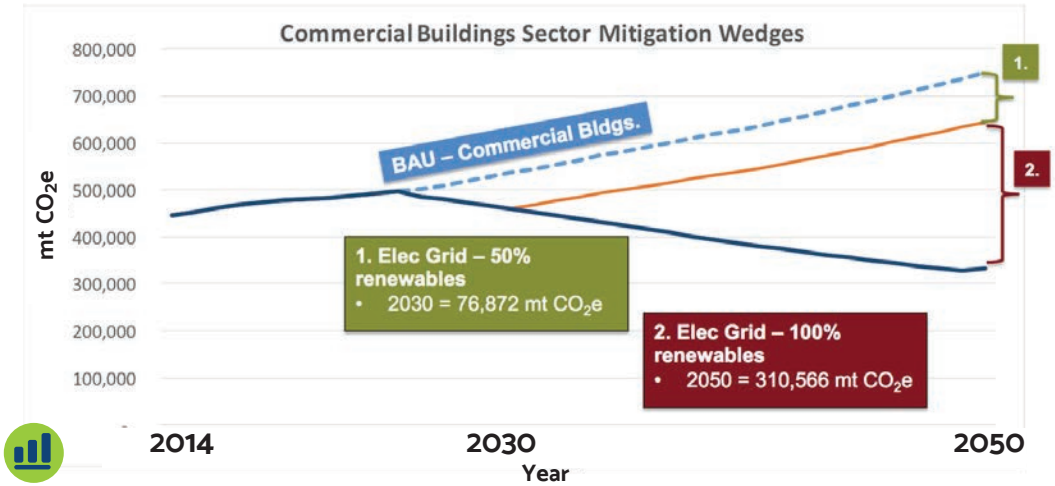
This graph is a hypothetical scenario that includes diverting half of the compostable materials that currently end up in the landfill. Compostable organics, including paper, account for 60% of the overall tonnage brought to the landfill on an annual basis. (BAU = Business As Usual)

Energy Supply

In 2004, Colorado became the first state in the U.S. to create a renewable energy portfolio standard in order to reduce GHG emissions. As the primary provider of energy for buildings and commercial uses throughout the Eagle County community, member-owned utility Holy Cross Energy provides electricity and strives to be a conscientious steward of natural resources. Holy Cross Energy was a pioneer in Colorado, offering consumers the option of purchasing renewable energy to offset GHG emissions. Partnering with utilities, such as Holy Cross Energy, Xcel Energy, and Black Hills Energy, is key toward making large-scale energy supply transitions.

Energy Supply Sector: Top Recommended Goals and Strategies

- Create more financial resources and incentives, and increase the capacity of exterior energy offset programs within the Eagle County community (examples: Eagle County Eco-Build Program, Avon Exterior Energy Offset Program, and Aspen Renewable Energy Mitigation Program), and strive for consistency across jurisdictional boundaries.
- Research feasibility of local and regional locations for community solar arrays.
- Encourage utilities to set aggressive goals to reduce their GHG emissions and transition over time away from coal-fired power production.



This graph is a hypothetical scenario that includes reducing the GHG intensity from the electrical power mix by 50% in 2030 and 100% in 2050. (BAU = Business As Usual)

Key Recommendations for Community Leaders & Decision Makers

The following recommendations support the success of the overall climate action plan and apply to all sectors in this plan:

1. Adopt this climate action plan.
2. Identify people to guide the implementation and follow-through of recommendations in the current plan–designate a task force and hire sustainability/climate staff as needed within local governments and large businesses.
3. Allocate funds for implementation of projects and infrastructure.
4. Collaborate across jurisdictional boundaries for greater impact and likelihood of success.
5. Measure and monitor GHG reduction impacts over time.
6. Begin to address climate change adaptation.

What Does Success Looks Like?

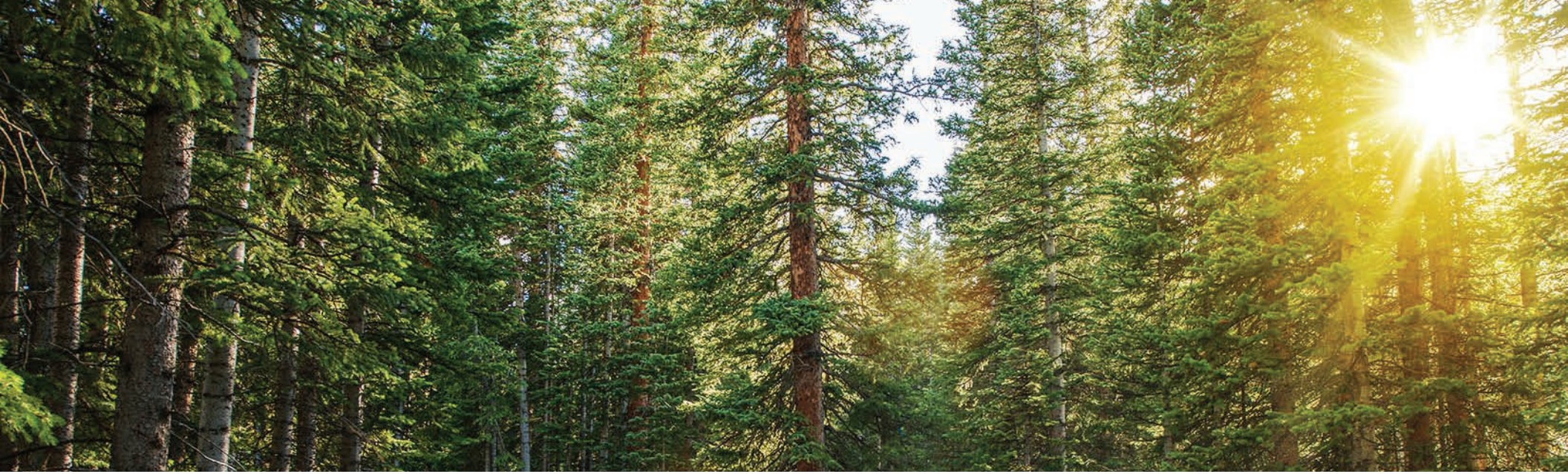
Successful community-driven GHG reduction efforts have several key elements that are centered on realistic and achievable targets, community endorsement and support, and strong alignment with community and organizational values. At the onset of the planning process, the stakeholders identified the following elements that are critical to long-term success of the *Climate Action Plan for the Eagle County Community*:

