2030 Climate Action Plan

Adopted 2025

ACKNOWLEDGEMENTS

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Community Engagement Hosts

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The Eldo

Elevation Hotel & Spa

Special presentation by Auden Schendler, *Aspen One*

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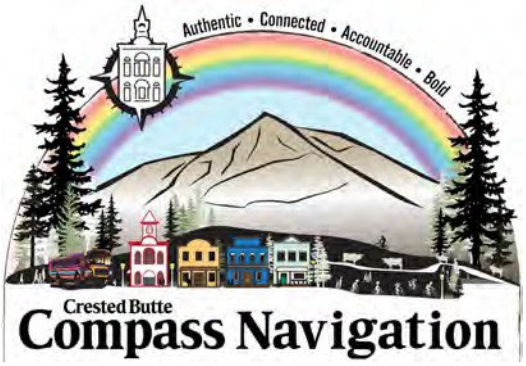
This Climate Action Plan identifies a climate action roadmap for the Town of Crested Butte. To join the Town and take action as a RESIDENT or BUSINESS, click here for resources.

PREFACE

HOW THIS PLAN WAS DEVELOPED

Crested Butte's Climate Action Plan (CAP) is designed to be authentic, connected, accountable, and bold—an actionable roadmap that responds to the urgent realities of climate change. It sets out a meaningful strategy and clear priorities for how a small town like Crested Butte can lead by example in climate action, making a meaningful difference in both local and global contexts.

An Intentional and Interconnected Plan



Crested Butte recognizes the gravity of climate change but also faces pressing challenges such as an affordable housing crisis, workforce shortages, rising living costs, and the need to balance continued tourism growth. To address these interconnected issues, the Town of Crested Butte adopted a holistic, strategic approach, integrating climate action with broader community priorities. This approach, known as Compass Navigation, aligns the Climate Action Plan (CAP) with key initiatives, empowering the town to tackle multiple challenges thoughtfully and simultaneously. Developed amid both unprecedented local collaboration and the global climate crisis, the CAP builds on the Community Compass, created in 2022 as Crested Butte's guiding framework. The Compass established the community's core values and laid the groundwork for a series of interrelated plans, including the 5-Year Strategic Plan, all designed to navigate the town toward a sustainable future.

Transportation Mobility Plan (TMP) – Focuses on de-emphasizing cars while enhancing walking, biking, rolling, and transit options. The CAP supports driving forward the TMP by implementing low-carbon transportation solutions.

Climate Action Plan (CAP) – This CAP integrates climate-focused strategies into all Compass plans, ensuring that sustainability considerations are embedded across town planning efforts.

Historic Preservation Plan (HPP) – Supports the Compass goal of preserving Crested Butte's architectural identity while incorporating energy-efficient building guidelines that respect the town's character.

Community Plan (CP) – Leverages the Town's development regulations to stimulate investment in community-serving housing, businesses, and non-profits. The CAP supports the CP by leveraging zoning strategies to increase housing density and improve transportation efficiency, ultimately reducing emissions.

Following 5 Steps to Value-Based Decision Making

The Community Compass's 5-step process ensures that Crested Butte's Town Council makes informed, values-driven decisions. The CAP was developed using this framework to create a roadmap aligned with parallel planning efforts:

1. **Define the challenge and develop a goal statement** – A 2022 greenhouse gas (GHG) emissions inventory identified key emissions drivers, shaping the CAP's goals and action opportunities.
2. **Commit to a community engagement strategy** – Town leaders convened a Climate Action Plan Committee (CAPC) with community members, a Town Council member, a BOZAR representative, and staff. Broad engagement efforts included a Climate summit, block parties, surveys, open mic nights, and a public comment period to ensure community-wide engagement for this plan.
3. **Identify success measures** – Crested Butte tailored specific criteria to evaluate the impact of climate actions:
    - Reduces GHG emissions (measured in metric tons of CO2 equivalent, MTCO2e)
    - Provides a return on investment ($/MTCO2e avoided)
    - Sets a bold example for mountain communities
    - Takes a proactive rather than reactive approach
    - Leverages regional partnerships
    - Provides community co-benefits
4. **Create alternative solutions and filter them through success measures** – The Town identified potential climate action pathways and refined them based on community input and evaluation criteria.
5. **Make informed decisions** – The CAP supports the Town Council in making bold, well-informed climate decisions based on data analysis and community participation.

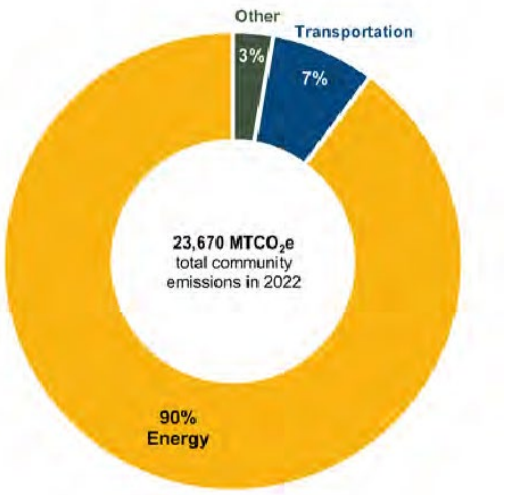
By integrating climate action across multiple planning efforts, this CAP ensures that Crested Butte remains resilient, forward-thinking, and committed to a sustainable future.

Photo credits: Town of Crested Butte & Town of Mt. Crested Butte

EXECUTIVE SUMMARY

Climate change is one of the most important issues facing society and Crested Butte is no exception. This plan provides a strategic roadmap for climate action out to 2030. It builds on the Town's 2019 Climate Action Plan (CAP) to update an understanding of Crested Butte's greenhouse gas emissions and charts an actionable path to reduce them.

The goal of this plan is to act on the urgency of climate change by setting the example of what is possible for mountain communities to take responsibility for our climate impacts and strategically drive down Crested Butte's emissions.



5% Increase in calculated community emissions between 2017 and 2022

Building Energy Sector electricity and natural gas use are the largest source of emissions

At the time of this plan's development in 2024, the United States government was committed to reducing overall U.S. GHG emissions by 61-66% from 2005 levels by 2035 and reaching net-zero GHG emissions economy wide by 2050 (Federal Sustainability Plan, 2024). Overarching strategies included:

- Catalyzing America's Clean Energy Industries
- Transitioning to Zero-Emissions Vehicles and Energy Efficient Buildings Powered by Pollution-Free Electricity
- Increasing Adapation and Resiliency of Supply Chains and Federal Agencies
- Advancing Equity and Environmental Justice

To date, the State of Colorado retains its commitment to climate action and statewide GHG emissions reduction goal of 50% overall emissions reduction in 2030 from 2005 levels. Near term actions at the state level address cross-cutting strategies around utilities, transportation, buildings, oil an gas, industry, and agriculture.

Crested Butte's 2022 GHG emissions inventory revealed that 90% of in-boundary community emissions are produced from building energy use, 51% of which are

produced by residential buildings' energy use. Addressing emissions from existing buildings continues to be one of the more challenging and complex GHG emissions reduction strategies for Crested Butte and significantly reducing emissions must be balanced with other declared emergencies, such as the housing emergency, and community priorities. Should all actions in this plan be realized and utility-level committments met by 2030, **this plan sets a path to reduce the Town of Crested Butte's total community emissions by 52%.**

OPPORTUNITIES FOR EMISSIONS REDUCTION:

Based on this CAP emission inventory, forecasts, community input, and Town Council guidance, Crested Butte's key opportunities for emissions reduction are clear:

Buildings (B): Empower and incentivize the community to reduce energy use, electrify buildings to maximize the future benefits of a renewable-energy grid, and encourage efficient land use policy.

Renewable Energy (R): Leverage advocacy and investments to accelerate the grid-wide shift to renewable energy ensuring buildings can fully transition to clean power.

Waste (W): Create and expand programs that simplify waste reduction making it easy for the community to engage in climate action.

Transportation (T): Advance the Town's Transportation Mobility Plan and Community Plan by prioritizing investments in walking, biking, and transit, preparing for an electric vehicle future, and improving land use policy to support efficient transportation infrastructure.

This CAP defines an action plan with strategies and actions, prioritized by cost effectiveness, related to these four opportunity areas to meet its goal. It is not intended to provide a prescriptive set of instructions, as circumstances will change and programmatic details of exactly how each of the actions are brought to life will emerge as the Town implements.

Estimated implementation costs and additional FTEs are outlined below:

- **Total estimated implementation costs to 2030:** $397,700 - $522,000
- **Total additional FTE recommended for implementation to 2030**: 0.6 - 2.5

Coordination with other Town departments could help supplement staffing or project needs. Town Council will continue to prioritize staffing needs and projects, including this plan's recommendations, as part of the annual Town budgeting process.

ANTICIPATED TIMELINE AND COSTS

The following table summarizes expected implementation timeline and a cost breakdown for the recommended strategies within this plan:

	Strategies	Estimated Cost
Near-Term 2025 - 2026	• **B1**: Enable climate-friendly future development • **B2:** Accelerate efficiency improvements and electrification in existing **residential** buildings • **B3:** Accelerate efficiency improvements and electrification in existing **commercial** buildings • **B5:** Lead the way with efficiency improvements and electrification of Town buildings • **R1:** Push to accelerate widespread grid decarbonization • **R2:** Support new local renewable energy generation • **W1:** Increase landfill waste diversion and encourage sustainable consumption	$299,900 - $381,000
Mid-Term 2027 - 2028	• **B3:** Accelerate efficiency improvements and electrification in existing **commercial** building (Cont'd) • **B4**: Close the gap on new construction electrification and efficiency • **R1:** Push to accelerate widespread grid decarbonization (Cont'd) • **R3:** Assess renewable energy to serve Town Facilities	$66,100 - 93,600
Long-Term 2029 - 2030	• **B4**: Close the gap on new construction electrification and efficiency (Cont'd) • **B5:** Lead the way with efficiency improvements and electrification of Town buildings (Cont'd)	$31,700 - $47,400

INTRODUCTION

Climate change is a critical issue, and Crested Butte is not immune. The Crested Butte community, nestled at nearly 9,000 feet with its mountains, rivers, and lakes, is already experiencing its effects—warmer summers, increased wildfire risk, and altered snow and stream patterns. The beauty of the Gunnison Valley's surroundings and the recreational opportunities they provide are the foundation of Crested Butte's economy and way of life, both of which are at risk.

At the time of this plan's development in 2024, the United States government was committed to reducing overall U.S. GHG emissions by 61-66% from 2005 levels by 2035 and reaching net-zero GHG emissions economy wide by 2050 (Federal Sustainability Plan, 2024). Overarching strategies included:

- Catalyzing America's Clean Energy Industries
- Transitioning to Zero-Emissions Vehicles and Energy Efficient Buildings Powered by Pollution-Free Electricity
- Increasing Adapation and Resiliency of Supply Chains and Federal Agencies
- Advancing Equity and Environmental Justice

To date, the State of Colorado retains its commitment to climate action and statewide GHG emissions reduction goal of 50% overall emissions reduction in 2030 from 2005 levels. Near term actions at the state level address cross-cutting strategies around utilities, transportation, buildings, oil an gas, industry, and agriculture.

This 2030 Climate Action Plan (CAP) renews the Town's commitment to mitigating climate change by prioritizing the reduction of greenhouse gas (GHG) emissions across the community and municipal operations. While the Town of Crested Butte's (Town) small footprint may seem insignificant in the global context, Crested Butte's legacy of creativity, collaboration,

Photo credit: Robby Lloyd

THIS CAP'S GOAL:

Crested Butte will act on the urgency of climate change by setting the example of what is possible for mountain communities to take responsibility for our climate impacts and strategically drive down Crested Butte's GHG emissions.

and leadership positions the Town to take meaningful action. By addressing Crested Butte's emissions, this plan aims to shape the future, inspire other communities, and amplify Crested Butte's impact.

ABOUT THIS PLAN

This plan provides a 5-year roadmap for climate action out to 2030. It builds on the Town's 2019 Climate Action Plan to update the Town's understanding of Crested Butte's GHG emissions, charts an actionable path to reduce them, and empowers the community to take their own climate actions. The development of this plan was driven by robust data analysis and extensive community engagement. It is not intended to provide a prescriptive set of instructions, as circumstances will change and programmatic details of exactly how each of the actions are brought to life will emerge as the Town implements. It does, however, identify key strategies and steps to act on the Town's greatest opportunities to reduce emissions both community-wide and within Town operations.

CLIMATE CHANGE IN CRESTED BUTTE

Climate change is affecting weather and climate extremes in every region across the globe and having a profound impact across the US and in our community (IPCC 2021).

In Colorado, temperatures have risen about 2.3°F from 1980 to 2022 and "further and significant warming is expected in all parts of Colorado, in all seasons, over the next several decades" (Bolinger, et al. 2024). The frequency and intensity of heat waves, drought, and wildfire are all expected to increase across Colorado as temperatures rise by another 1 – 4°F, precipitation patterns shift, and snowpack decreases between now and 2050 (Bolinger, et al. 2024).

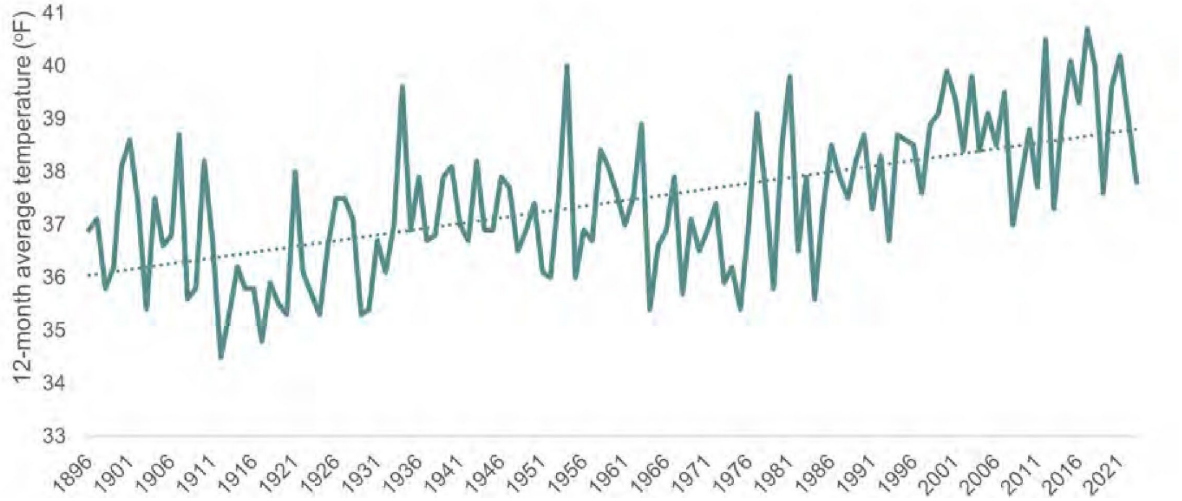


Figure 1. 12-month average temperature in the Gunnison Valley (NOAA 2024)

In the Gunnison Valley, temperatures have risen slightly less quickly than the state average – about 1.5°F since 1980 as shown in Figure 1 – and remain relatively cool thanks to our high-altitude climate (NOAA 2024). However, this region's environment, economy, and way of life remain vulnerable to climate change. Rising temperatures across the U.S. may drive more people to Crested Butte's cooler mountain climate. This community relies on its outdoor recreation resources to thrive at 9,000 ft. Reduced snowpack, drought, wildfires, and extreme or unpredictable weatherwill continue to impact Crested Butte and its economy in myriad ways.

UNDERSTANDING CRESTED BUTTE'S GHG EMISSIONS

Global warming is projected to continue until at least mid-century, regardless of efforts to reduce future GHG emissions and many of the changes will be irreversible for centuries to millennia (IPCC 2021). Climate change impacts will largely scale with future GHG emissions. While adaptation is vital, we can still help mitigate severe effects by significantly reducing emissions by 2030.

COMMUNITY EMISSIONS

The community GHG inventory quantifies emissions from activities in Crested Butte, guiding climate action alternatives and providing a framework to evaluate and monitor their impact over time. The 2022 community GHG inventory was developed using current best-practices in the Global Protocol for Community-Scale Greenhouse Gas Inventories (WRI, ICLEI, and C40 Cities Climate Leadership Group 2022). It includes Scope 1 and Scope 2 emissions relevant to Crested Butte along with Scope 3 solid waste emissions attributable to activities within Crested Butte (Table 1). As part of this plan, Crested Butte's 2017 community GHG inventory was also updated to align with the GPC guidance to allow for comparison between the two inventory years.