Set Realistic and Achievable Targets
- GHG reduction targets must be achievable and measurable
- A diverse number of GHG emissions reduction strategies and projects are needed
- Actions must be taken by local governments
- Progress should be monitored regularly
- Celebrate successes along the way to reaching larger goals

Community Endorsement, Ownership, and Support of this Plan is Critical
- There must be broader community awareness of the need for climate action
- Individuals should understand their impacts and responsibilities
- Private sector participation and public-private partnerships are keys to success
- There must be simple, accessible opportunities for individuals to take action
- The community has the tools and resources to reach short and long-term targets

Align the Plan with Community and Organizational Values
- Local governments adopt the plan and hold values that align with the plan
- The plan integrates benefits to the economy, the environment, and social equity
- The plan is a catalyst to coordinated climate action across jurisdiction boundaries
- Local organizations are aligned with the plan and keys to its success
- Local governments strive to coordinate across boundaries
- Minimize policy restrictions that limit people's abilities to take action
- Community-wide climate change education is imperative

Despite the rewards of success, there are challenges to climate action planning and implementation. These include concerns about communication to and adoption by the public, leadership and prioritization of climate change by decision makers, lack of available funding for new projects, lack of long-term coordinated climate action effort, and tangible obstacles such as technology and infrastructure.



CONSIDERATIONS FOR IMPLEMENTATION

- **Breadth of community:** Develop programs and education for both residents and guests
- **Celebrate successes:** Take time to recognize accomplishments along the way
- **Clarity:** Use language and communication tools that the public can understand
- **Funding:** Decision makers prioritize funding for GHG mitigation actions
- **Diversity:** Include a variety of people, strategies, and actions to ensure success
- **Implementation:** Decision makers support human resources to enact projects and policies
- **Infrastructure:** Be ready to make tough decisions about infrastructure and building codes
- **Measurement:** Develop metrics that can be monitored and used by all stakeholders
- **Longevity:** Instill a culture of sustainability, and enact policies that outlast changes in leadership
- **Resistance to change:** Tackle incremental actions that build confidence
- **Unity:** Support towns, county, and other organizations in new climate action partnerships

Call To Action

The success of this plan rests in the hands of the community and its leaders at many levels. The stakeholders have identified projects, programs, and policies that are both feasible and meaningful for the Eagle County community. In order to meet the 2025 target of 25% reduction of GHG emissions, and the aspirational but critical goal of achieving the 2050 target of a minimum of 80% reduction, this plan must be adopted quickly, shared throughout the community, and supported with meaningful resources.

APPENDIXES

Appendix A: Project Ideas & Recommendations

This Appendix includes detailed tables for each of the six sectors including a basic explanation of each and why they matter. This section also includes lists of recommendations for reducing GHG emissions through water conservation and soil carbon sequestration. The tables include an overview of what is already being done in Eagle County, as the county, towns, and other entities have already undertaken meaningful work in reducing GHG emissions. Finally, the tables include details on programs, projects, and policies that can be undertaken to reduce GHG emissions. These robust lists were developed by the stakeholders in order to provide all users of this climate action plan a place to begin mitigating GHG, and they are reflective of the "triple bottom line" of people, planet, and profit. The stakeholders' intent is that the county, towns, and other entities use these tables to help guide conversations about planning, policy development, and project implementation.

The tables on the following pages also include three columns highlighting ideas that the stakeholders felt would be of special interest to businesses, towns, and the county.

Commercial Buildings and Industrial Energy

This sector includes traditional commercial buildings, multi-family housing, ski area operations, and commercial area heated streets and driveways.

Why focus on the commercial building sector? At 32% of 2014 emissions, this sector constitutes the largest component of the Eagle County community's GHG emissions. The emissions from this sector can be mitigated through incentives for commercial building owners and landlords, new energy efficient technologies, community solar gardens, education, and sustainable practices in the hospitality sector.

What's already being done: Energy rebates from Energy Smart Colorado (Eagle County Eco-Build Fund, Avon Exterior Energy Offset Program) and Holy Cross Energy, Actively Green Sustainable Business Training and Certification Program, county and municipal goals to reduce energy use, private sector sustainability initiatives, Eco-Schools programming, and more.

Cont'd Page 25

Commercial Buildings & Industrial Energy

Programs and projects	Importance to stakeholders	Recommended especially for businesses	Recommended especially for towns	Recommended especially for county
Modify buildings to maximize natural light; add dark sky compliant lighting retrofits	High	✓		
Increase assessments and rebates for renewable energy use on commercial properties	High	✓		
Adopt SmartRegs for buildings	High		✓	✓
Include more advanced levels of Actively Green	High	✓		
Land planning: encourage gardens, green roofs, and native plants in all commercial buildings; create infrastructure for construction and demolition waste, convert golf course "rough" areas into natural habitat	High		✓	✓
Make sustainability practices part of consideration in awarding contracts/ new building requirements - onsite or offsets	High		✓	✓
Allow renters in multi-family buildings to make energy-smart recommendations to building owners			✓	
Encourage landlords to use "green leases"; incentives for landlords		✓	✓	
Develop baseline energy usage for commercial buildings / plazas		✓	✓	
Minimum rental energy efficiency guidelines			✓	
Reduce hotel energy use: install key cards that turns on/off utilities for each room; install timers on gas fireplaces; install occupancy sensors and better automation systems; more education for hospitality sector		✓		
Expand Energy Smart to beyond retrofits; focus on multi-family, low income units			✓	✓
Hold annual meeting of building officials and planning and design review boards to exchange ideas and best practices				✓
Policies and regulations	**Importance to stakeholders**	**Recommended especially for businesses**	**Recommended especially for towns**	**Recommended especially for county**
Require green laundry practices and efficient toilets at hotels		✓		
Expand local mitigation programs and fees on snowmelt to address outdoor energy use	High		✓	
Develop net zero building codes and certification programs			✓	✓
Set wattage limits for lighting for new/remodeled buildings and dark sky code				
Encourage local stores to sell only LED lights		✓		
Incorporate flexible work hours and telecommuting to reduce building energy use		✓		
Support free building phase two audits / recommissioning				

Residential Buildings

This sector includes residential homes, both primary and second homes, and multi-family residences with fewer than five units.

Why focus on the residential building sector? Residential building-use constituted 28% of emissions in the Eagle County community in 2014. This large component of the community's emissions can be addressed with homeowner education, energy efficiency audits and incentives, building codes, and other local programs.

What's already being done: Energy Smart Colorado and Holy Cross Energy home energy assessments and rebates for retrofits, 'green' MLS program, access to community solar and wind projects through Holy Cross Energy, and more.

Programs and projects	Importance to stakeholders	Recommended especially for businesses	Recommended especially for towns	Recommended especially for county
Expand Energy Smart Colorado; more education on existing rebate programs; shift to performance based programs	High			
Incentives for landlords and short-term rentals to be more efficient	High			✓
LED light bulb giveaways or conversions; require only LED holiday lights; buy-back program for non-LED lights		✓		
Multi-zone split systems for efficient electric baseboards				
Smart sensors in homes, especially large second homes				
Town-sponsored events and programs that support energy efficiency		✓	✓	
Develop net zero building codes and certification programs			✓	✓
Work with HOAs to promote low water use and energy efficiency practices			✓	
Policies and regulations	**Importance to stakeholders**	**Recommended especially for businesses**	**Recommended especially for towns**	**Recommended especially for county**
Promote water conservation – native grasses, organic matter, xeriscaping	High		✓	
Generate new sources of revenue for income qualified energy efficiency upgrades; employers could offer as benefit to employees	High	✓	✓	
Eco-Build 3.0 – above 2015 IRC codes for new and existing buildings	High		✓	✓
Consistent building codes across local political boundaries to increase building contractor's time efficiency and avoid "jurisdictional shopping" by contractors	High		✓	✓

Transportation and Mobility

This sector includes transportation and transit-oriented design. It also includes the Eagle County Regional Airport.

Why focus on the mobility sector? Almost 30% of the Eagle County community's 2014 emissions came from this sector (3% was from the Eagle County Regional Airport). This sector represents an area in which great gains can be made with policy, infrastructure, education, and a "culture change" among residents and visitors.

What's already being done: ECO Transit, Town of Vail bus system, Sole Power program, improved bike path development, policies to support use of electric bikes, small scale bike share programs, idling policies, and more.

Programs and projects	**Importance to stakeholders**	**Recommended especially for businesses**	**Recommended especially for towns**	**Recommended especially for county**
Change car culture; company incentives for collective transport and telecommuting/encourage remote working	High	✓	✓	
Bicycle education programs (ex: learn to ride safely, bike repair classes, bike donation/earn a bike programs); bicycle sharing program; E-bikes sharing program	High		✓	
Electric vehicle infrastructure and incentives; electric buses, more electric charging stations	High	✓	✓	✓
Car sharing programs	High			✓
Bike sharing programs and more bike parking areas	High	✓	✓	
Complete connectivity for biking/walking between towns and better designated bikeways to improve safety			✓	✓
Public transport service with existing rail line				✓
Shared work spaces (co-working spaces shared by businesses and others) so people don't have to commute cross county)		✓		
Policies and regulations	**Importance to stakeholders**	**Recommended especially for businesses**	**Recommended especially for towns**	**Recommended especially for county**
Transit-oriented design zoning	High		✓	✓
Local in-proximity to workplace affordable housing to reduce commuting miles; reduce county sprawl infrastructure extensions	High		✓	✓
Commit to low carbon emission, and zero tailpipe emission, vehicles and equipment		✓	✓	✓
Ride share/carpool service		✓		
Charge for parking			✓	
Encourage carpooling in company vehicles		✓		
Emissions testing; increase MPG policies				✓
Funding for low cost/free transit; first study who uses and if this would be productive				✓

Waste and Landfill

This sector includes waste diversion, residential and commercial recycling, and the county landfill.

Why focus on the waste reduction sector? Reduce-Reuse-Recycle, all three R's are important. In 2015, the overall waste diversion rate of the Eagle Valley was 19.6%. This included general recycled materials, organic materials including yard waste, and household hazardous waste including electronic waste. Eagle County has set an overall waste diversion goal of 30% by 2030. The Eagle Valley recycling rate was 26.9% in 2015; this is below the national average of 34%. Waste reduction, recycling and composting, and sustainable purchasing are areas in which the community can have a greater impact through policy, better infrastructure, education, and programs. A 2010 study of the waste stream at the Eagle County landfill revealed that 40% of current landfill waste could be processed as compost if a commercial scale facility were available.

What's already being done: Eagle County Materials Recovery Facility, waste haulers provide recycling, county and town supported recycling drop-off sites, e-waste collection events, zero waste events, collaboration amongst Eagle Valley Waste Diversion Steering Committee, waste reduction goals set by local governments and other entities, Actively Green Sustainable Business Training and Certification Program, Eco-Schools, and other programs. One town has recently implemented a plastic bag ban and a recycling ordinance.

Educational tours to the landfill and recycling facility are very popular.