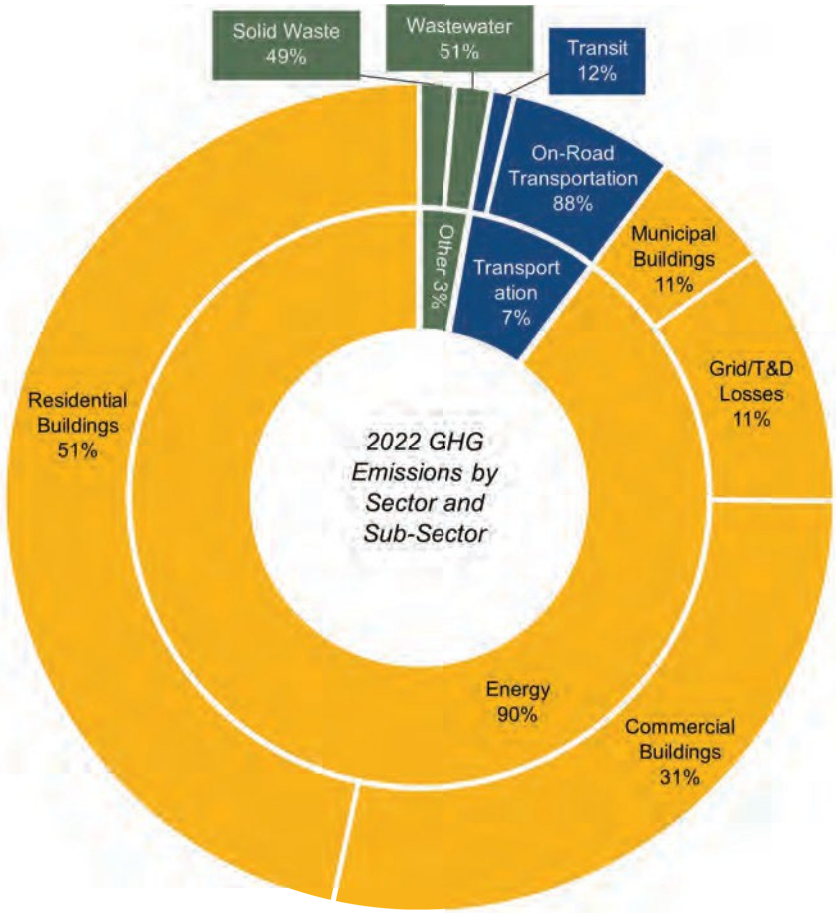
Table 1. The scope of emissions in the community-wide emissions inventory for 2022

Scope	Definition	Sources Included in the 2022 Inventory
Scope 1	GHG emissions from sources located within the Town boundary.	• Natural gas use • Wastewater treatment processes • Transportation within Town limits
Scope 2	GHG emissions occurring because of the use of grid-supplied electricity, heat, steam, and/or cooling within the Town boundary.	• Electricity use
Scope 3	All other GHG emissions that occur outside the Town boundary because of activities taking place within the Town boundary.	• Solid waste disposal

Community Emissions Today

In 2022, Crested Butte's community emissions totaled 23,670 MTCO2e—equivalent to 5,000 gasoline cars driven for a year (EPA 2024). The Energy sector accounted for 90% of emissions, followed by Transportation at 7% and Waste/Water at 3%. *Details, including emission factors, are available in Appendix I: 2022 Town of Crested Butte GHG Emissions Inventory.*

Figure 3. Crested Butte's community-wide 2022 greenhouse gas emissions



23,670 $MTCO_2e$
total community emissions in 2022

5% increase
in calculated community emissions between 2017 and 2022

Building energy sector
electricity and natural gas use are the largest source of emissions

16.5 $MTCO_2e$
emissions per capita in 2022

13 lb CO_2e
residential building emissions per square foot in 2022

24 lb CO_2e
commercial building emissions per square foot in 2022

20 lb CO_2e
municipal building emissions per square foot in 2022

Change in Community Emissions since 2017

Community GHG emissions increased by 5% from 2017 to 2022, driven by higher natural gas use, increased vehicle miles traveled, and increased solid waste generation. Reduced electricity consumption and lower emissions factors for electricity, natural gas, and transportation helped offset some of the increase. Per capita, community emissions increased by 1% between 2017 and 2022. *More details are in Appendix I: 2022 Town of Crested Butte GHG Emissions Inventory.*

Increased:

- **Natural gas usage**
- **Vehicle miles traveled**
- **Solid waste generation**

Reduced:

- **Electricity use**
- **Emissions factors (electricity, natural gas, vehicle efficiency)**

Figure 4. Town of Crested Butte community-wide GHG emissions by sector, 2017 and 2022

SECTOR	2017 ($MTCO_2e$)	2022 ($MTCO_2e$)	CHANGE
Energy	**20,300**	**21,260**	**+5%**
Commercial Buildings	8,750	6,680	-24%
Grid / T&D Losses	1,970	2,390	+21%
Municipal Buildings	Included in Commercial	1,150	N/A
Residential Buildings	9,580	11,040	+15%
Transportation	**1,740**	**1,740**	**0%**
On-Road Transportation	1,740	1,530	-12%
Transit	Not calculated	210	N/A
Other	**560**	**670**	**+20%**
Solid Waste	240	330	+38%
Wastewater Treatment	320	330	+6%
TOTAL EMISSIONS	**22,600**	**23,670**	**+5%**
Population	**1,385**	**1,434**	**+4%**
PER CAPITA EMISSIONS	**16.3**	**16.5**	**+1%**

Table 2. Community emissions by sector and sub-sector, 2017 and 2022, population numbers are 5-year ACS estimates

Future Community Emissions

Based on 2022 GHG emissions, the Town developed Business as Usual (BAU) and Adjusted BAU forecasts for 2030 emissions. The BAU and ABAU do not include anticipated emissions reduction from the actions proposed in this plan; they serve as a baseline to measure the impact of new actions.

Business as Usual (BAU)

The BAU estimates emissions should the Town not realize the utility-level emissions reduction commitments or market shifts (such as increased vehicle efficiency) that are anticipated. Under the BAU scenario, community emissions would increase by an estimated 7% when accounting for population growth and existing Town commitments expected to impact future emissions:

7% increase
in community emissions under BAU scenario.

Expected population growth

Population is a key driver of activities, including energy use and waste generation. The BAU includes forecasted growth in the average daily annual population of Crested Butte, taking into account both full-time residents and visitors.

Planned new and redeveloped Town facilities

A number of new Town facilities are planned for construction or redevelopment between now and 2030.

The Town's adoption of up-to-date building and energy codes

Crested Butte has adopted the 2021 International Building and Energy Codes, with added efficiency and all-electric provisions to reduce future building emissions.

Adjusted Business as Usual (ABAU)

The ABAU demonstrates how emissions are expected to change with current utility level emissions reduction commitments and forecasted market and population changes. Under the ABAU scenario, community emissions are expected to decrease by an estimated 42% when accounting for the following external commitments, in addition to the BAU factors:

42% decrease
in community emissions under ABAU scenario.

Increased renewables generation in Crested Butte's electricity supply

Tri-State, GCEA's wholesale electricity provider, aims to reduce GHG emissions by 89% by 2030 from 2005 levels, resulting in a projected 78% reduction in Crested Butte's electricity emissions by 2030. GCEA is also pursuing local renewable energy projects, such as the 1.1 MW "Oh Be Joyful" solar array , which increases Crested Butte's renewable energy supply.

More fuel-efficient vehicles

Colorado's fuel efficiency standards will reduce emissions per mile for gas and diesel vehicles, a key factor in transportation emissions.

Transition to electric vehicles (EVs)

The shift to EVs and renewable electricity will reduce transportation emissions. The ABAU incorporates expected EV adoption based on Colorado's Zero Emission Vehicle requirements and forecasts.

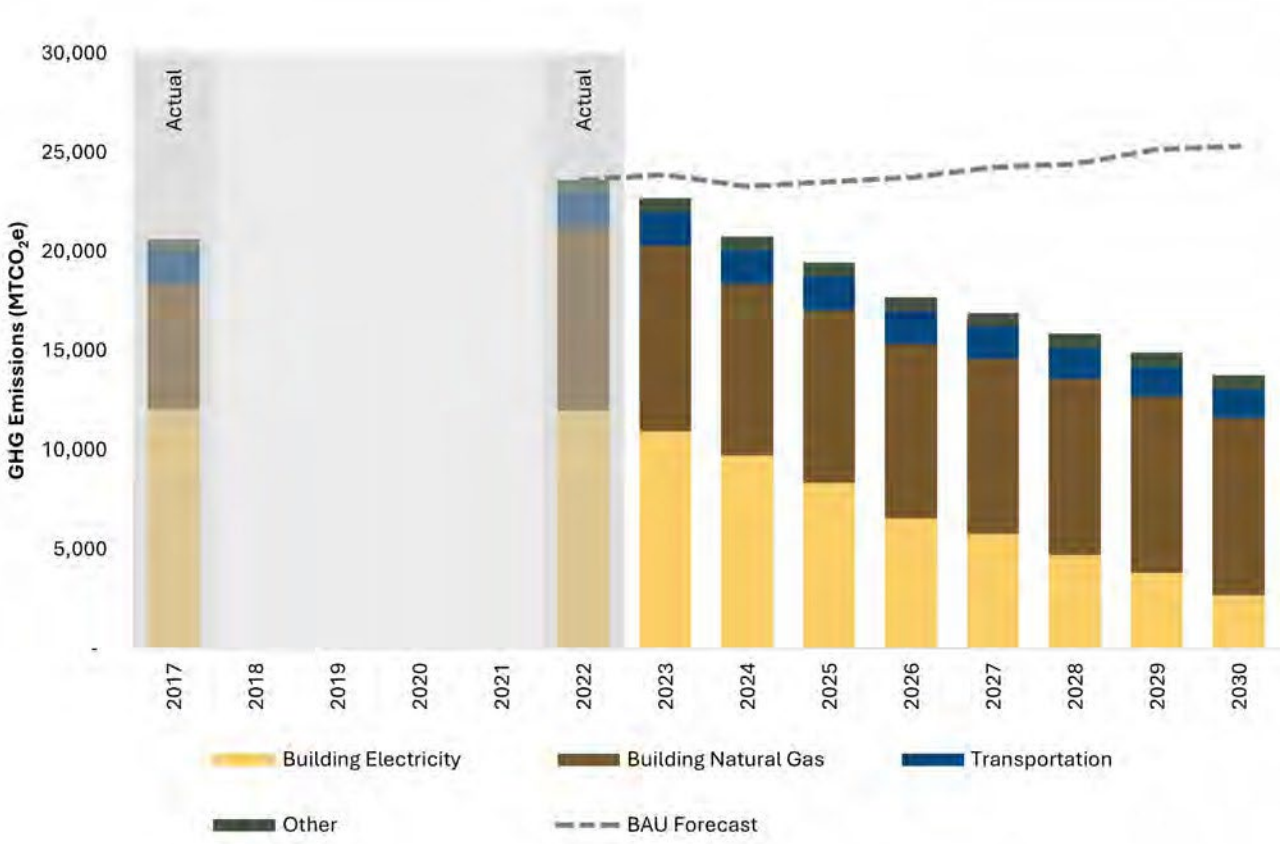


Figure 5. Projected BAU and ABAU Forecast to 2030.

Key Takeaways

- **Significant emissions reductions** are anticipated between 2022 and 2030 because of GCEA's transition to more renewable sources of electricity.
- **Improving building energy use efficiency and electrifying systems** in Crested Butte is the Town's largest opportunity to significantly reduce emissions to 2030.
- As electricity and transportation emissions reduce over time, natural gas will become an **increasingly large portion** of the community's remaining emissions.

MUNICIPAL EMISSIONS

The 2022 municipal emissions inventory follows ICLEI best practices (ICLEI Local Governments for Sustainability, 2019) to provide a comprehensive view of emissions from electricity, natural gas, fleet fuel use, and wastewater treatment, including transmission losses and fugitive emissions, from the Town.

Municipal Emissions Today

In 2022, municipal emissions totaled 1,800 MTCO2e, equivalent to 420 gasoline vehicles driven for a year (EPA,2024) and accounted for 8% of total community emissions (Figure 6). Energy use in buildings and facilities made up 71%, fleet vehicles 11%, and wastewater treatment 18%. Municipal emissions weren't included in the 2017 inventory, so there is no baseline year for comparison.

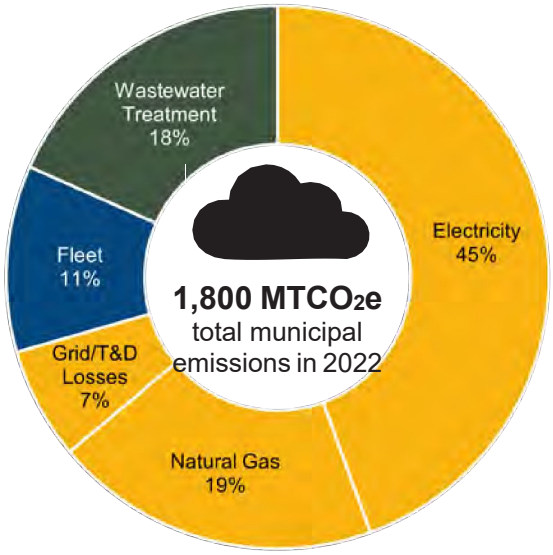


Figure 6. Crested Butte's municipal 2022 GHG Emissions

Photo credits: Town of Crested Butte

Where feasible, the Town of Crested Butte considers converting its medium- and heavy-duty fleet to electric vehicles

In 2022, as part of the Town's 196 $MTCO_2e$ in fleet emissions, approximately 86% of fleet emissions are from medium- and heavy-duty vehicles. Between 2025-2030, the Town is considering acquiring two to three medium and heavy-duty electric vehicles for its fleet to replace existing aging equipment. The impact of converting these vehicles to electric would reduce Town transportation emissions by an additional 9 – 14 $MTCO_2e$, or about 1% of the Town's ABAU forecasted greenhouse gas emissions in the year 2030.

Future Municipal Emissions

Similar to community-wide GHG emissions forecast, BAU and ABAU forecasts for municipal emissions were created to project 2030 emissions levels. The BAU and ABAU do not include anticipated emissions reduction from the actions proposed in this plan; they serve as a baseline to measure the impact of new actions.

Business as Usual (BAU)

Under the BAU scenario, Town emissions in 2030 would be 59% higher in 2030 than 2022 due to planned new construction and redevelopment projects.

59% increase
in Town emissions under BAU scenario.

Adjusted Business as Usual (ABAU)

Under the ABAU scenario, Town emissions will be 27% lower in 2030 than 2022 as a result of the following factors:

- The same utility and state commitments described in the community ABAU section
- An accelerated transition to electric vehicles for municipal fleet associated with the Town's existing EV transition plan.

27% decrease
in Town emissions under ABAU scenario.

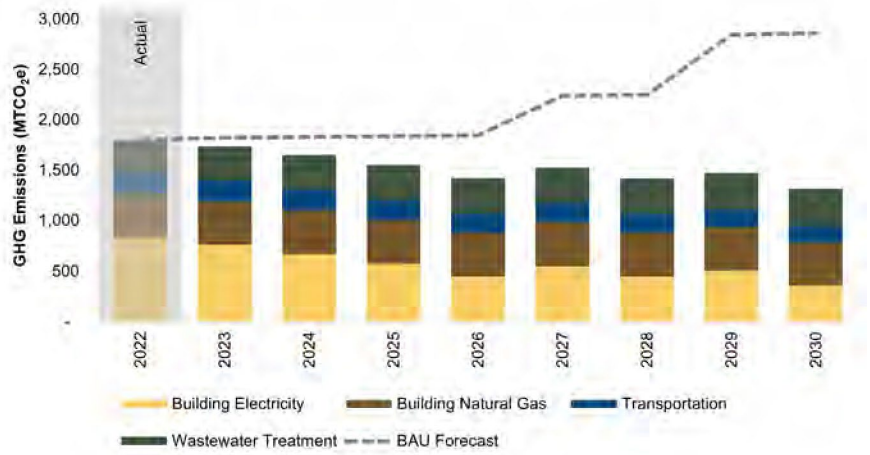


Figure 7. Projected Municipal BAU and ABAU Forecast to 2030.

Key Takeaways

- As GCEA's electricity **supply becomes more renewable**, including local energy supply projects such as the Oh Be Joyful 1.1 MW solar array, the emissions associated with each unit of electricity used in Town facilities will decrease.
- **The addition of new facilities will increase energy use**, underscoring the importance of maximizing efficiency and powering new buildings with clean electricity.
- As the Town electrifies its fleet vehicles, **the emissions associated with fleet operations will decrease.**
- The Town has an opportunity to further reduce existing building emissions **through efficiency improvements and electrifying natural gas systems** when the opportunity arises.

ACTION PLAN

Based on the Town's emission inventory and forecasts, the key opportunities for emissions reduction are clear:

Buildings: Empower and incentivize the community to reduce energy use, electrify buildings to maximize the future benefits of a renewable-energy grid, and encourage efficient land use policy.

90% of Crested Butte's emissions come from energy use in buildings, presenting the greatest opportunity for climate action for the Town. As electricity becomes cleaner, most remaining emissions will come from natural gas in existing buildings. The Town will focusing heavily on energy assessments to inform future retrofitting efforts, energy efficiency to reduce energy demands for a building, and efficient land use patterns. Paired with electrification, all measures can lower energy demand, reduce emissions, and cut both upfront and ongoing electrification costs. Figure 9 shows how energy use is expected change from 2022 to 2030 based on actions in this plan.

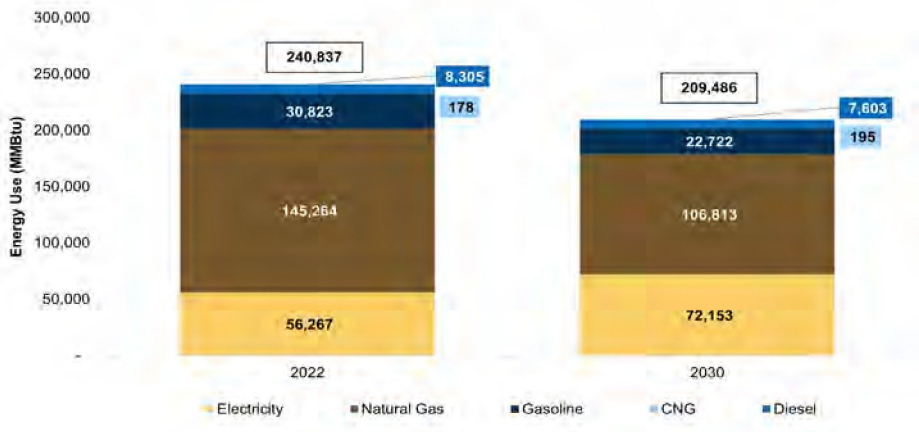


Figure 9. Estimated community-wide energy use in 2030 by type, compared to 2022

Renewable Energy: Leverage advocacy and investments to accelerate the gride-wide shift to renewable energy ensuring buildings and transportation can transition to clean power.

While significant emissions reductions are anticipated by 2030 due to existing commitments by Gunnison County Electric Association (GCEA) and its wholesale electricity provider, Tri-State Generation and Transmission (Tri-State), the Town has opportunities to push for an accelerated transition, while prioritizing cost-effectiveness, supporting local energy generation, and assessing renewable energy generation at its facilities where feasible.

Waste: Create and expand programs that simplify waste reduction making it easier for the community to engage in climate action.