Cont'd Page 29

Programs and projects	Importance to stakeholders	Recommended especially for businesses	Recommended especially for towns	Recommended especially for county
Update Eagle Valley Waste Diversion plan; consider increasing waste diversion goals	High			✓
Ensure all schools recycle and compost (when commercial composting becomes available)	High		✓	✓
Reuse construction materials (lumber and construction and demolition waste)	High		✓	
Group for sustainable purchasing, including local food purchasing	High	✓		
Infrastructure improvements for waste diversion, possible single stream at MRF, organic waste diversion	High			✓
Zero waste events supported by towns and event producers		✓	✓	
Repurpose waste into energy or materials				✓
Address infrastructure gaps discovered in waste access audit of public spaces		✓	✓	
Visible public recycling areas, drop sites – at bus stops, sidewalks, at events, etc.			✓	✓
Home and community composting				
Anaerobic digesters and methane capture operations				✓
Policies and regulations	**Importance to stakeholders**	**Recommended especially for businesses**	**Recommended especially for towns**	**Recommended especially for county**
Zero waste event goals – encourage events and event facilities to be zero waste	High	✓	✓	
Research feasibility of increasing landfill tipping fee to support waste diversion efforts	High			✓
Support a Colorado Bottle bill – recycling of glass bottles				
Reduce use of single use shopping bags county-wide			✓	✓
Yard waste collection county-wide			✓	✓
Commercial compost provided			✓	✓
Packaging policies, get rid of Styrofoam		✓	✓	✓
Register pesticide users to protect organic waste			✓	
Consistent county-wide recycling practices and procedures			✓	✓
Waste hauler licensing			✓	
Pay as you throw			✓	✓

Give community members the knowledge and power to understand their impacts and make climate-friendly choices

- Use social-science research on climate change communications for education and outreach strategies (e.g., Yale Program on Climate Change Communication, and George Mason Center for Climate Change Communication resources)
- Incorporate social diversity and inclusivity throughout education and outreach
- Develop a climate action class to feed into current sustainability education programs and trainings
- Convene and educate neighborhood climate action groups
- Continue to host educational tours to the landfill, and include the materials recovery facility (MRF) and hazardous household waste facility
- Host household zero-waste training for residential homeowners
- Educate home owners and businesses on shutting down and unplugging when leaving the home or office (reduce "vampire" energy-use)
- Educate and incentivize second homeowners to reduce energy use
- Promote use of "smart hubs" to understand real-time energy use
- Conduct trainings specifically for property managers and landscapers
- Educate land owners and users on climate-friendly land use practices

Support businesses in climate-friendly practices

- Encourage more participation of businesses in the Actively Green Sustainable Business Training and Certification Program
- Reduce waste through sustainable purchasing practices and less packaging
- Provide more employer/employee climate action and sustainability training
- Leverage the VVP Actively Green Awards and the Annual Actively Green Awards Party for businesses
- Engage local organizations and groups in educating businesses
- Provide cards for hotel rooms and short-term rentals; educate guests on why their efforts matter (water-wise signage, etc.)
- Develop employee field experiences, retreats, and experiential learning for climate science understanding for mountain communities

Cont'd Page 31

Create a culture in the community that promotes climate action and sustainability

- Create a climate education team to educate about and support implementation of the Climate Action Plan
- Provide an e-newsletter with updates on progress related to the Climate Action Plan
- Create a valley-wide marketing campaign to elevate day-to-day awareness of climate action and sustainable living
- Use an "education-through-demonstration" approach to showcase climate-friendly building, landscaping, and other best-practices
- Share the benefits with visitors, such as carbon sequestration and water conservation

Engage school children and their families for long-lasting change

- Expand the Eco-Schools program at all K-12 schools to educate and recognize youth for their leadership, and incorporate energy saving programs and infrastructure at all schools
- Develop competitions for schools on 'how to reduce carbon footprint'
- Develop "farm-to-school" fresh, local food served in school cafeterias, and teach food production and gardening as part of the curriculum

Ideas for an education and marketing campaign promoting climate action

- Develop a multi-media brand platform
- Create a video about actions that can be taken to promote climate action
- Utilize local media, TV, radio, and social media
- Fund an educational point position with responsibilities to oversee implementation of climate action education and outreach
- Use standardized and frequently communicated, measurable goals
- Use empowering positive messages and real-world examples
- Focus messages on improved quality of life, connect the message to people and the future
- Identify influencers and have them speak up–local celebrities and leaders at regular and fun community events
- Host "Trash Talk" about waste with winter visitors–education campaign
- Train volunteer advocates for each neighborhood to share ideas with their neighbors; work through neighborhood and homeowner associations
- Include outreach to all community sectors, associations, clubs, chambers, etc.

Energy Supply

1. Reduce reliance on coal-fired power plants, and add more renewable energy sources
2. Provide consumers an option to return equity checks back to Holy Cross Energy to invest in clean power or energy efficiency programs
3. Restructure utility rates to make energy efficiency and conservation more attractive
4. Educate utility co-op owners to advocate for changes
5. Identify areas for local solar arrays
6. Explore use of geothermal energy supply for homes and commercial buildings
7. Explore new technologies, such as storage, to increase renewable energy usage
8. Support Colorado Communities for Climate Action (policy initiatives and lobbyists at the state-level focused on GHG reduction)

Additional Recommendations

Water Conservation and Energy

Water conservation reduces demand for both water and energy. Conserving water can play an important role in reducing GHG emissions. The storage, transport, and delivery of water for commercial, residential, and agricultural needs lead to significant GHG emissions. The stakeholders recommend several strategies to conserve water and save energy:

- Educate people that all water consumed has to be pumped and processed, requiring energy
- Support water utilities and local governments in initiatives to reduce water consumption in facilities and operations
- Include more heat recovery systems that use heat energy from discharged treated effluent, such as Avon's Community Heat Recovery System that heats the pools at the Avon Recreation Center using heat energy from the Avon Waste Water Treatment Facility
- Reduce use of water in residential and commercial properties
- Develop small hydro plants for electricity generation
- Create a study on incentives to switch to xeriscaping for buildings and residences
- Work with HOAs to promote low water use and energy efficiency practices

Carbon Sequestration and Land Management

Organic matter holds carbon in the soil. Land management, landscaping, farming, and ranching practices that support healthy soil development can also be important ways to capture, or sequester, GHGs in the soil and help protect the atmosphere. Below are recommendations related to carbon sequestration:

- Engage agencies, such as CSU Extension, USDA, NRCS, Betty Ford Alpine Gardens, and The Ground Up, to provide education on land management techniques that increase carbon storage
- Reduce methane emissions by stopping biodegradable materials from entering the landfill, composting can be a vital way to restore and protect the climate
- Promote leaving grass clippings on the ground to return nutrients to the soil
- Reduce impermeable surfaces, and encourage catchment of water that promotes healthy ecosystems
- Encourage green roofs with native plant species that do not require a large amount of water
- Reduce use of synthetic fertilizers and pesticides that are made from fossil fuels that contribute to climate change
- Encourage holistic approaches during revegetation and restoration after disturbances, such as after building and infrastructure construction or after natural disasters (e.g., fires and flooding)

Appendix B: Stakeholder Meetings and Public Engagement Information

Guiding Principles for Stakeholder Group

- Value each other's and the community's input and knowledge
- Keep in mind the triple bottom-line: "people, planet, profit"
- Take calculated risks
- Address all sectors that contribute to GHG emissions
- Develop meaningful goals and metrics to show progress through time
- Strive for informed consent on decisions

Stakeholder Meeting Dates

March 21, 2016
April 18, 2016
May 23, 2016
June 20, 2016
August 22, 2016
November 14, 2016

Stakeholder Meeting Notes and Materials

Meeting notes, slideshow presentations, and other supporting materials can be found at www.walkingmountains.org/cap.

Public Open House Sessions

September 14, 2016, Brush Creek Pavilion, Eagle
September 19, 2016, Grand View, Lionshead Welcome Center, Vail
September 22, 2016, Miller Ranch Community Center, Edwards

Eagle County Energy Inventory

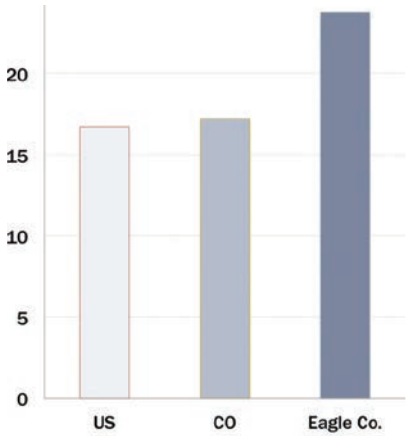
2014 data on energy use, costs and GHG emissions

KEY FINDINGS

- Greenhouse gas emissions from energy use in Eagle County in 2014 totaled 1.4 million metric tons of carbon dioxide equivalent (CO2e).
- The single largest source of emissions, at 39 percent, is from the generation of electricity used to power residential and commercial buildings and facilities.
- Greenhouse gas emissions on a per capita basis are higher in Eagle County than in Colorado or the U.S. As a resort community, Eagle County has more second homes, hotels and energy intensive recreation facilities.
- Consistent with national findings, Eagle County transportation emissions come primarily from passenger vehicles.
- The Eagle County community spent $243 million in 2014 on energy, for electric and natural gas bills and for diesel and gasoline transportation fuels.
- If the community as a whole became 10 percent more energy efficient, $24 million could stay in the community each year to strengthen the local economy.

Section 1: Overview of Emissions, Energy Costs and Energy Use

Total 2014 carbon dioxide equivalent (CO_2e) emissions:
1,387,080 metric tons

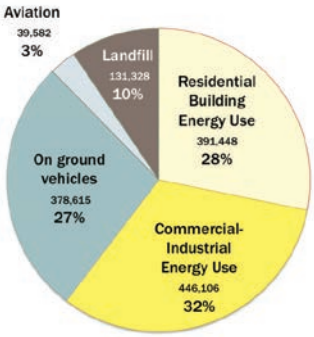


1. Emissions per Capita, 2014
Metric tons of CO_2

Greenhouse gas emissions divided on a per capita basis are 28 percent higher in Eagle County than in Colorado. Contributing factors are transportation, second homes and lodging.

See appendix for details about household energy use and the impact of second homes on energy use.

2. Emissions by Sector, 2014
Metric tons of CO_2e



3. Emissions by Source, 2014
Metric tons of CO_2e

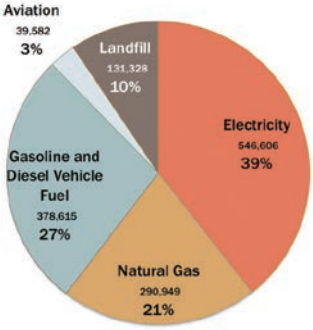


Chart 2 illustrates the sources of emissions by use, while Chart 3 illustrates emissions by fuel source. The residential and the commercial/industrial sectors contribute the largest percentage of total emissions in the county. By fuel, electricity use contributes the largest share of emissions, followed by gasoline and diesel fuels for transportation.

4. Energy Costs by Source
Total energy costs: **$243.5 million**

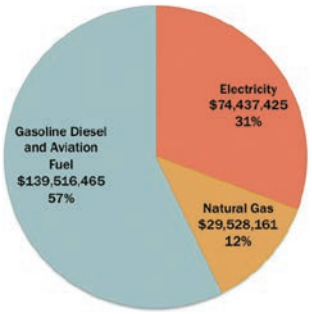


Chart 4 shows that more than half of energy costs are for transportation fuels (based on 2014 average price of $2.92/gallon). Natural gas prices in Colorado rank 47th in the U.S., thus the small wedge for natural gas costs.

5. Energy Use by Source, 2014
Total energy use: 18.8 trillion BTUs

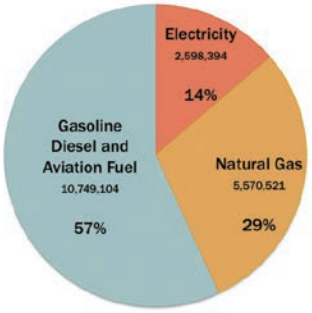
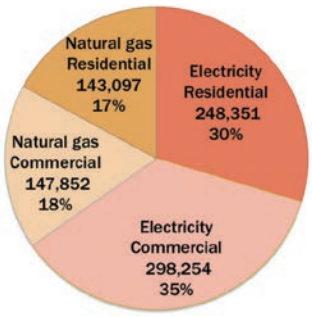


Chart 5 converted gallons of transportation fuel, kilowatt hours of electricity and therms of natural gas into a common, industry standard energy unit, the British thermal unit (BTU). See Appendix for the definition of BTU.

Section 2: Utility Energy

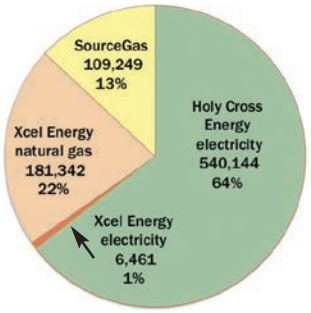
6. Emissions by Sector

Metric tons of CO_2e

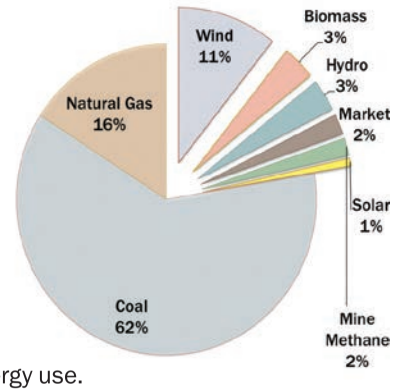


7. Emissions by Utility

Metric tons of CO_2e



8. Holy Cross Energy Electricity Sources



CO2 emissions/year: 831,384 metric tons

Average CO2 intensity: 1.57 lb. per kWh

Renewable energy: 20.3%

Member-owned renewable systems: 517
Capacity: 3,492 kW

Meters in Eagle County:
29,335 residential
6,304 commercial

Electricity is the dominant source of emissions from building energy use.

Section 3: Emissions from Buildings, Facilities and Industry

9. Emissions by Community by Residential and Commercial Sector, 2014

Metric tons of CO_2e

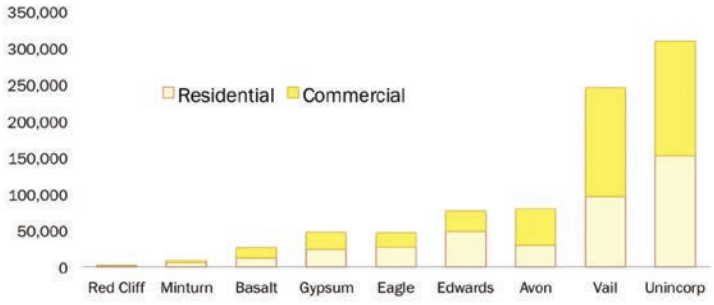


Chart 9 shows total emissions in each community from building, facility and industrial energy use in the residential and commercial sectors.

Notes for Charts 9 and 10:

Edwards: Data for Edwards, an unincorporated community, includes the entire 81632 zip code.

Unincorp: Abbreviation for "unincorporated" includes meters in unincorporated Eagle County other than the Edwards 81632 zip code. Unincorporated Eagle County has more population and housing units than any of the county's individual municipalities.

Commercial: A utility designation for a meter on properties such as hotels, multi-family complexes with one meter, recreational facilities (lifts and snow-making equipment), governments, schools, retail, industrial and manufacturing facilities.

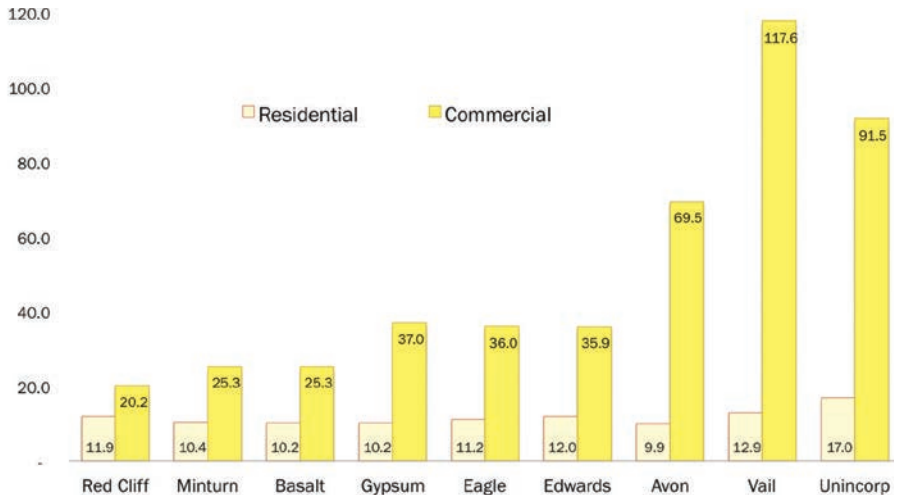
Businesses and governments often hold many utility accounts for the multiple properties they own or lease. In this chart, each utility account is counted separately, regardless of ownership.

10. Emissions by Community by Residential and Commercial Utility Account, 2014

Metric tons of CO_2e

Chart 10 shows emissions by community based on the number of residential (light yellow) and commercial (dark yellow) electric utility accounts in each community and in unincorporated areas (far right bar).

While commercial energy use per account is higher than residential, it's important to note that there are about five times as many residential accounts as commercial accounts across Eagle County. However, total energy use between the two sectors is close, 53 percent for commercial and 47 percent for residential (see Chart 6).



Section 4: Transportation Energy Emissions and Use

11. Eagle County Transportation Emissions, 2014

Metric tons of CO_2e

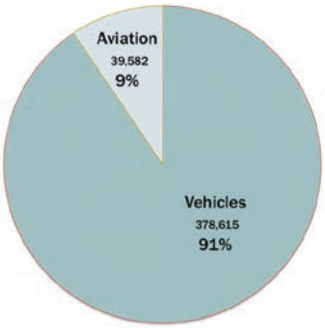


Chart 11. To calculate motor vehicle energy use, the research team determined that the best available method was to use Colorado Department of Transportation traffic statistics for Eagle County.