Waste disposal and wastewater treatment account for 3% of Crested Butte's emissions, however, reducing waste offers straightforward actions to tackle a portion of community emissions and empower the community to tangibly engage in climate action through everyday behaviors. The Town can improve waste management by reducing landfill waste, increase waste diversion through composting and recycling, and reduce potent methane and other GHG emissions.

Transportation: Advance the Town's Transportation Mobility Plan and Community Plan by prioritizing investments in walking, biking, and transit, preparing for an electric vehicle future, and improving land use policy to support efficient transportation infrastructure

Only 5% of trips taken inside Crested Butte's boundaries are by car, but cars dominate travel in and out of Town (Town of Crested Butte 2024). This plan heavily leverages the 2024 Transportation Mobility Plan, and the Community Plan, which identify opportunities for the Town to further de-emphasize vehicle travel and make transportation more efficient through land use policies. Additionally, the Town is developing a joint Electric Vehicle (EV) Readiness Plan with Mt. Crested Butte to identify opportunities to support the adoption of EVs.

Additional action details, such as cost considerations and success measure alignment, for this plan can be viewed in *Appendix II. 2030 CAP Action Details.*

SCOPE 3 EMISSIONS REDUCTION OPPORTUNITIES

Crested Butte's GHG inventory aligns with current best-practice guidance but does not encapsulate all possible emissions associated with a community's activity. Emissions occurring outside of Crested Butte because of activities inside the Town, called Scope 3 emissions, can be particularly difficult to quantify but still drive regional emissions. As an example, the Town could influence and better understand the following potential emission sources:

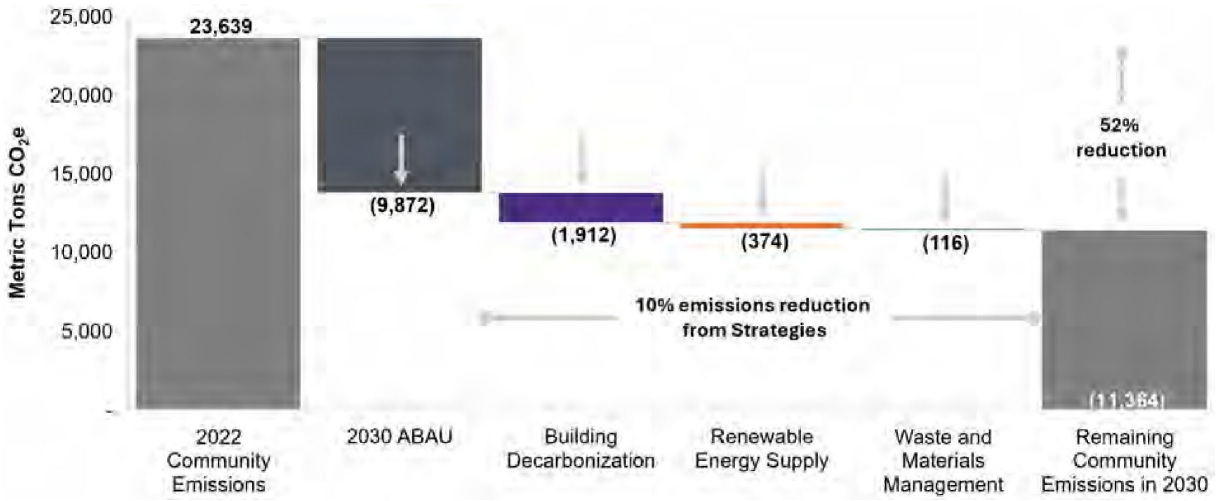
- The **transportation emissions** from commuter and visitor travel can be managed via the Transportation Mobility Plan, regional transit expansion, visitor education, and alternative transport. The Community Plan will address land use and growth, impacting housing and transportation patterns.
- While the **embodied carbon of building materials** is not included in the GHG Inventory, both this Climate Action Plan and the Historic Preservation Plan include actions to better understand building material lifecycles and emissions.
- **Emissions associated with waste disposal** in the landfill are included in the GHG inventory based on information provided by Waste Management. However, there may be an opportunity for regional coordination to improve waste data collection and provide a more holistic estimate of waste emissions.
- Additional scope 3 emissions are associated with **the production and delivery of goods and services** consumed in Crested Butte, including both local and non-local food production.

IMPACT OF LOCAL CLIMATE ACTION

Under the ABAU scenario, emissions are projected to decrease by 42% from 2022 to 2030 due to existing utility and state efforts. Implementing all strategies in this CAP could achieve an additional 10% reduction (a 24% reduction in per capita emissions, **resulting in a 52% reduction in total community emissions by 2030 (Figure 10) and a 59% reduction in total emissions per capit**a. Transportation impacts are not calculated, as vehicle efficiency and EV adoption are included in the ABAU and addressed in related plans

52% decrease in community emissions with CAP actions & utility and state efforts.

Figure 10. Greenhouse gas Emissions impacts of crested butte's climate action plan strategies and actions.



LOCAL ACTION MATTERS

The shift from the Biden Administration, notably one of the most climate-forward presidential administrations in American history, to the Trump Administration, an administration that appears to be pivoting away from supporting major climate action policy, during the development of this plan presents certain challenges and political and financial uncertainty over the next five years. However, Colorado state and local policy remain committed to addressing climate change and its impacts. The Town of Crested Butte will push forward on climate action despite the federal government's current stance on environmental conservation and climate.

Photo credit: Lydia Stern

Emissions Reduction in Context

The cumulative impact of the ABAU forecast and the estimated impact of implementing all strategies identified in this CAP is **a 52% reduction in community greenhouse gas emissions from 2022 levels.**

While this plan does not set a quantified GHG target for Crested Butte, it does provide a framework for monitoring change in emissions over time, providing both a baseline and forecast for comparison. Additionally, the estimated emissions reduction aligns with state and federal targets for emissions reduction, including:

- The State of Colorado's adopted goal is to reduce emissions by 50% by 2030 and 100% by 2050, compared to 2005 levels (State of Colorado 2024).
- The Biden Administration set goals to reduce U.S. GHG emissions 50-52% below 2005 levels by 2030 and achieve net-zero emissions by 2050.
- The reduction also aligns with the 50% reduction in global emissions needed to meet the United Nation's Paris Agreement goal to keep global warming below 1.5° Celsius.

LAYING THE FOUNDATION

Implementing this plan will require years of effort, significant financial and staff resources, flexibility, and collaboration. To support successful implementation of this plan, the Town of Crested Butte commits to the following:

- **Explore revenue streams to sustain climate action**: Community members and Town Council stressed the need for incentives and funding to remove financial barriers and drive action. The Sustainability Department will prioritize cost-effective strategies and seek diverse funding sources, including grants, utility programs, and taxes, to fund climate action in Crested Butte.
- **Collaborate on climate action outreach and education:** Outreach and education are key to sustaining momentum and community participation in climate action. The Town will address the specific outreach needs of each action and engage residents, businesses, and partners through collaboration and information sharing.
- **Lead with regional collaboration and impact:** Implementing this plan requires regional collaboration to scale impact beyond Crested Butte, addressing emissions in the Gunnison Valley and beyond.
- **Coordinate efforts for Town operations to lead by example:** the Sustainability Department will coordinate climate action across the Town, working with relevant departments to drive progress and improve Town operations and buildings.
- **Build staff capacity to implement the climate action plan:** The Town will assess staffing needs in addition to the Sustainability Coordinator, such as training or hiring, and adjust to meet plan commitments.
- **Establish regular updates to the GHG inventory and climate action plan:** Town staff will regularly track implementation, develop an annual work plan with priorities and resources, and share it with Town Council to align with budget priorities. A full GHG inventory and CAP update is planned every five years.

BUILDINGS (B):

Empower and incentivize the community to reduce energy use, electrify buildings to maximize the future benefits of a renewable-energy grid, and encourage efficient land use policy

In 2022, 90% of Crested Butte's community-wide GHG emissions were associated with energy use in the built environment and this sector represents Crested Butte's biggest opportunity to reduce emissions. The strategies and actions in this sector focus on incorporating efficient future land use, empowering and incentivizing the community to increase the efficiency of existing and new buildings, and transitioning from natural gas to electricity.

HOW CB USES ENERGY TODAY

Energy use in residential buildings was the single largest source of GHG emissions in Crested Butte in 2022, at 51% of total emissions, followed by commercial buildings at 31%. Municipal buildings and facilities energy use accounted for 11% of community energy emissions, with another 11% attributed to grid electricity and natural gas transmission losses.

2022 SNAPSHOT

Residential energy emissions
11,040 $MTCO_2e$

Commercial energy emissions
6,680 $MTCO_2e$

Municipal energy emissions
1,150 $MTCO_2e$

Energy system losses
2,580 $MTCO_2e$

Photo credit: Robby Lloyd

WHAT CB IS ALREADY DOING TO REDUCE EMISSIONS

Crested Butte is already demonstrating leadership on building decarbonization, including:

- **Adoption of the 2021 International Code Council (ICC) Building Codes**
- **Adoption of additional requirements for commercial new construction and major remodels**
- **GreenDeed Program:** providing direct funding to deed-restricted housing owners to complete a free Energy Savings Assessment and implement recommended energy savings projects. The Town of Crested Butte has improved municipal building efficiency through energy audits, wastewater system upgrades, and energy-efficient upgrades. In 2021, an Investment Grade Audit (IGA) led to weatherization, energy-efficient lighting, and solar panel installations on the fire station and Marshal's building.

DRIVERS OF CHANGE

Building energy emissions depend on energy use and the emissions per unit of energy. Energy use is influenced by factors like population growth, weather, building efficiency, and behavior. Improving building efficiency is crucial to maximizing the benefits of electrification, and encouraging energy-conscious behaviors can reduce emissions, save energy costs, and improve comfort in the home.

While natural gas emissions are expected to remain steady, Crested Butte's electricity supply is becoming cleaner. By 2029, electricity emissions are anticipated to fall below those of natural gas. Transitioning to electric energy systems (beneficial electrification) will be key to reducing future emissions, with added benefits of stable energy prices, efficiency, and improved indoor comfort and air quality.

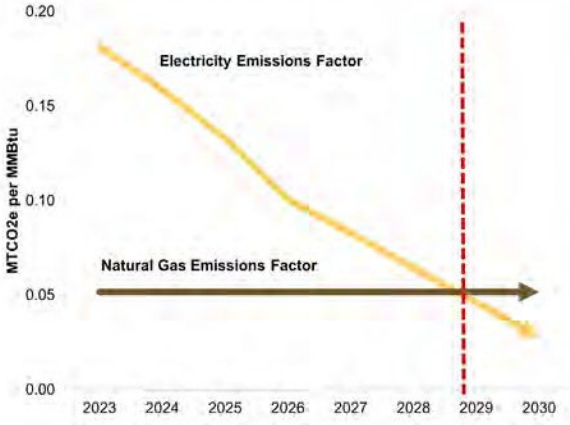


Figure 11. Emissions associated with each unit of energy used for electricity and natural gas, over time.

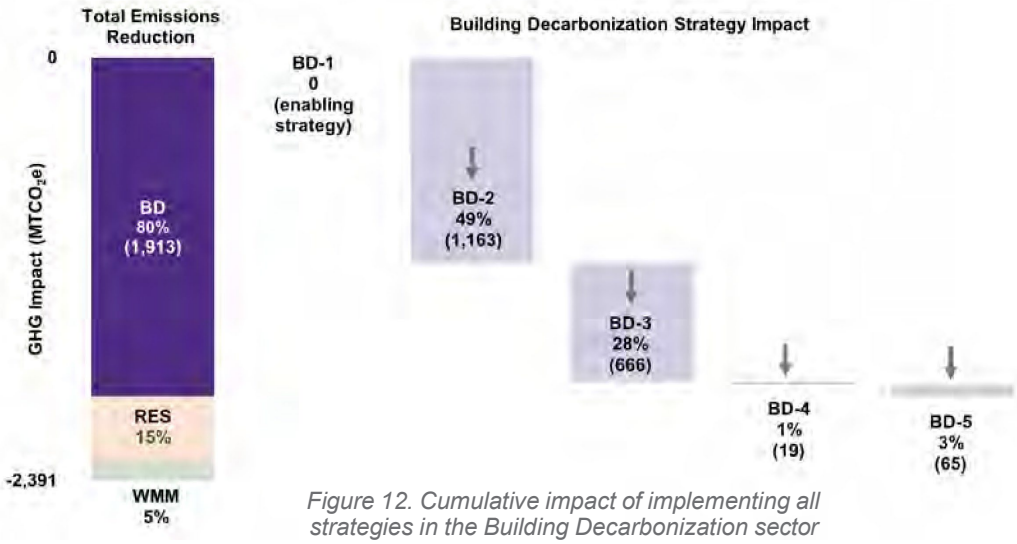


Figure 12. Cumulative impact of implementing all strategies in the Building Decarbonization sector

Strategy B1: Enable climate-friendly future development

Community codes and guidelines are instrumental tools to ensure that development aligns with our community's vision for Crested Butte's future. Addressing climate considerations upfront can help avoid unintended downstream consequences of planning and development decisions today.

GHG Impact in 2030:
n/a, enabling

Cost Effectiveness:
n/a, enabling

Town Cost 2025 – 2030:
n/a

Town Staff Time (Annual Average):
n/a

Action B1.A: Incorporate climate considerations into zoning code and regional planning efforts.

The zoning code guides the Town's future development, regulating land use, density, and building height. These decisions impact greenhouse gas emissions by enabling transit-oriented density and efficient buildings. This action will integrate climate considerations into the 2025 Community Plan, zoning code update, and Gunnison County Corridor Plan. The Town's **Community Plan** will leverage zoning to increase the number of people living in town, reduce transportation emissions, and facilitate more efficient buildings.

Target	Emissions Impact *(by 2030)*	Estimated Total Cost *(2025 – 2030)*	Cost Effectiveness *(Total Cost/ Emissions Impact)*	Estimated Avg. Annual Staff Time	Timing
Incorporation of climate considerations into the Community Plan and zoning code update	No direct emissions impact (enabling action)	Included in development of Community Plan & Corridor Plan	Included in development of Community Plan & Corridor Plan	Included in development of Community Plan & Corridor Plan	Near-Term (2025-2026)

Photo credits: Lydia Stern

Action B1.B: Enable climate-friendly construction and development through flexible design guidelines and a review of permitting processes.

This action removes barriers to development by updating design standards, building codes, and permitting to support energy efficiency, electrification, and renewables. Community members could be empowered to bring more climate-friendly designs through the Board of Zoning and Architecture Review (BOZAR) process. Measures may include more flexible roof pitches, water efficiency, and lower solar permit fees. The Historic Preservation Plan created a framework for this action, identifying the need to provide flexibility in materials and design requirements to reach climate goals, outside of its National Historic District and buffer.

Target	**Emissions Impact** *(by 2030)*	**Estimated Total Cost** *(2025 – 2030)*	**Cost Effectiveness** *(Total Cost/ Emissions Impact)*	**Estimated Avg. Annual Staff Time**	**Timing**
Included in Historic Preservation Plan	No direct emissions impact (enabling action)	Included in Historic Preservation Plan	Included in Historic Preservation Plan	Included in Historic Preservation Plan	Near-Term (2025-2026)

Strategy B2: Accelerate efficiency improvements and electrification in existing residential buildings

Crested Butte's approximately 1,260 existing residential buildings covered 1.9 million square feet and accounted for 51% of community-wide GHG emissions in 2022. Reducing emissions from these existing residential buildings will be critical to meeting community climate goals over time. This strategy includes opportunities to require energy assessments and require efficiency improvements and electrification of Crested Butte's existing residential building stock while minimizing the cost to community members and creating other benefits.

GHG Impact in 2030:
1,163 $MTCO_2e$

Cost Effectiveness:
\$89 - \$101 / $MTCO_2e$

Town Cost 2025 – 2030:
\$104,600 - \$117,700

Town Staff Time (Annual Average):
0.2 – 0.4 FTE

Action B2.A: Require an energy assessment for residential Level 1, 2, and 3 remodels.

This action amends Crested Butte's Building Code to require energy assessments for all residential alteration permits (Levels 1, 2, and 3, see Guide to Key Terms for definitions). It builds on existing energy efficiency and electrification-ready requirements for Level 3 permits, using permitting as a touchpoint to collect better baseline energy use data that can inform future

Town retrofitting programs or policies. Providing energy efficiency data to homeowners also provides them with the necessary information to choose to improve and electrify their properties.

Target	Emissions Impact *(by 2030)*	Estimated Total Cost *(2025 – 2030)*	Cost Effectiveness *(Total Cost/ Emissions Impact)*	Estimated Avg. Annual Staff Time	Timing
100% applicable permits receive an energy assessment following code update	No direct emissions impact (enabling action)	$4,300 - $6,500	No direct emissions impact	<0.1 FTE	Near-Term (2025-2026)

Action B2.B: Require an energy assessment for vacation rental units.

There are 191 licensed vacation rental units within Crested Butte Town limits as of 2024. This action leverages the annual vacation rental licensing process as a touchpoint with these residential properties to require energy assessments. This action will help the Town collect data on vacation rental unit energy use to understand changes over time and can inform business license owners on how to best improve the efficiency of their property or electrify energy systems.

Target	Emissions Impact *(by 2030)*	Estimated Total Cost *(2025 – 2030)*	Cost Effectiveness *(Total Cost/ Emissions Impact)*	Estimated Avg. Annual Staff Time	Timing
100% (191) vacation rental units completing an energy assessment 2025-2030	No direct emissions impact (enabling action)	$10,800 - $16,200	No direct emissions impact	0.1 – 0.2 FTE	Near-Term (2025-2026)

Action B2.C: Provide Town-funded energy efficiency and electrification incentives for all residential buildings.

While Actions A and B require energy assessments, this action incentivizes efficiency and electrification upgrades for all homes. Through incentive programs, it aims to remove cost or permitting barriers for homeowners choosing to electrify or make their properties more energy efficient. Incentives could be designed to prioritize deed restricted housing units, building on the success of the GreenDeed program, or other residential Town-wide programs could be developed.