CDOT data does not include county roads or city streets. Because of this missing information, this inventory's estimate is inherently conservative and is very likely an underestimate of total transportation energy use.

Because of the economic importance of I-70 to the region for destination traffic, the high percentage of local traffic on I-70, and the built-in underestimation due to missing city street traffic, the research team chose to include 100 percent of I-70 traffic to represent the county's total vehicle miles traveled.

12. Eagle County Energy Use by Vehicle Class, 2014

Thousands of Gallons

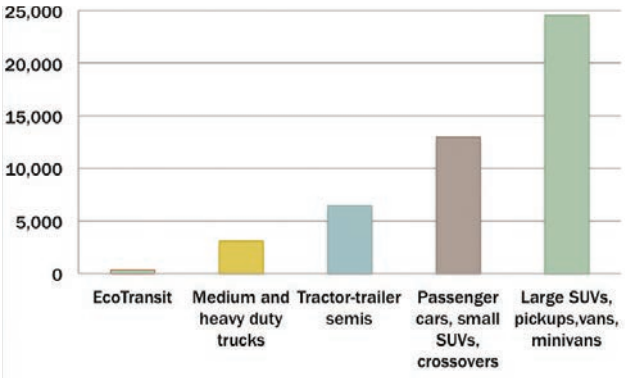


Chart 12. The majority of gasoline and diesel fuel use is for vehicles that carry passengers. The two bars on the right represent small and large passenger vehicles. Combined, they account for 79 percent of gasoline and diesel gallons used in Eagle County. Medium and heavy-duty trucks and semis use 21 percent of gasoline and diesel gallons.

13. U.S. Transportation Sector Emissions by Source

Metric tons of CO_2e

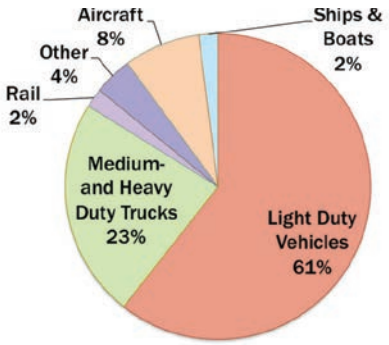


Chart 13. Within the U.S. transportation sector, light-duty vehicles (including passenger cars and light-duty trucks) were by far the largest category, responsible for 61 percent of emissions. Medium- and heavy-duty trucks made up the second largest category, with 23 percent of emissions. Between 1990 and 2013, emissions nationwide in the transportation sector increased more in absolute terms than any other sector (i.e. electricity generation, industry, agriculture, residential, or commercial).

Section 5: Recommendations

Energy Efficiency: Energy efficiency programs need to address electricity consumptions in residential, commercial and industrial sectors across the county. The greatest potential for emissions reduction is in commercial sector energy use.

Renewable Energy: Partnering with Holy Cross Energy to increase the amount of renewable energy in the utility's power portfolio will decrease emissions from electricity consumption.

Transportation: Programs should focus on reducing passenger vehicle travel and shifting to cleaner-burning alternative fuels. Key components should include increased availability of public transit, growth in public electric vehicle charging stations and use of electric vehicles, and more bicycle travel options within communities.

Policy: Local government partners should work toward similar policies that reduce emissions, such as energy efficiency building codes, land use codes that encourage compact walkable communities and transit-oriented development, and multi-modal transportation planning.

Areas of Further Study

- Travel pattern study to assist with local traffic emissions calculations and planning for mass transit.
- Updated waste composition study at the Eagle County Landfill to ensure more recent data is incorporated into future inventories and to acknowledge improvements at the landfill.
- Energy use study to differentiate between occupied and unoccupied housing.
- Energy use study specifically focused on resort operations.

Appendix

Energy and Emissions by Population and Household

Per capita and per housing unit calculations are one way to compare one community's energy use to others, even when population totals are different. However, these calculations can be difficult to apply in a resort-dominated community such as Eagle County.

Per Capita: A per capita calculation divides energy use or emissions by the permanent population of the community, as shown in Chart 1 (page 1). The Eagle County population used for this calculation was 52,831.

Chart 1 shows a much higher rate of emissions per capita for Eagle than for Colorado or the United States. Eagle County's large resort industry, which includes ski lifts and on-mountain facilities, and a high density of lodging, dining and retail establishments in eastern Eagle County, acts like other large energy-using industries would in skewing the per capita emissions figure.

Per Housing Unit: Per housing unit calculations are another means of comparing one community's energy use to others, specifically in the residential sector. These calculations divide total energy use in the residential sector by the number of households or residential service meters in that community. This calculation excludes emissions from the commercial sector, avoiding the imbalance seen in Chart 1.

However, the per housing unit calculation is also difficult to apply in Eagle County, because a high percentage of residential units are used sporadically or seasonally as second homes and vacation rentals. These second homes and vacation rentals use energy whether they are vacant or occupied, although they would presumably use less energy when vacant.

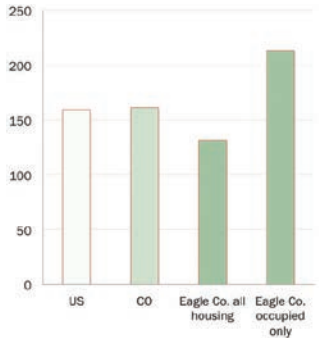
The Colorado State Demographer reports that of Eagle County's 31,675 housing units (this figure does not include commercial lodging properties), 38 percent were considered "vacant" or unoccupied in 2014. Colorado's average vacancy rate in 2014 was 7.6 percent.

Utility companies, however, do not differentiate between permanently occupied homes and sporadically occupied second homes and vacation rentals. So it's impossible, without further study, to calculate energy use by permanently occupied compared to sporadically occupied homes.