Target	Emissions Impact *(by 2030)*	Estimated Total Cost *(2025 – 2030)*	Cost Effectiveness *(Total Cost/ Emissions Impact)*	Estimated Avg. Annual Staff Time	Timing
100% (191) vacation rental units completing an energy assessment 2025-2030	No direct emissions impact (enabling action)	$10,800 - $16,200	No direct emissions impact	0.1 – 0.2 FTE	Near-Term (2025-2026)

Strategy B3: Accelerate efficiency improvements and electrification in existing commercial buildings

Crested Butte has approximately 600,000 square feet of commercial buildings, accounting for 23% of community building square footage and 31% of community-wide emissions in 2022. Despite having a smaller overall footprint, commercial buildings use more energy per square foot than residential buildings and therefore present significant opportunities for savings. This strategy includes opportunities to require energy assessments and encourage efficiency improvements and electrification of Crested Butte's commercial building stock.

GHG Impact in 2030:
665 $MTCO_2e$

Cost Effectiveness:
$122 - $134 / $MTCO_2e$

Town Cost 2025 – 2030:
$81,200 - $89,000

Town Staff Time (Annual Average):
0.3 – 0.7 FTE

Action B3.A: Require an energy assessment for commercial Level 1, 2, and 3 remodels.

This action amends Crested Butte's Building Code to require energy assessments for all commercial alteration permits (Levels 1, 2, and 3, see Guide to Key Terms for definitions). It builds on existing energy efficiency and electrification-ready requirements for Level 3 permits, using permitting as a touchpoint to identify more efficiency opportunities and collect baseline building data and informs property owners on how they might best improve the efficiency of their property or electrify energy systems.

Target	Emissions Impact *(by 2030)*	Estimated Total Cost *(2025 – 2030)*	Cost Effectiveness *(Total Cost/ Emissions Impact)*	Estimated Avg. Annual Staff Time	Timing
100% applicable permits receive an energy assessment following code update	No direct emissions impact (enabling action)	$4,300 - $6,500	No direct emissions impact	<0.1 FTE	Near-Term (2025-2026)

Action B3.B: Provide Town-funded energy efficiency and electrification incentives for all commercial buildings.

While Action A above leverages the permitting process as a touchpoint for energy information and improvements, this action focuses on incentivizing improvements for all commercial buildings. It involves developing a program to incentivize energy efficiency and electrification in Crested Butte's commercial building stock. Incentives could be designed to prioritize funds for community-serving businesses.

Target	Emissions Impact *(by 2030)*	Estimated Total Cost *(2025 – 2030)*	Cost Effectiveness *(Total Cost/ Emissions Impact)*	Estimated Avg. Annual Staff Time	Timing
16 commercial properties electrified to remove natural gas use by 2030 43 commercial properties implementing energy efficiency improvements by 2030	661 MTCO2e	$68,300 - $69,500	$103 - $105	<0.1 – 0.1 FTE	Near-Term (2025-2026)

Action B3.C: Require energy use disclosure and benchmarking for commercial buildings.

This action involves requiring commercial buildings over a certain size to disclose energy use to the Town to compare against other similar businesses to reduce emissions through behavior change and improvements made because of businesses better understanding their energy use. Introducing a disclosure and benchmarking program will allow the Town of Crested Butte to collect energy information about the community's commercial building stock and could lead to future efficiency incentives or requirements.

The State of Colorado Building Performance Program launched in 2023 requires owners of commercial, multifamily, and public buildings 50,000 square feet or larger to annually benchmark their energy use and set performance targets. This action could involve an expansion of the state's requirements to smaller non-residential buildings in Crested Butte.

Target	**Emissions Impact** *(by 2030)*	**Estimated Total Cost** *(2025 – 2030)*	**Cost Effectiveness** *(Total Cost/ Emissions Impact)*	**Estimated Avg. Annual Staff Time**	**Timing**
Benchmarking of commercial properties accounting for 50% commercial energy use by 2030	5 MTCO2e	$8,600 - $13,000	$1,813 - $2,741	0.8 – 1.2 FTE	Mid-Term (2027-2028)

Strategy B4: Close the gap on new construction electrification and efficiency

This strategy builds on Crested Butte's existing new construction codes to close one of the few remaining gaps in its electrification requirements – commercial kitchens.

GHG Impact in 2030:
19 $MTCO_2e$

Cost Effectiveness:
$587 - $878 / $MTCO_2e$

Town Cost 2025 – 2030:
$10,900 - $16,300

Town Staff Time (Annual Average):
0.1 - 0.2 FTE

Action B4.A: Require all-electric commercial kitchen equipment for new construction.

This action involves amending the Town of Crested Butte's existing energy and building codes to expand the new construction electrification requirement to commercial kitchens.

Target	Emissions Impact *(by 2030)*	Estimated Total Cost *(2025 – 2030)*	Cost Effectiveness *(Total Cost/ Emissions Impact)*	Estimated Avg. Annual Staff Time	Timing
3 all-electric new construction commercial kitchens by 2030	19 MTCO2e	$10,900 - $16,300	$587 - $878	<0.1 FTE	Long-Term (2029-2030)

Action B4.B: Estimate and track building materials used in construction.

This action tracks building materials utilized in construction, starting with a 2025 building code update. The Historic Preservation Plan calls for researching new materials regarding their energy efficiency, embodied carbon, wildfire resilience, and other measures to determine supported materials that align with the Town's goals. Early steps could require tracking high-carbon materials, such as concrete or steel, in new construction, to understand possible carbon impact and explore alternative materials in the future.

Target	Emissions Impact *(by 2030)*	Estimated Total Cost *(2025 – 2030)*	Cost Effectiveness *(Total Cost/ Emissions Impact)*	Estimated Avg. Annual Staff Time	Timing
Tracking process established	No direct emissions impact (enabling action)	Not calculated	No direct emissions impact	<0.1 FTE	Mid -Term (2027-2028)

Strategy B5: Lead the way with efficiency improvements and electrification of Town buildings

The Town has approximately 120,000 square feet of buildings, accounting for approximately 5% of community-wide building square footage and 11% of community energy-related emissions. Reducing emissions from Town buildings will not only contribute to community-wide goals but also demonstrate leadership, result in long-term economic savings, and create benefits for Town employees through increased building comfort.

The cost of actions under this strategy accounts for the full cost of implementation to the Town. This cost to the Town could be brought down with grant funding opportunities to improve the overall cost effectiveness of these actions.

GHG Impact in 2030:
65 $MTCO_2e$

Cost Effectiveness:
$1,173 - $1,521 / $MTCO_2e$

Town Cost 2025 – 2030:
$76,400 - $99,100

Town Staff Time (Annual Average):
0.3 – 0.6 FTE

Action B5.A: Perform updated audits of all municipal facilities and develop a municipal building energy efficiency and electrification plan

This action is the first step toward municipal emissions reduction – drawing on past energy audits and known future facilities changes to develop an energy efficiency and electrification plan that will serve as a long-range roadmap for energy efficiency improvements to Town buildings.

Target	**Emissions Impact** *(by 2030)*	**Estimated Total Cost** *(2025 – 2030)*	**Cost Effectiveness** *(Total Cost/ Emissions Impact)*	**Estimated Avg. Annual Staff Time**	**Timing**
Develop an energy efficiency and electrification plan, conduct updated audits of all municipal facilities by 2026	No direct emissions impact (captured through Action B5.B)	$55,600 - $68,000	No direct emissions impact	<0.1 FTE	Near-Term (2025-2026)

Action B5.B: Begin implementing electrification and efficiency improvements identified in energy efficiency and renewable energy plan

This action moves forward improvements to Town of Crested Butte facilities identified in the energy efficiency and electrification plan (B5.A) to increase the efficiency and reduce emissions from Town buildings and facilities (e.g., water and wastewater treatment) over time.

Target	**Emissions Impact** *(by 2030)*	**Estimated Total Cost** *(2025 – 2030)*	**Cost Effectiveness** *(Total Cost/ Emissions Impact)*	**Estimated Avg. Annual Staff Time**	**Timing**
3 municipal property energy efficiency upgrades 2025 – 2030	49 MTCO2e	$20,800 - $31,100	$426 - $636	0.2 - 0.4 FTE	Near-Term (2025-2026)

Action B5.C: Monitor Town facilities' energy use and include within a regular Climate Action Report

This action establishes ongoing monitoring of Town facilities' energy use to verify savings from Action B, benchmark efficiency, and identify further improvements. Disclosure of the Town's energy use in a Climate Action Report enhances transparency by the Town and sets an example for other building owners.

Target	**Emissions Impact** *(by 2030)*	**Estimated Total Cost** *(2025 – 2030)*	**Cost Effectiveness** *(Total Cost/ Emissions Impact)*	**Estimated Avg. Annual Staff Time**	**Timing**
100% municipal building energy use benchmarked by 2030	16 MTCO2e	$0	No cost	<0.1 FTE	Near-Term (2025-2026)

Photos credit: Nolan Blunck

RENEWABLE ENERGY (R):

Leverage advocacy and investments to accelerate the gride-wide shift to renewable energy ensuring buildings and transportation can transition to clean power.

Reducing the community's greenhouse gas emissions will require transforming how we use energy and where that energy comes from. This sector focuses on leveraging advocacy and investments to accelerate the grid-wide shift to renewable energy, ensuring buildings and transportation can fully transition to clean power.

WHERE CB'S ENERGY COMES FROM TODAY

Crested Butte's energy utilities are Gunnison County Electric Association (GCEA) for electricity and Atmos Energy for natural gas. In 2022, 56% of energy-related GHG emissions came from electricity use, and 44% from natural gas.

2022 SNAPSHOT

Electricity emissions
11,950 $MTCO_2e$

Natural gas emissions
9,500 $MTCO_2e$

Total energy emissions
21,260 $MTCO_2e$

Photo credit: Don Emmert

INCREASING RENEWABLE ENERGY

The Town of Crested Butte has already taken steps to increase the amount of renewable generation supplying Crested Butte's community, including by:

- Installing solar generation at Town facilities
- Joining Colorado Communities for Climate Action
- Partnering with GCEA to install community solar – the Oh Be Joyful solar farm south of Crested Butte and the Town's community solar project at the wastewater treatment plant.

DRIVERS OF CHANGE

Natural gas emissions per therm are expected to stay mostly constant, while electricity emissions per kWh are decreasing as fossil fuels are replaced by renewables like solar, wind, and hydropower. As electrification in buildings and transportation increases, transitioning to renewable energy is essential to maximize emissions reductions.

Tri-State's commitment to reducing greenhouse gas emissions by 89% by 2030 from a 2005 baseline, will drive down emissions from electricity use, as reflected in the Adjusted Business as Usual (ABAU) forecast (Figure 14).

Figure 14. Cumulative impact of implementing all strategies in the Renewable Energy Supply sector.

<u>Understanding our local electricity supply</u>:
Crested Butte, GCEA, and TriState Generation and Transmission

Crested Butte's electric utility – GCEA - is a non-profit member-owned rural electric cooperative. Each GCEA customer is a member-owner of the cooperative, with a say in the community's future energy supply. Co-op members can vote for their GCEA board representatives, vote for or against specific utility policies, and weigh in on important topics by engaging in public meetings and other decision-making processes.

Similarly, GCEA is a member of Tri-State Generation and Transmission (Tri-State), the utility's wholesale power supplier. Tri-State is owned by its 41 electric cooperative and public power district members in Colorado, Nebraska, New Mexico, and Wyoming. As a member-owner, GCEA also has say in the future of Tri-State's generation mix, policies, and plans.

Today, over 34% of Crested Butte's electricity supply through GCEA is generated from renewable sources and Tri-State has committed to reducing greenhouse gas emissions by 89% by 2030 from a 2005 baseline.

For more information on Tri-State's electric resource planning, visit: tristate.coop/resource-planning. Information about Tri-State's emissions reduction goals and progress are available at: tristate.coop/reducing-emissions.

Strategy R1: Push to accelerate widespread grid decarbonization

In contrast to strategy R1, which focuses on encouraging local renewable energy generation within the existing regulatory framework, R2 explores opportunities for the Town of Crested Butte to influence that framework by advocating for increased renewable generation system-wide.

GHG Impact in 2030:
n/a (no direct impact)

Cost Effectiveness:
n/a

Town Cost 2025 – 2030:
$12,500 - $16,500

Town Staff Time (Annual Average):
0.1 – 0.2 FTE

Action R1.A: Advocate for increased renewable energy generation at the local, state, and federal levels.

The Town of Crested Butte is already engaged in advocacy through its membership in Colorado Communities for Climate Action (CC4CA), a coalition of local governments across Colorado pushing for stronger state and federal climate policies. This action explores other opportunities for the Town to leverage its voice through dedicated advocacy efforts at the local utility (GCEA and Tri-State Generation and Transmission), state, and federal levels.

Target	Emissions Impact *(by 2030)*	Estimated Total Cost *(2025 – 2030)*	Cost Effectiveness *(Total Cost/ Emissions Impact)*	Estimated Avg. Annual Staff Time	Timing
Participate in ongoing advocacy, including opportunities and the local, state, and federal level	No direct emissions impact	$12,500 - $16,500	No direct emissions impact	0.1 – 0.2 FTE	Near-Term (2025-2026)

Photo credit: Nolan Blunck

Strategy R2: Support local renewable energy generation

Crested Butte has an opportunity to encourage the increase of local renewable energy generation through strategic partnerships and programs that support the installation of renewable technologies. This strategy focuses on opportunities to leverage generation within the current utility and regulatory landscape.

GHG Impact in 2030:
116 $MTCO_2e$

Cost Effectiveness:
\$222 - \$626 / $MTCO_2e$

Town Cost 2025 – 2030:
\$25,700 - \$72,400

Town Staff Time (Annual Average):
0.2 - 0.5 FTE

Action R2.A: Provide educational resources to increase voluntary adoption of local renewable generation and evaluate coordinating "group buy" programs.

This action focuses on encouraging voluntary adoption of local generation by raising awareness of existing opportunities and evaluating the facilitation of installation through a “group buy” program.

Target	Emissions Impact *(by 2030)*	Estimated Total Cost *(2025 – 2030)*	Cost Effectiveness *(Total Cost/ Emissions Impact)*	Estimated Avg. Annual Staff Time	Timing
Triple the current number of solar permits filed to achieve 3 business and 3 residential solar arrays per year, resulting in 84kW per year installed generation capacity	78 MTCO2e	\$15,000 - \$45,000	\$193 - \$580	0.2 – 0.5 FTE	Near-Term (2025-2026)

Group Buy Programs

A group buy program is a collective purchasing initiative where a group of individuals or organizations come together to negotiate better prices and terms for products or services. By leveraging their combined buying power, participants can secure discounts, streamline the purchasing process, and gain access to expert guidance and peer-learning opportunities.

Case Study - Gunnison County, CO

In 2019, the Solarize Gunnison County group buy program was launched to make going solar more economically feasible for people in Gunnison County and contracts signed for at least 55kW of new solar installations (Gunnison Country Times 2019).

Action R2.B: Partner with GCEA to support the installation of local renewable generation up to allowable limits.

In 2024, Tri-State Generation and Transmission raised GCEA's local electricity generation limit from 5% to 40% of total supply until 2028. This policy enables Crested Butte to partner with GCEA to install up to 0.8 MW of additional local renewable energy, leveraging the new generation allowance.

Target	Emissions Impact *(by 2030)*	Estimated Total Cost *(2025 – 2030)*	Cost Effectiveness *(Total Cost/ Emissions Impact)*	Estimated Avg. Annual Staff Time	Timing
0.8MW additional local renewable generation installed	16 MTCO2e	$7,500 - $22,500	$477 - $1,431	0.1 – 0.3 FTE	Mid-Term (2027-2028)

Action R2.C: Expand the Renewable Energy Mitigation Program (REMP) to require renewable energy generation or fee-in-lieu for buildings over a certain size.

The Town of Crested Butte Renewable Energy Mitigation Program (REMP) requires any hot tub larger than 64 square feet, or any outdoor heated space (heated driveways, for example) to be off-set by renewable energy sources or a fee-in-lieu. Additionally, any new commercial buildings over 10,000 square feet are required to install solar under the Town's building code.

This action involves expanding the existing program to add a requirement for the installation of on-site renewable energy generation or payment of a fee-in-lieu for all newly constructed buildings over a defined size.

Target	Emissions Impact *(by 2030)*	Estimated Total Cost *(2025 – 2030)*	Cost Effectiveness *(Total Cost/ Emissions Impact)*	Estimated Avg. Annual Staff Time	Timing
3 installations or payments in lieu each year, resulting in 24kW per year installed generation capacity	22 MTCO2e	$3,200 - $4,900	$143 - $219	<0.1 FTE	Mid-Term (2027-2028)

Strategy R3: Assess renewable energy to serve Town facilities

This strategy involves evaluating renewable energy installations for Town facilities as efficiency or electrification improvement opportunities arise.

GHG Impact in 2030:
Up to 247 $MTCO_2e$

Cost Effectiveness:
TBD based on need and opportunities

Town Cost 2025 – 2030:
TBD based on need and opportunities

Town Staff Time (Annual Average):
< 0.1 FTE

Action R3.A: Evaluate renewable energy generation to meet Town energy needs.

This action involves the Town of Crested Butte assessing the installation of renewable energy generation as energy efficiency or electrification opportunities arise. All renewable energy projects on Town properties will be heavily evaluated for availability of grant funding and the Town's long-term return on investment.

Target	Emissions Impact *(by 2030)*	Estimated Total Cost *(2025 – 2030)*	Cost Effectiveness *(Total Cost/ Emissions Impact)*	Estimated Avg. Annual Staff Time	Timing
TBD based on need and opportunities	up to 247 MTCO2e	TBD based on need and opportunities	Calculated at strategy level	<0.1 FTE	Long Term (2029-2030)

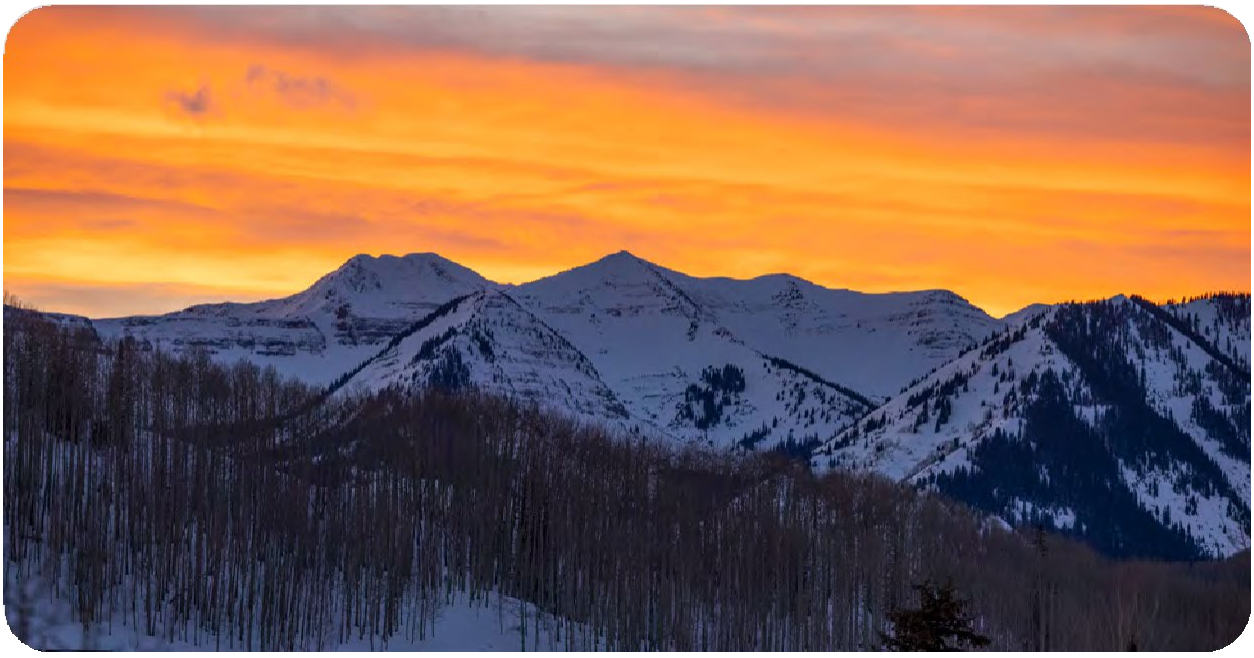


Photo credit: Robby Lloyd

WASTE (W):

Create and expand programs that simplify waste reduction making it easier for the community to engage in climate action.

Crested Butte's GHG inventory includes emissions from 629 tons of landfill waste, which produces methane, a potent greenhouse gas that increases atmospheric warming more intensely than carbon dioxide. This sector focuses on reducing landfill waste through source reduction, recycling, and composting, and addresses emissions from wastewater treatment tied to the population served. Waste reduction also mitigates systemic emissions from sourcing, manufacturing, and transport of materials.

The Town recognizes that waste emissions only represent 3% of the community's total emissions, however, this sector represents an immense opportunity to educate and engage with the community on climate and empower community members to make daily behavior changes.

2022 SNAPSHOT

Waste and wastewater emissions
670 $MTCO_2e$

Total material sent to landfill
629 Tons

Total material recycled
262.9 Tons

Total material composted
10 Tons

Diversion rate from landfill
30%

Photo credit: Brendle Group

HOW CB USES AND DISPOSES OF MATERIALS TODAY

Crested Butte partners with Waste Management for weekly residential trash and bi-weekly recycling pick-up. Of the approximately 903 tons of waste material generated in Crested Butte, 30% is recycled and composted while the remaining 70% is sent to landfill in Montrose or Grand Junction. Data was not available for commercial and large multifamily units, which contract privately with waste haulers for collection and disposal.

WHAT CB IS ALREADY DOING TO REDUCE WASTE EMISSIONS

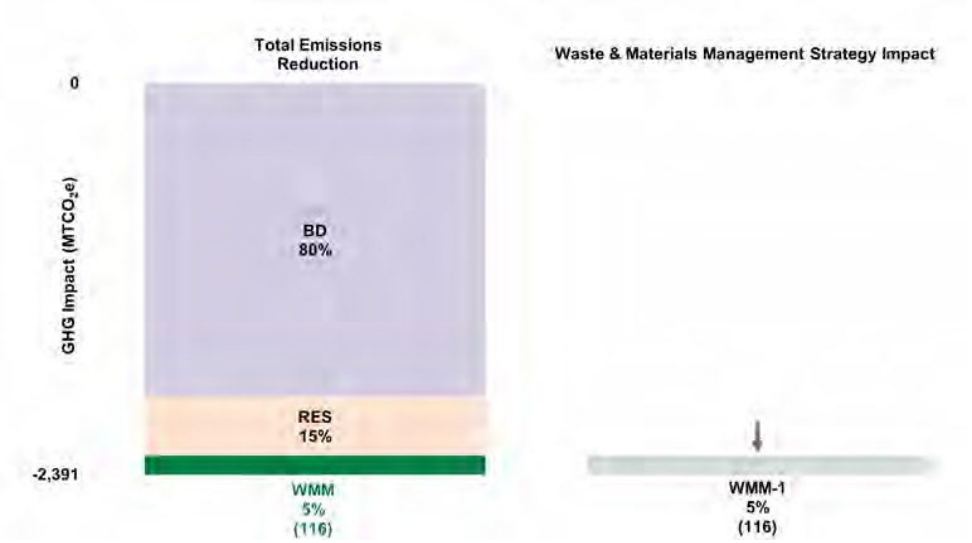
Crested Butte is reducing landfill waste through the following:

- Universal residential recycling,
- Town-wide plastic bag ban,
- Climate Responsible Special Events (CRSE) program, and;
- A 2024 North Valley compost drop-off program partnership with Mt. Crested Butte and Elements Mountain Compost. The Town is piloting this year-long composting program (June 2024–June 2025) with plans to continue if participation is strong.

DRIVERS OF CHANGE

Waste and wastewater emissions in Crested Butte are directly driven by the volume of waste sent to landfill and the volume of wastewater treated, both of which are influenced by population change and visitor numbers. Crested Butte's average daily population increased by 5% from 2017 to 2022. In addition to population, the availability and use of recycling and compost diversion streams drive landfill waste emissions.

Figure 15. Cumulative impact of implementing all strategies in the Waste Reduction sector.



Strategy W1: Increase landfill waste diversion and encourage sustainable consumption

This strategy aims to reduce landfill waste by minimizing waste at the source and increasing recycling and composting. Actions follow best practices and target a 224-ton reduction from the forecasted 688 tons of waste by 2030.

GHG Impact in 2030:
116 $MTCO_2e$

Cost Effectiveness:
$742 - $953 / $MTCO_2e$

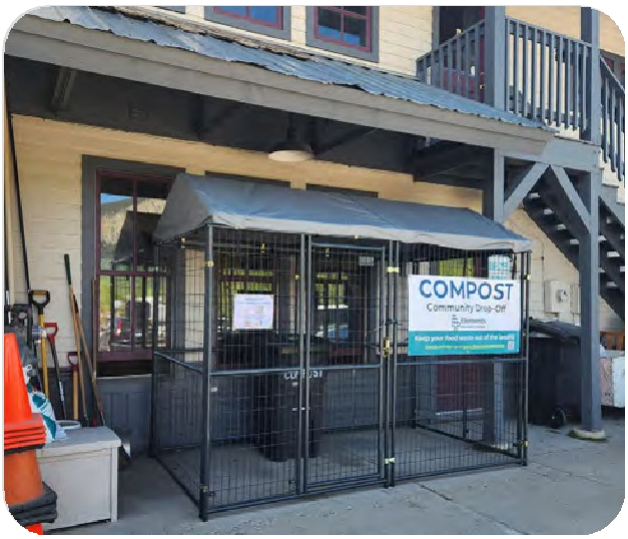
Town Cost 2025 – 2030:
$86,400 - $111,000

Town Staff Time (Annual Average):
0.4 – 1.0 FTE

Action W1.A: Require adequate space for trash, recycling, and composting containers and pickup in new development.

Requiring adequate space for recycling and composting in new developments removes barriers to waste diversion, ensuring access to both current and future programs. This action involves a code amendment mandating adequate space in residential and commercial projects.

Target	Emissions Impact *(by 2030)*	Estimated Total Cost *(2025 – 2030)*	Cost Effectiveness *(Total Cost/ Emissions Impact)*	Estimated Avg. Annual Staff Time	Timing
Participate in ongoing advocacy, including opportunities and the local, state, and federal level	No direct emissions impact	$12,500 - $16,500	No direct emissions impact	0.1 – 0.2 FTE	Near-Term (2025-2026)



Photos credit: Elements Compost

Action W1.B: Facilitate the development of new waste diversion programs or infrastructure.

The Town of Crested Butte is working to expand waste diversion infrastructure, including piloting a community compost drop-off in partnership with Mt. Crested Butte and Elements Mountain Compost. Future efforts may improve or expand the pilot program or support new infrastructure and program development.

Target	**Emissions Impact** *(by 2030)*	**Estimated Total Cost** *(2025 – 2030)*	**Cost Effectiveness** *(Total Cost/ Emissions Impact)*	**Estimated Avg. Annual Staff Time**	**Timing**
TBD based on need and opportunities	Calculated at strategy level	TBD based on need and opportunities	Calculated at strategy level	TBD	Mid-Term (2027-2028)

Action W1.C: Incentivize waste reduction, recycling, and composting for residents and businesses

This action focuses on the creation of incentives, paired with education and outreach, to encourage waste reduction and diversion to recycling and composting by all residents and businesses in Crested Butte.

Target	**Emissions Impact** *(by 2030)*	**Estimated Total Cost** *(2025 – 2030)*	**Cost Effectiveness** *(Total Cost/ Emissions Impact)*	**Estimated Avg. Annual Staff Time**	**Timing**
Implementation of town-wide waste reduction and diversion incentives	Calculated at strategy level	$29,500 - $44,500	Calculated at strategy level	0.1 – 0.3 FTE	Near-Term (2025-2026)

Photo credit: Lydia Stern

Action W1.D: Ban certain materials from landfill and enforce requirements for construction and demolition materials recycling.

This action focuses on reducing waste by banning certain materials from being sent to landfill, requiring that they are either eliminated from the waste stream or diverted through recycling. The action specifically focuses on construction and demolition waste by exploring requirements for the reuse and/or recycling of certain materials.

Target	Emissions Impact *(by 2030)*	Estimated Total Cost *(2025 – 2030)*	Cost Effectiveness *(Total Cost/ Emissions Impact)*	Estimated Avg. Annual Staff Time	Timing
Adoption of ordinance to ban materials from landfill and/or require materials recycling	Calculated at strategy level	$44,600 - $50,000	Calculated at strategy level	0.6 FTE	Mid-Term (2027-2028)

Deconstruction Ordinances

A deconstruction ordinance is a regulation that encourages or requires the careful dismantling of buildings instead of traditional demolition. The goal is to minimize waste by salvaging reusable materials, which can then be recycled or repurposed. This approach can not only reduce landfill waste but also create local economic opportunities through the resale of salvaged materials.

Case Study - Boulder, CO

The City of Boulder, CO has implemented an ordinance that mandates the deconstruction of certain types of buildings, rather than demolishing them. The ordinance includes guidelines on how to conduct the deconstruction and incentivizes property owners to participate by providing access to resources and information on local deconstruction service.

Action W1.E: Adopt a save-as-you-throw (SAYT) ordinance to disincentivize waste generation

This action proposes a residential Save-As-You-Throw (SAYT) ordinance in partnership with the Town's waste hauler to incentivize waste diversion, linking trash costs to waste volumes through tiered pricing. It discourages waste generation and complements Action C's recycling and composting incentives.

Target	Emissions Impact *(by 2030)*	Estimated Total Cost *(2025 – 2030)*	Cost Effectiveness *(Total Cost/ Emissions Impact)*	Estimated Avg. Annual Staff Time	Timing
Adopt a save-as-you-throw ordinance	Calculated at strategy level	$2,200 - $3,200	Calculated at strategy level	<0.1 FTE	Mid-Term (2027-2028)

Action W1.F: Develop incentives and programs to encourage waste reduction and diversion by Town employees

This action aims to reduce waste from Town operations through staff programs like office supply re-use libraries or interdepartmental competitions with incentives for waste diversion.

Target	Emissions Impact *(by 2030)*	Estimated Total Cost *(2025 – 2030)*	Cost Effectiveness *(Total Cost/ Emissions Impact)*	Estimated Avg. Annual Staff Time	Timing
Implementation of Town employee waste reduction and diversion incentives	Calculated at strategy level	$1,800 - $2,700	Calculated at strategy level	<0.1 FTE	Near-Term (2025-2026)

Action W1.G: Develop and implement a Town Environmental Purchasing Policy (EPP)

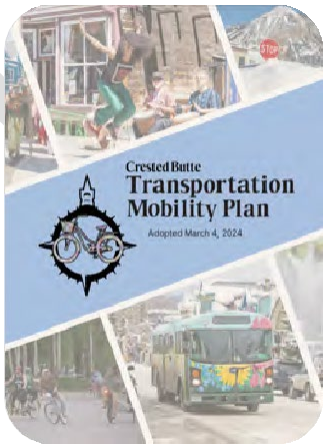
An EPP is a set of guidelines and practices that prioritize or require the purchase of environmentally friendly products and services. This action aims to strategically reduce waste from Town operations and require or encourage sustainable Town purchasing practices through the development of an Environmental Purchasing Policy (EPP). Components of an EPP could include a requirement or price preference for environmentally preferable products that are certified through third party programs (i.e., EnergyStar, BCorps, etc.) or guidelines for incorporating lifecycle cost into purchasing decisions, as examples.

Target	Emissions Impact *(by 2030)*	Estimated Total Cost *(2025 – 2030)*	Cost Effectiveness *(Total Cost/ Emissions Impact)*	Estimated Avg. Annual Staff Time	Timing
Implementation of Town employee waste reduction and diversion incentives	Calculated at strategy level	$1,800 - $2,700	Calculated at strategy level	<0.1 FTE	Near-Term (2025-2026)

TRANSPORTATION (T):

Advance the Town's Transportation Mobility Plan and Community Plan by prioritizing investments in walking, biking, and transit, preparing for an electric vehicle future, and improving land use policy to support efficient transportation infrastructure

In 2022, transportation within Crested Butte accounted for 7% of community emissions. This section outlines strategies to reduce emissions by shifting to lower-carbon transportation options and supporting electric vehicle adoption, aligned with actions in three related plans:



- **Crested Butte Transportation Mobility Plan (2024):** The Transportation Mobility Plan (TMP) describes Crested Butte's existing mobility conditions, identifies key transportation challenges, and outlines an implementation plan with actions to integrate land use and transportation planning, increase alternative modes of travel, and manage parking supply to set the future up in a way that de-emphasizes cars and focuses on walking, biking, rolling, and transit.
- **North Gunnison Valley Electric Vehicle Plan (adoption anticipated in 2025):** Crested Butte is working with the Town of Mt. Crested Butte to create an Electric Vehicle (EV) plan for the North Gunnison Valley that will align regional EV support strategies.
- **Crested Butte Community Plan (adoption anticipated in 2025):** The Community Plan will aim leverage the Town's development regulations to increase opportunities for people to live closer to work, supporting the TMP and CAP goals as well.
- **Gunnison County Corridor Plan (adoption anticipated in 2025):** The Corridor Plan will integrate land use, transporation, and infrastructure planning to advance climate action and environmental resliency alongside other goals to meet the needs of the entire region.

While this Climate Action Plan is primarily focused on reducing GHG emissions within the Town of Crested Butte, the emissions and benefits of these other plans will extend throughout the Gunnison Valley.

2022 SNAPSHOT

Transportation emissions
1,470 $MTCO_2e$

Vehicle miles traveled
3,673,171

HOW CB MOVES TODAY

Crested Butte, just 0.9 square miles, sees most residents walking and biking. Pedestrian travel accounts for 79% of trips in summer and 94% in winter, while biking makes up 16% in summer and 1% in winter. Only 5% of trips that start and end in town are made by vehicle. However, significant traffic comes from visitors and commuters, with 44% of Crested Butte employees living outside town in summer and 37% in winter. Although travel emissions to and from Crested Butte aren't included in the community inventory, they impact regional transportation

WHAT CB IS ALREADY DOING TO ADVANCE LOW CARBON TRANSPORTATION

The TMP outlines actions to shift focus from cars to walking, biking, rolling, and transit over 20 years. Its strategy balances promoting alternative travel modes, reducing parking convenience, and prioritizing pedestrians through land use planning.

The TMP was adopted on March 4, 2024, and the Town has hit the ground running with implementation. In 2024, the Town:

- Implemented improved corner paint and bike racks on Elk Avenue
- Added additional stop signs where warranted.
- Applied for CDOT access permit and secured 80% of construction funding for the Red Lady roundabout at the entrance to town, due to its active participation in the Safe Streets for All regional corridor planning
- Developed and deployed a traffic calming policy
- Began annual parking management evaluation by Town Council and expanded the permit program to include a skier permit in impacted neighborhoods
- Began an EV charging incentive program
- Actively participating in Mountain Express and RTA strategic plans
- Conducting Compass Navigation process and preparing for a regional corridor plan

All of the actions in the TMP are incremental and strategically phased over the next 20 years to improve transportation choices, managing parking inventory, and integrate land use and transit.

DRIVERS OF CHANGE

Transportation emissions are driven by vehicle miles traveled and the per mile emissions of vehicles. Crested Butte's number one transportation goal is to de-emphasize the car by prioritizing walking, biking, rolling, and transit with a secondary focus on supporting EV adoption for necessary car trips. The TMP highlights that increasing traffic has degraded the pedestrian experience. While future growth and development will impact transportation emissions, stricter vehicle standards and higher EV adoption, along with renewable electricity, will reduce emissions per mile. Crested Butte can further support EV adoption through the North Gunnison Valley EV Plan.