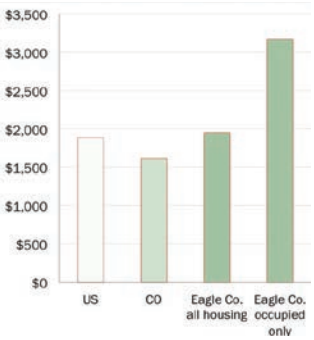
For this inventory, the research team ran the per housing unit calculation both ways, dividing all residential energy use by all housing units (second bar from right in Charts 15-18), and dividing only by permanently occupied units (right bar). Neither bar accurately depicts average household energy use for Eagle County. Dividing by all units yields a low per-unit average, while dividing only by occupied units yields an unfairly high per-unit average. The true number is probably somewhere in between.

Energy per Household per Year, 2014

14. Energy Use, in million BTUs

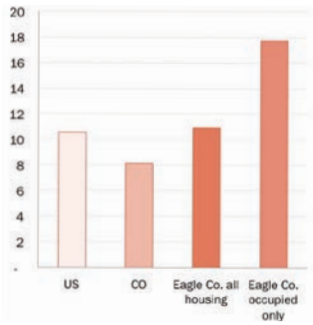


15. Energy Cost

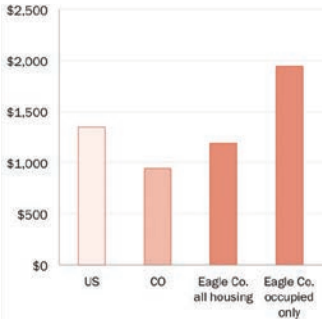


Electricity per Household per Year, 2014

16. Electricity Use, in mWh



17. Electricity Cost



18. Occupied and unoccupied housing units, 2014

Eagle County has a high percentage of unoccupied housing units compared to Colorado overall, or to non-resort counties such as Garfield County. Summit County has an even higher percentage of residential units considered unoccupied.

What is a BTU?

Charts 5 and 15 report total energy use by a common unit, British thermal unit or BTU.

One BTU is the amount of work needed to raise the temperature of 1 pound of water by 1 degree F. For a physical example, burning one 4-inch wooden kitchen match generates 1 BTU.

Sources and Acknowledgements

Data collection and analysis by Erica Sparhawk, CLEER, and Rick Heede, Climate Mitigation Services

Special thanks to the Eagle County Commissioners, Jeanne McQueeney, Jill Ryan and Kathy Chandler-Henry, for their continued work to address climate change, for their understanding of the importance of energy, and for commissioning this emissions inventory for enacting informed climate action policies.

The following individuals provided data, insight, support and expertise for this report:

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Steve DeGrazio, Xcel Energy

Lisa Pfitzinger and Renae Chandler, Black Hills Energy / SourceGas

Amanda Nolan, Eagle County Landfill

Chris Anderson and Jeffrey Brownback, Eagle County Airport

Energy Inventory Protocol

The Eagle County Energy Inventory quantifies total energy use, costs and carbon emissions by sector and by fuel and utility source, using 2014 as the baseline year.

The inventory's purpose is to understand how and where energy is used and emissions are generated. With this information in hand, each energy-using sector can identify opportunities to increase efficiency, reduce emissions and reduce costs.

This inventory complies with the U.S. Community Protocol for Accounting and Reporting of GHG Emissions (USCP). At least five emission-generating activities must be included for an inventory to be USCP compliant. This inventory surveys five activities: residential energy, commercial energy, vehicles, aviation and the landfill.

Sources

Chart 1

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*

Charts 2 - 7

Eagle County Energy Inventory data gathered from Holy Cross Energy, Xcel Energy, SourceGas, Colorado Department of Transportation, Eagle County Airport

Pitkin, Eagle and Garfield Waste Composition Study, 2009, LBA Associates, funded by U.S. Dept. of Agriculture

Chart 7

In 2016, Black Hills Energy acquired SourceGas.

Chart 8

Holy Cross Energy, 2014 CO2 Emissions Report

Charts 9 - 10

Eagle County Energy Inventory data (usage and customer counts) gathered from Holy Cross Energy, Xcel Energy and SourceGas

Chart 11

Colorado Department of Transportation: Vehicles Miles Traveled Statistics, Data provided by CDOT staff Andrew Hogle and Leo Livecchi.

Chart 12

Vehicle miles traveled (VMT) data was combined with the Aspen VMT Model 2014 prepared by Charlier Associates (2015), the nearest regional data available, to estimate vehicle miles traveled per vehicle type, including cars, pickups, and medium and heavy trucks.

Chart 13

U.S. Office of Transportation and Air Quality: Fast Facts: U.S. Transportation Sector Greenhouse Gas Emissions 1990-2013, EPA-420-F-15-032October 2015: *bit.ly/fastfacts15032*

Charts 14 - 18

U.S. Energy Information Administration: U.S. & Colorado energy comparisons: *bit.ly/EIA-US-Colo*

Colorado State Demographer's Office: Population and Household Estimates for Colorado Counties and Municipalities, 2014: *bit.ly/COCountyMuniHousing2014*

CLEER: Clean Energy Economy for the Region
P.O. Box 428 / 520 S. Third St., Suite 17, Carbondale, Colorado 81623
(970) 704-9200 / CleanEnergyEconomy.net

Appendix D: Glossary of Key Terms

Adaptation – efforts by society or ecosystem to prepare for and adjust to future climate change (e.g., upgrading infrastructure to be prepared for climate change - induced changes in summer temperatures or annual rainfall)
Climate – the average weather over 30 years
Climate Change – a statistically significant variation in either the mean climate or in its variability (decade or longer) due to natural or anthropogenic causes
Mitigation – an effort to reduce or prevent impacts of greenhouse gas emissions (e.g., building more multi-modal trails to reduce vehicle use)
Projection – a model that describes the future of the climate based on trajectories and data
Trend – the trajectory of past climate over short- and long-term periods of time
Resilience – the capability to anticipate, prepare for, or recover from a complex, multi-hazard threat
Weather – the current and short-term way the atmosphere is behaving

Appendix E: Literature Cited

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State of Colorado. 2015. Colorado Climate Plan. http://cwcb.state.co.us/environment/climate-change

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Climate Action Plan for the Eagle County Community