Strategy T1: Improve transportation choices

The TMP includes actions not only to maintain alternative transportation choices, but to improve them, by investing in transit and introducing traffic calming, corridor plans, and streetscapes. While Crested Butte has the goal of being a safer and car-optional community, the Town also has an opportunity to support and encourage EV adoption and use for those trips when cars are needed. The EV plan will identify specific actions that the Town can take to educate the community and make driving an EV to and around Crested Butte more accessible and convenient for workers, residents, and visitors alike. Actions to improve transportation choices will reduce emissions and have significant co-benefits for the community.

Photo credit: Nolan Blunck

Strategy T2: Manage parking supply

The convenience of parking is the biggest factor that determines if someone will drive a car and the TMP includes actions to strategically address parking over the next 20 years to incrementally manage over-parked areas, improve parking safety, and reduce the number of cars entering and leaving Crested Butte. Access to convenient and affordable charging infrastructure is a key driver of EV adoption. The EV plan will identify actions to meet future demand while prioritizing origin and destination charging (e.g., at lodging establishments or multifamily housing) that aligns with the Town's "park once" ethos.

Photo credit: Nolan Blunck

Strategy T3: Integrate land use and transportation

Land use significantly influences transportation choices by affecting travel distance and the access and convenience of different modes. Addressing land use impacts long- term transportation emissions. The Community Plan and the Gunnison County Corridor Plan will help to support this strategy.

Photo credit: Nolan Blunck

IMPLEMENTATION

STRATEGY PRIORITIZATION

The Town will prioritize strategies and actions that are most cost-effective for initial implementation. Top priorities include accelerating efficiency improvements and electrification in existing residential and commercial buildings. See Figure 16 for a summary of the top 6 strategies ranked by cost-effectiveness, measured in estimated dollars per MTCO2e reduced. Strategies without a direct emissions impact are not ranked.

1	$89 - $101	**B2:** Accelerate efficiency improvements and electrification in existing residential buildings
2	$122 - $134	**B3:** Accelerate efficiency improvements and electrification in existing commercial buildings
3	$222 - $626	**R2:** Support new local renewable energy generation
4	$587 - $878	**B4:** Close the gap on new construction electrification and efficiency
5	$742 - $953	**W1:** Increase landfill waste diversion and encourage sustainable consumption
6	$1,173 - $1,521	**B5:** Lead the way with efficiency improvements and electrification of Town buildings

Figure 16. Top 6 Strategies Ranked by Estimated Cost Effectiveness ($ per $MTCO_2e$)

TIMELINE

Plan implementation will begin immediately following adoption. The actions outlined in the plan are intentionally high-level to allow for flexibility in the details and approach. As each action is addressed, Town staff will engage the community and Town Council on the best path forward and be prepared to adapt to emerging challenges, opportunities, and stakeholder feedback.

Action implementation will involve developing more detailed steps and timelines while refining resource needs through budget and staffing analysis. In addition, Town staff will integrate stakeholder feedback in program design, including communications and community education.

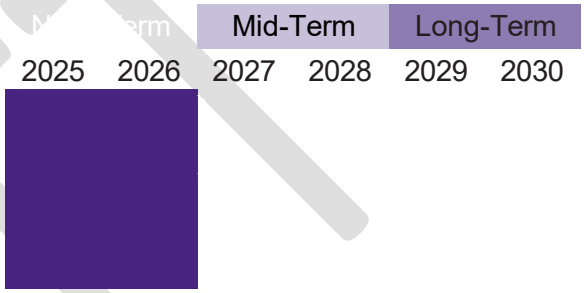
A preliminary timeline for the implementation of strategies and actions identified in this plan is provided below and will be updated as needed to reflect implementation progress, schedule adjustments, budget priorities and the inclusion of new strategies and actions, as appropriate. Additionally, the Town will continue to evaluate and engage in regional, Gunnison Valley-wide projects and programs with the potential to significantly reduce Scope 3 emissions beyond Crested Butte town limits.

TRACKING PROGRESS

The Town will monitor implementation progress by identifying Key Performance Indicators at the outset of projects and managing an internal tracking database. The Town is committed to transparent communication with the community on climate progress and staff will regularly publish high-level progress and emissions updates online.

Regularly reporting on progress will help the Town to monitor implementation, stay ahead of challenges and adapt to changing community and budgetary conditions. A full Climate Action Plan update, which will include a detailed GHG emissions inventory, is scheduled for 2030.

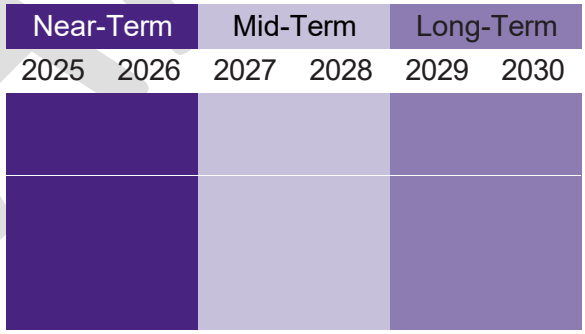
B1: Enable climate-friendly future development



A. Incorporate climate considerations into zoning code.

B. Enable climate-friendly construction and development through flexible design guidelines and a review of permitting processes.

B2: Accelerate efficiency improvements and electrification in existing residential buildings

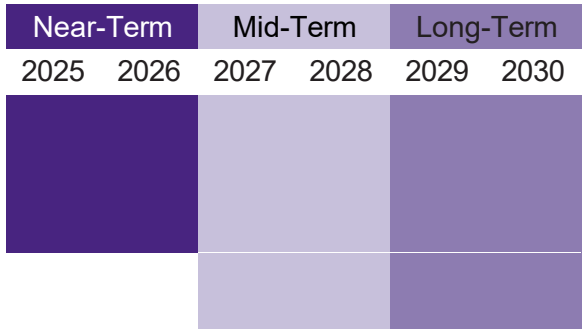


A. Require an energy assessment for residential Level 1, 2, and 3 remodels.

B. Require an energy assessment for vacation rental units.

C. Provide Town-funded energy efficiency and electrification incentives for all residents

B3: Accelerate efficiency improvements and electrification in existing commercial buildings

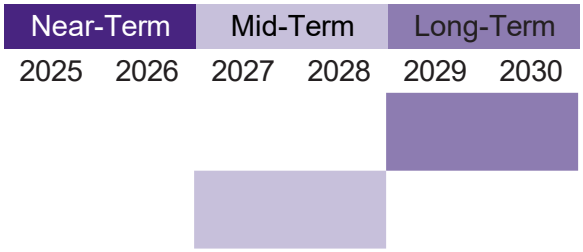


A. Require an energy assessment for commercial Level 1, 2, and 3 remodels.

B. Provide Town-funded energy efficiency and electrification incentives for all businesses.

C. Require energy use disclosure and benchmarking for commercial buildings.

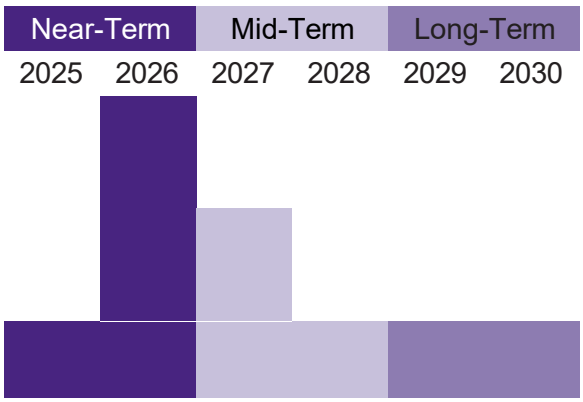
B4: Close the gap on new construction electrification and efficiency



A. Require all-electric commercial kitchen equipment for new construction.

B. Estimate and track building materials used in construction.

B5: Reduce emissions from Town buildings

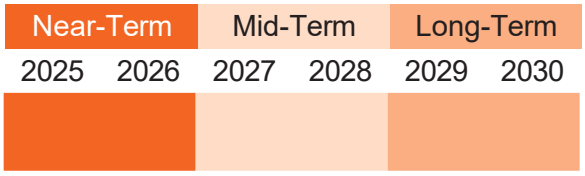


A. Perform updated audits of all municipal facilities and develop a municiapl building energy efficiency and electrification plan.

B. Begin implementing electrification and efficiency improvements identified in energy efficiency and electrification plan

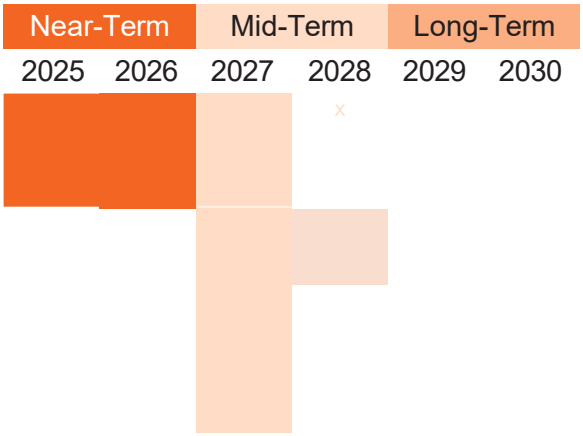
C. Monitor Town facilities' energy use and include within a regular Climate Action Report.

R1: Push to accelerate widespread grid decarbonization



A. Advocate for increased renewable energy generation at the local, state, and federal levels

R2: Support local renewable energy generation

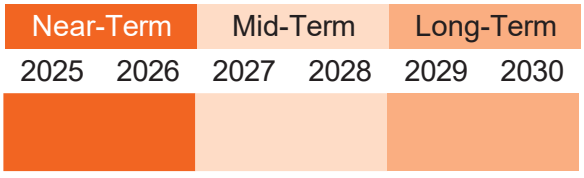


A. Provide educational resources to increase voluntary adoption of local renewable generation and evaluate coordinating a "group buy".

B. Partner with GCEA to support the installation of local renewable generation up to allowable limits

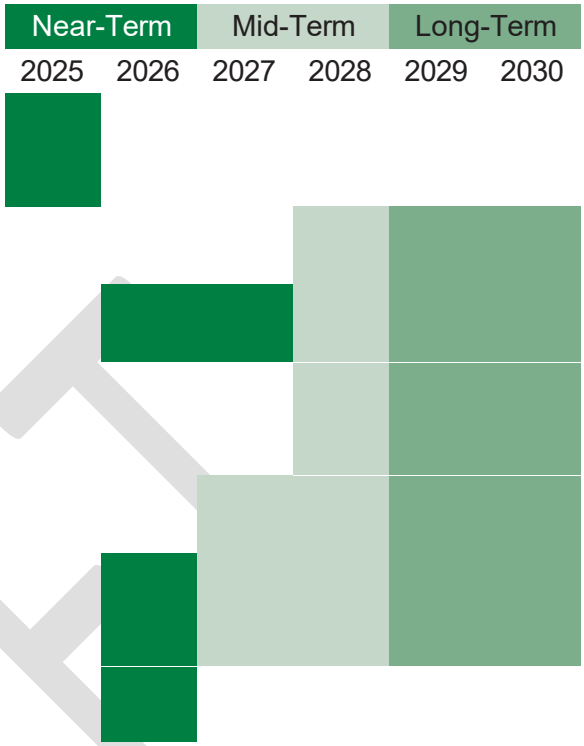
C. Expand the Renewable Energy Mitigation Program (REMP) to require renewable energy generation or fee-in-lieu for buildings over a certain size

R3: Assess renewable energy resources to serve Town facilities



A. Investigate renewable energy generation to meet Town energy needs.

W1: Increase landfill waste diversion and encourage sustainable consumption



- **A.** Require adequate space for trash, recycling, and composting containers and pickup in new development.
- **B.** Facilitate the development of new waste diversion infrastructure.
- **C.** Incentivize waste reduction, recycling, and composting for residents and businesses
- **D.** Ban certain materials from landfill and enforce requirements for construction and demolition materials recycling.
- **E.** Adopt a save-as-you-throw ordinance to disincentivize waste generation
- **F.** Develop incentives and programs to encourage waste reduction and diversion by Town employees
- **G.** Develop and implement a Town Environmental Purchasing Policy

T1: Improve transportation choices
T2: Manage parking convenience
T3: Integrate land use and transit

Ongoing implementation coordinated through Transportation and Mobility Plan efforts

GUIDE TO KEY TERMS

Adjusted Business As Usual (ABAU): Forecast of community and municipal emissions that takes into account Business As Usual change along with utility renewable generation commitments and projected vehicle efficiency and electrification policy and market impacts.

Average Daily Annual (ADA) Population: The average number of people present in a given location on any day over the course of a year. This measure accounts for variations in population throughout the year due to factors such as tourism, seasonal residents, commuters, or transient visitors.

Business As Usual (BAU): Forecast of community and municipal emissions that takes into account expected population growth, planned Town facilities, and existing Town codes.

Climate change: Climate change refers to long-term shifts in temperatures and weather patterns. Since the 1800s, human activities have been the main driver of climate change, primarily due to the burning of fossil fuels like coal, oil, and gas (United Nations n.d.).

Community Compass: The Crested Butte Community Compass is the Town of Crested Butte's comprehensive long-range plan. The Compass includes a strategic plan and decision-making framework that was used to guide the development of this Climate Action Plan in a way that is aligned with the community's values.

Decarbonization: The process of reducing or eliminating GHG emissions from activities, for example by a transition to more renewable sources of energy.

Electrification: The process of replacing technologies or systems that rely on fossil fuels such as natural gas with those that rely on electricity.

Emissions factor: The emissions generated per unit of activity such as energy consumption or fuel use.

Emissions scopes (1, 2, 3): For the purposes of GHG inventories, emissions are classified into three scopes. Scope 1 emissions are associated with sources located inside the Town boundary (e.g., the burning of natural gas), Scope 2 emissions are associated with the generation of grid-supplied electricity used inside the Town, and Scope 3 emissions are other emissions that occur outside the Town boundary as a result of activities taking place within the Town.

Energy assessment: The assessment of a building's energy usage that can be used to identify opportunities for efficiencies and improvements.

Energy benchmarking: Energy benchmarking policies require property owners to report energy usage data and compare against similar types of buildings, often using a standardized metric like Energy Use Intensity (EUI) or ENERGY STAR scores.

Energy disclosure: Energy disclosure policies require property owners to report energy usage data to increase transparency and encourage energy efficiency improvements.

EV (Electric Vehicle): EVs are vehicles powered entirely or partially by electricity, as opposed to internal combustion engines that rely on fossil fuels such as gasoline or diesel. EVs include both Battery Electric Vehicles (BEVs) powered solely by electricity, and Plug-in Hybrid Electric Vehicles (PHEVs) that have both an electric motor and an internal combustion engine.

GHG (greenhouse gas): GHGs are gases that trap heat in the atmosphere and contribute to climate change. GHGs emitted by human activities include Carbon Dioxide (CO_2), Methane (CH_4), Nitrous Oxide (N_2O) and Fluorinated gases (EPA 2024).

GPC (Global Protocol for Community-Scale Greenhouse Gas Inventories): The GPC is an internationally recognized framework for the development of community-scale GHG inventories. It provides a standardized methodology for calculating and reporting emissions and is widely used in climate action planning. The GPC is regularly updated to reflect best practices and is maintained by the World Resources Institute, C40 Cities, and ICLEI Local Governments for Sustainability (WRI, ICLEI, and C40 Cities Climate Leadership Group 2022).

ICLEI Local Government Operations Protocol: A widely used protocol to account for GHG emissions associated with local government operated buildings, vehicles, and other operations (ICLEI USA 2018).

kWh (kilowatt-hour): A kWh is a unit of energy used to measure electricity consumption over time. 1 kWh represents the energy usage of a device that consumes 1 kilowatt of power continuously for 1 hour.

Level 1, Level 1, Level 3 Permits: These permit types represent different levels of building alteration as defined in the International Code Council 2021 International Building Code adopted by the Town of Crested Butte (International Code Council 2021).

- Level 1 Permit: Includes the removal and replacement or the covering of existing materials, elements, equipment or fixtures using new materials, elements, equipment, or fixtures that serve the same purpose.
- Level 2 Permit: Includes the addition or elimination of any door or window, the reconfiguration of any system, or the installation of any additional equipment, and applies where the work area is equal or less than 50% of the building area.
- Level 3 Alterations: Where the work area exceeds 50% of the building area.

$MTCO_2e$ (metric tons carbon dioxide equivalent): $MTCO_2e$ is a standard unit used to quantify and compare GHGs with different global warming potential (GWP). Since gases have different impacts on climate change, emissions are standardized by the equivalent amount of carbon dioxide that would have the same impact.

Renewable energy: Energy sources are considered renewable when they are replenished at a higher rate than they are consumed. Solar and wind energy are examples of renewable resources, while fossil fuels such as coal, oil, and gas are non-renewable resources. Generating renewable energy creates far lower GHG emissions than burning fossil fuels (United Nations n.d.)

Snow: Don't forget about snow in Crested Butte! We have big winters and a lot of snow and climate action strategies need to take this seasonal reality into account.

Therm: A therm is a unit of energy used to measure natural gas consumption. One therm is equivalent to 100,000 British Thermal Units (BTUs), and one BTU is the amount of energy required to raise the temperature of one pound of water by one degree Fahrenheit.

Grid / Transmission and Distribution (T&D) Losses: This term refers to the emissions associated with losses in the energy system, including electricity lost during the generation, transmission, and distribution of electricity from power plants to end users, and natural gas leakage.

Waste reduction: A decrease in the total amount of waste generated.

Waste diversion: The percentage of total waste generated that is reused, recycled, or composted rather than sent to landfill.

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HOW CRESTED BUTTE RESIDENTS CAN TAKE CLIMATE ACTION

Learn about climate change

- Learn about the State of Colorado's actions on climate change and clean energy: climate.colorado.gov
- Explore how the climate is expected to change in Gunnison County and around the U.S.: crt-climate-explorer.nemac.org
- Check out tools, resources, and information to help our community become more resilient in the face of changing conditions: coresiliency.com

Buildings (B): Improve the efficiency of and electrify your home

- Explore ways that you can save energy at home: energy.gov/energysaver/energy-saver
- Sign up for a home Energy Evaluation through Gunnison County Electric Association (GCEA): gcea.coop/energy-efficiency/energy-evaluations
- Save money and improve the efficiency and comfort of your home through GV-HEAT's income qualified and non-income qualified programs: gvrha.org/gvheat
- Take advantage of available incentives to increase the efficiency of and electrify your home: homes.rewiringamerica.org/calculator and crestedbutte-co.gov/rebates

Renewable Energy (R): Help increase the amount of Crested Butte's energy supply met through renewable resources

- Start your solar journey by installing solar at home or signing up for one of GCEA's Green the Grid subscription programs: gcea.coop/energy-efficiency/renewable-energy-programs
- Participate in GCEA's PowerWise Pledge™ to show your financial commitment to GCEA's efforts to green the grid: gcea.coop/powerwise-pledge
- Participate in GCEA board meetings and elections to advocate for renewable power: gcea.coop/about-us/annual-meeting-elections

Waste (W): Reduce waste sent to landfill

- Make sure you know what can and cannot be recycled in CB: crestedbutte-co.gov/trash-recycle
- Sign up for composting:crestedbutte-co.gov/compost
- Learn how to reduce, reuse and recycle waste at home, work, and school: epa.gov/recycle/reducing-waste-what-you-can-do
- Consider borrowing or buying used items instead of buying new.
- Learn how to properly store food to maximize freshness and avoid waste: foodsafety.gov/keep-food-safe/foodkeeper-app

Transportation (T): Choose low carbon transportation options

- Walk, bike, roll, or take the bus around Town whenever you can!
- Take public transit when possible:
  - Mountain Express for in-town and inter-mountain trips: mtnexp.org
  - Gunnison RTA for trips to Gunnison: gunnisonvalleyrta.com
  - Bustang Outrider all the way to Denver: ridebustang.com/outrider
- Team up with others to carpool to work, run errands, or for longer trips
- Use available incentives to make your next vehicle electric: evco.colorado.gov

HOW CRESTED BUTTE BUSINESSES CAN TAKE CLIMATE ACTION

Learn about sustainable business programs and best practices

- Check out voluntary sustainable business programs that can help you reduce emissions and stand out from the crowd:
  - » Join the State of Colorado Green Business Network to receive a free sustainability assessment: cdphe.colorado.gov/co-green-business
  - » Explore resources from B Lab, including B Corp certification and make your business a force for good: bcorporation.net

Buildings (B): Improve the efficiency of and electrify your business

- Explore ways that you can save energy in your business: energystar.gov/buildings/save-energy-commercial-buildings
- Sign up for a business Energy Evaluation through Gunnison County Electric Association (GCEA): gcea.coop/energy-efficiency/energy-evaluations
- Save money and improve the efficiency of your business using GCEA's energy rebates: gcea.coop/energy-efficiency/rebates
- Explore resources available through the State of Colorado to support businesses with building efficiency and electrification: energyoffice.colorado.gov/funding-financing-businesses
- Track your building energy and water use: energystar.gov

Renewable Energy (R): Help increase the amount of Crested Butte's energy supply met through renewable resources

- Start your solar journey with by installing solar at your business or signing up for one of GCEA's Green the Grid subscription programs: gcea.coop/energy-efficiency/renewable-energy-programs
- Participate in GCEA's PowerWise Pledge™ to show your financial commitment to GCEA's efforts to green the grid: gcea.coop/powerwise-pledge

Waste (W): Reduce waste sent to landfill

- Sign up for recycling collection and install clear signage to ensure that all staff and customers know what can and cannot be recycled in CB: crestedbutte-co.gov/trash-recycle
- Adopt a sustainable purchasing policy and buy from local vendors whenever possible.
- Reduce and reuse – source products and equipment from improvement or reuse stores like the Habitat Restore in Buena Vista.
- Consider eliminating single use items such as takeout containers and plastic water bottles.
- Participate in the Town of Crested Butte's Climate Responsible Special Events (CRSE) program

Transportation (T): Choose low carbon transportation options

- Encourage or incentivize your employees to walk, bike, carpool or take transit instead of driving alone.
- Coordinate an employee carpool or vanpool program.
- Explore opportunities and incentives to electrify your fleet vehicles: energyoffice.colorado.gov/funding-financing-businesses

Appendix I:
2022 Town of Crested Butte Greenhouse Gas Emissions Inventory

2022

Town of Crested Butte Greenhouse Gas Emissions Inventory

November 2024

Climate Action Plan

CRESTED BUTTE, COLORADO
A National Historic District

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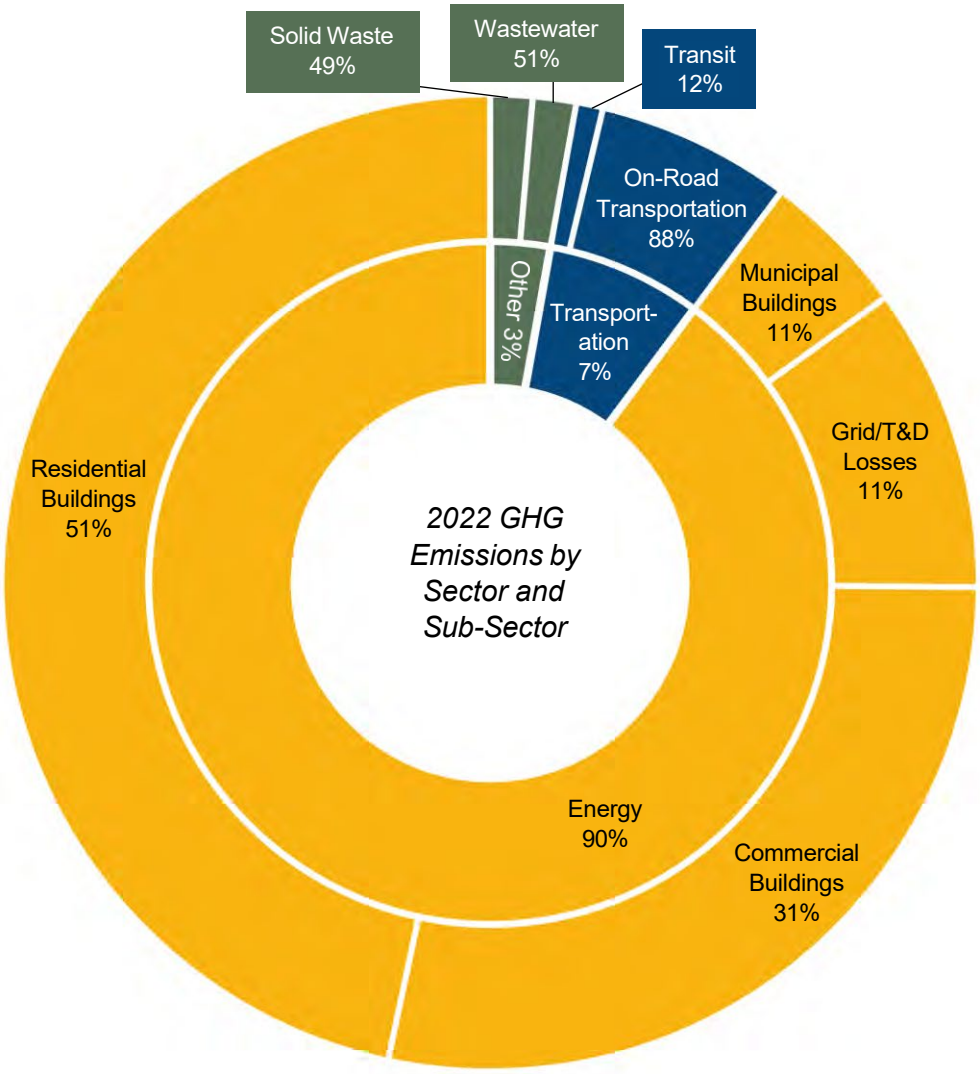
Town of Crested Butte 2022 Greenhouse Gas Emissions Inventory: Executive Summary

In order to inform the Climate Action Plan 2030, the Town of Crested Butte developed a community-wide and municipal greenhouse gas (GHG) emissions inventory. The inventory provides a snapshot of Crested Butte's GHG emissions in 2022, along with a comparison to 2017 data.



23,670 MTCO$_2$e

total community emissions in 2022

5% increase

in calculated community emissions between 2017 and 2022

1,800 MTCo2e

total municipal emissions in 2022, 8% of the community total

Building energy sector

electricity and natural gas are the largest source of emissions

[1] 2017 emissions presented in this report have been recalculated and updated from the original version of the 2017 inventory to align with current best practices.

CHANGE IN EMISSIONS: 2017 TO 2022

The key drivers of change in emissions between 2017 and 2022 include:

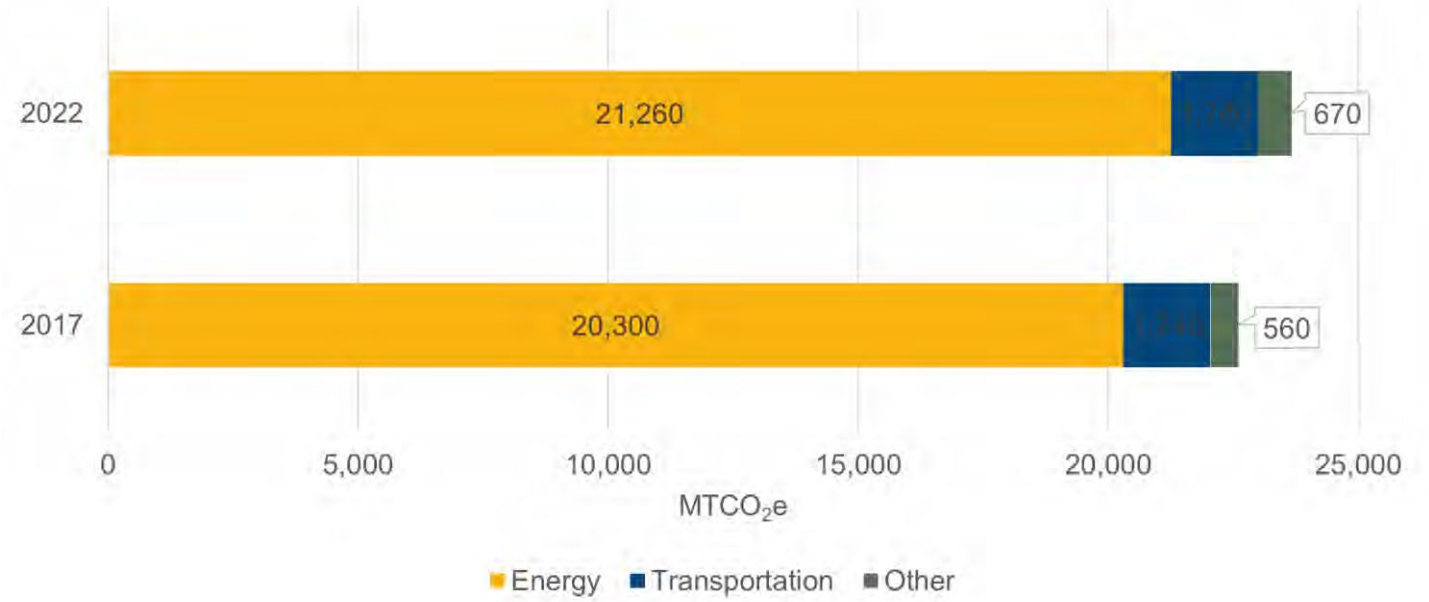
Increased:

- Natural gas usage
- Vehicle miles traveled
- Solid waste generation

Reduced:

- Electricity use
- Emissions factors (electricity, natural gas, vehicle efficiency)

Town of Crested Butte Community Emissions, 2017 and 2022



Sector	2017 ($MTCO_2e$)	2022 ($MTCO_2e$)	Change
Energy	**20,300**	**21,260**	**+5%**
Commercial Buildings	8,750	6,680	-24%
Grid / T&D Losses	1,970	2,390	+21%
Municipal Buildings	Included in Commercial	1,150	N/A
Residential Buildings	9,580	11,040	+15%
Transportation	**1,740**	**1,740**	**0%**
On-Road Transportation	1,740	1,530	-12%
Transit	Not calculated	210	N/A
Other	**560**	**670**	**+20%**
Solid Waste	240	330	+38%
Wastewater Treatment	320	330	+6%
Total Emissions	**22,600**	**23,670**	**+5%**

1. INTRODUCTION

This report provides an estimate of Crested Butte's greenhouse gas (GHG) emissions in 2022 and a comparison to 2017 emissions data.

The purpose of a GHG inventory is to quantify the emissions associated with energy consumption, fuel use, and activities within the community's geographic boundary. The inventory was created as a first step in the development of Crested Buttes Climate Action Plan. The inventory will inform the identification of climate action alternatives in the Climate Action Plan and will enable the Town to evaluate and monitor the impact of alternatives by tracking change in community and municipal emissions over time.

Community Context and Benchmarks

Since actions and trends in the community drive changes in GHG emissions, it is helpful to understand key community characteristics and context that may have influenced 2022 emissions and changes since 2017.

Factor	Description
Population Growth	Population growth is typically associated with increased activity and community emissions. The population of Crested Butte increased 4%, from 1,385 in 2017 to 1,434 in 2022 while the population of Gunnison County increased by 5%. This growth could explain some of the changes in energy use, transportation, and waste generation.
Impact of COVID-19	Evaluating emissions in 2022 avoids the most significant impacts of the COVID-19 global pandemic on activities and emissions in 2020 and 2021. However, since Crested Butte's tourism-driven economy was significantly impacted by the pandemic, some observed changes in emissions may be attributable to lasting indirect impacts of COVID-19.

Establishing New Community Benchmarks

The 2022 inventory establishes new community benchmarks to support GHG emissions trend analysis and evaluation in future years, including:

Factor	2022 Benchmark	Description
Number of Visitors	267,000	Given Crested Butte's small full-time population and high number of visitors, changes in activity may be more closely linked to changes in visitation than changes in the number of residents.
Annual Daily Average Population	2,779 (2021 estimate)	Average daily annual (ADA) is an average of population throughout the entire year.[2] This number was estimated for the Town of Crested Butte Wastewater Treatment Plant Improvements Project.
Heating Degree Days	10,458	Heating degree days (HDD) are a measure of how hot or cold it is in a given year and are a key indicator of natural gas heating demand.
Geographic Area	0.80 square miles	An increase in the geographic area due to annexations into the Town of Crested Butte could be associated with an increase in activity data and services provided by the Town.
Building Area	2,626,995 square feet	An increase in the building area inside the Town could be associated with increased energy use and emissions.

[2] Kingdom, J., and Charbonnet, E., (2021) Wastewater Treatment Plant Improvements Project: Project Memorandum 1

2. SUMMARY OF RESULTS

This inventory was prepared following the Global Protocol for Community-Scale Greenhouse Gas Inventories (GPC) BASIC+ requirements. The 2017 inventory was developed using different methodologies that are not consistent with the GPC protocol. The electricity grid losses, natural gas transportation and distribution losses, on-road transportation, solid waste, and wastewater treatment emissions presented in this report have been recalculated and updated from the original version of the 2017 inventory to align with current best practices that account more holistically for community emissions.

This section provides a summary of community and municipal inventory results by sector and includes a breakdown of community emissions by scope. **The inventory includes Scope 1 and Scope 2 emissions relevant to Crested Butte and accounts for Scope 3 solid waste emissions attributable to activities within Crested Butte.**

Scope	Definition	Sources Included In This Inventory
Scope 1	GHG emissions from sources located within the Town boundary.	• Natural gas use • Wastewater treatment processes • Transportation within Town limits
Scope 2	GHG emissions occurring as a consequence of the use of grid-supplied electricity, heat, steam, and/or cooling within the Town boundary.	• Electricity use
Scope 3	All other GHG emissions that occur outside the town boundary as a result of activities taking place within the Town boundary.	• Solid waste disposal

Community Emissions Summary

Community Emissions By Sector and Scope

Total community emissions for the Town of Crested Butte were 23,670 $MTCO_2e$ in 2022. As shown in **Figure 1**, by far the largest source of emissions was the Energy sector, accounting for 90% of the total, followed by Transportation at 7%, and Other emissions (Wastewater Treatment and Solid Waste) at 3%.

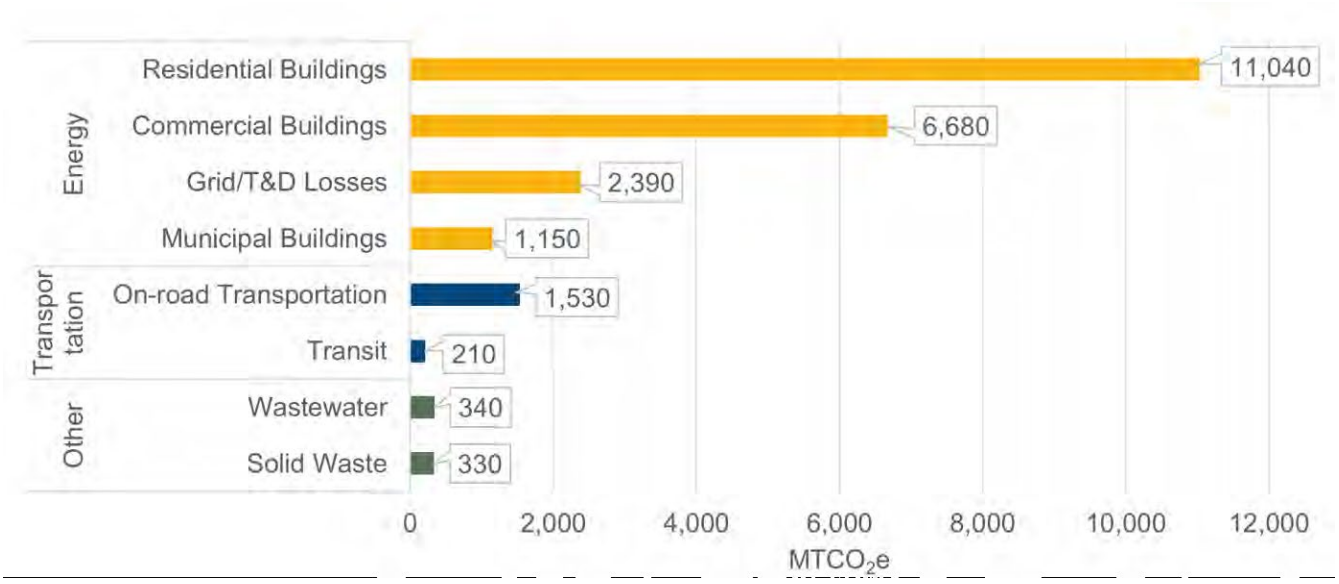


Figure 1. Town of Crested Butte GHG Emissions Summary by Sector And Subsector, 2022

Table 1 provides a more detailed summary of Crested Butte's emissions by sector, source and scope, showing that only a small portion of Scope 3 emissions are included in this inventory. Emissions are fairly evenly distributed between Scope 1 and 2.

Table 1: Community Emissions by Scope, Sector, and Source

Scope, Sector, Source	2022 $MTCO_2e$
Scope 1	**11,370**
Energy	**9,310**
Natural Gas	**9,310**
Commercial	2,590
Municipal	350
Residential	4,580
T&D Losses	1,790
Other	**340**
Wastewater	**330**
Wastewater Treatment Process	10
Wastewater Treatment Fugitive	330
Transportation	**1,720**
On-road Vehicle Transportation	**1,510**
Diesel	250
Gasoline	1,060
Municipal	200
Transit	**210**
Diesel	200
Compressed Natural Gas	10
Scope 2	**11,970**
Energy	**11,950**
Electricity	**11,950**
Commercial	4,090
Grid Loss	600
Municipal	800
Residential	6,460
Transportation	**20**
On-road Vehicle Transportation	**20**
Electric	20
Scope 3	**330**
Other	**330**
Solid Waste	**330**
Grand Total	**23,670**

Change in Community Emissions

While the 2017 emissions data presented in this report were calculated to align with current best practices, caution should still be exercised in drawing assumptions about trends between two individual years. As the Town creates future inventories using consistent methodology, it will become easier to reliably compare emissions and track trends over time.

As shown in **Figure 2** and **Table 2**, calculated emissions for 2022 were 5% higher than those for 2017.

The increase in calculated emissions was driven by increases in natural gas use, residential electricity use, vehicle miles traveled, and solid waste generation. Change in these sub-sectors was offset, in part, by reduced commercial electricity use and decreasing emission factors, including for electricity and vehicle efficiency.

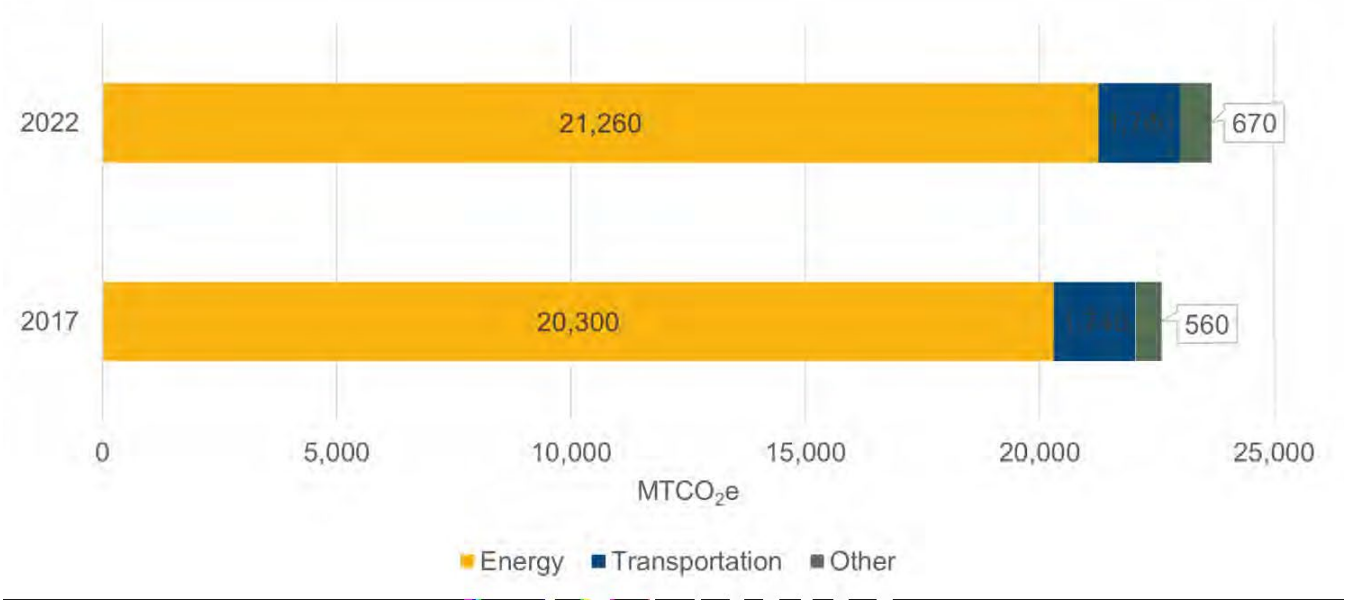


Figure 2. Town of Crested Butte Community GHG Emissions by Sector, 2017 and 2022

Table 2. Community Emissions by Sector and Sub-Sector, 2017 and 2022

Sector	2017 ($MTCO_2e$)	2022 ($MTCO_2e$)	Change
Energy	**20,300**	**21,260**	**+5%**
Commercial Buildings	8,750	6,680	-24%
Grid / T&D Losses	1,970	2,390	+21%
Municipal Buildings	Included in Commercial	1,150	N/A
Residential Buildings	9,580	11,040	+15%
Transportation	**1,740**	**1,740**	**0%**
On-Road Transportation	1,740	1,530	-12%
Transit	Not calculated	210	N/A
Other	**560**	**670**	**+20%**
Solid Waste	240	330	+38%
Wastewater Treatment	320	330	+6%
Total Emissions	**22,600**	**23,670**	**+5%**

Community Emissions Per Capita

Total calculated emissions per capita were approximately 16.5 $MTCO_2e$, a slight increase from 16.3 $MTCO_2e$ in 2017.

For comparison, **Figure 3** below shows per capita emissions from peer cities, the State of Colorado and the United States. Note that while these comparison cities are all mountain communities with tourism-based economies, they vary in size and are all larger than Crested Butte. Additionally, each of these communities have unique characteristics and different scales and scopes included in their GHG inventories, which means that direct comparison should be approached with caution, for example Aspen's inventory includes aviation emissions at the Aspen-Pitkin County Regional Airport.

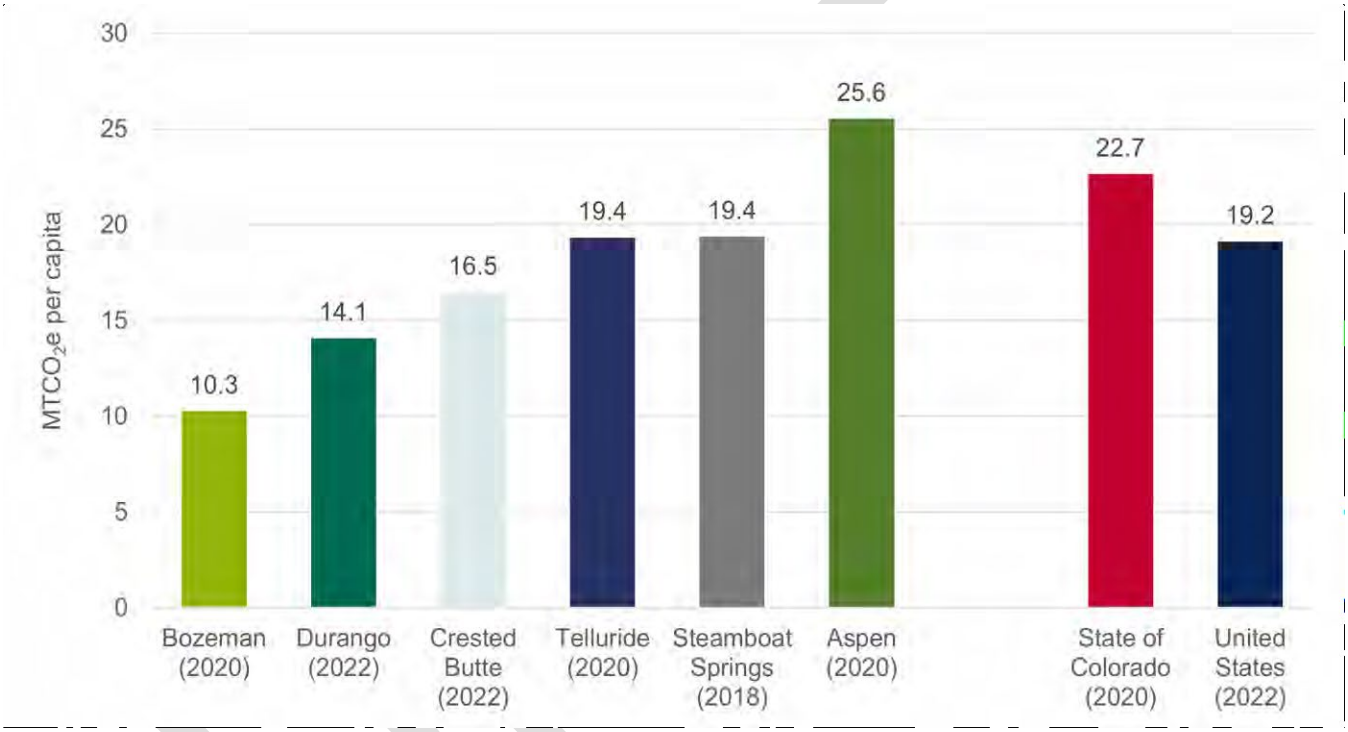


Figure 3. Community Emissions by Capita Comparison[4]

[3] City of Bozeman 2020 Community Greenhouse Gase Emissions Inventory Report, City of Durango 2022 Community and Municipal Greenhouse Gas Emissions Inventory, Town of Telluride 2020 Greenhouse Gas Emissions Inventory, Routt County and City of Steamboat Springs 2018 Greenhouse Gas Inventory and Forecasted Emissions Report, City of Aspen 2020 Greenhouse Gas Emissions Report, 2023 Colorado Statewide Inventory of Greenhouse Gas Emissions and Sinks, U.S. Greenhouse Gas Emissions 2022

Municipal Emissions Summary

This section describes emissions associated with Town of Crested Butte municipal operations. In 2022, total municipal emissions were 1,800 $MTCO_2e$ and accounted for approximately 8% of total community emissions.

Municipal Emissions by Sector

Figure 4 shows municipal emissions by sector and subsector. Energy accounted for 71% of total municipal emissions, fleet vehicles accounted for 11% and wastewater treatment processes accounted for 18%.

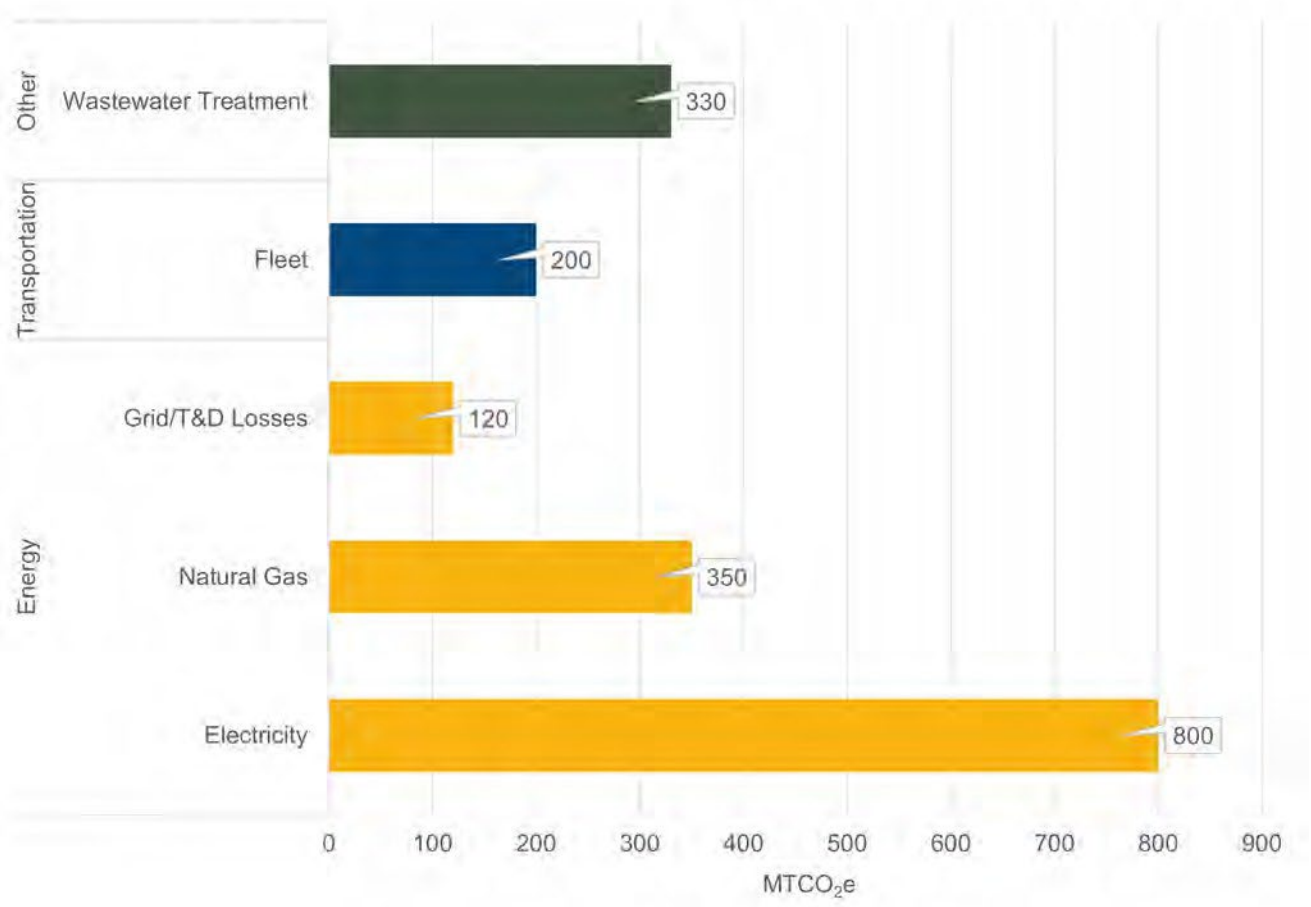


Figure 4. Town of Crested Butte Municipal GHG Emissions by Sector, 2022

Municipal Emissions: New Methodology

Municipal emissions, other than electricity used in wastewater treatment, were not separated out from community emissions in Crested Butte's 2017 inventory. The 2022 municipal emissions inventory was developed to align with best practices outlined in the ICLEI Local Government Operations Protocol and provide a more holistic picture of emissions associated with government operations.

The municipal inventory includes energy emissions from electricity, natural gas usage, and associated losses; gasoline and diesel use by Town fleet; and wastewater treatment process and fugitive emissions. The emissions from electricity used in wastewater production in 2022 are included in the total municipal electricity use total, in accordance with current best practices.

3. ENERGY EMISSIONS

This section provides an overview of emissions associated with energy used in the built environment, including electricity and natural gas use in residential, commercial, and municipal buildings, as well as the associated distribution system losses.

Emissions Snapshot

Total community energy emissions in 2022 were 21,260 $MTCO_2e$, accounting for 90% of Crested Butte's total community emissions. Emissions included in this sector were 5% higher in 2022 than 2017.

As shown in **Table 3**, the increase in energy emissions is driven by a 15% increase in residential building emissions and a 21% increase in energy losses. This increase was partially offset by an 11% reduction in commercial and municipal building emissions. Since municipal building emissions were not separated out from commercial buildings in 2017, Table 3 compares 2022 combined commercial and municipal emissions to the 2017 commercial subsector.

Table 3: Town of Crested Butte Energy Emissions, 2017 and 2022

Subsector	2017 $MTCO_2e$	2022 $MTCO_2e$	Percent Change
Residential Buildings	9,580	11,040	+15%
Commercial Buildings	8,750	6,680	-11%*
Municipal Buildings	Included in commercial	1,150	
Losses (Transmission & Distribution, Process & Fugitive)	1,970	2,580	+21%
Total	**20,030**	**21,260**	**+5%**

*Change in commercial and municipal emissions combined since municipal was not separated out from commercial in 2017.

Figure 5. Town of Crested Butte 2017 and 2022 Energy Emissions

Electricity

Total electricity emissions in 2022 were 11,950 $MTCO_2e$, and account for 56% of total energy sector emissions, down from 63% in 2017. As shown in **Table 4** and **Figure 6**, total electricity emissions were 5% lower in 2022 than 2017.

Table 5 shows the change in electricity use between 2017 and 2022.

Table 4: Electricity Emissions, 2017 and 2022

Subsector	2017 $MTCO_2e$	2022 $MTCO_2e$	Percent Change
Residential Buildings	6,080	6,460	+6%
Commercial Buildings	5,960	4,090	-18%*
Municipal Buildings	Not calculated	800	
Transmission & Distribution Losses	510	600	+18%
Total	**12,550**	**11,950**	**-5%**

*Change in commercial and municipal emissions combined since municipal was not separated out from commercial in 2017.

Figure 6. Electricity Emissions by Sub-sector, 2017 and 2022

Table 5: Electricity Inputs

Source	Unit[4]	2017 Input	2022 Input	Percent Change
Residential Use	kWh	8,697,045	9,371,583	+8%
Commercial Use	kWh	8,530,477	5,926,335	-17%*
Municipal Use	kWh	0	1,159,667	
Total	**kWh**	**17,227,522**	**16,457,585**	**-4%**

Emissions Factor	lbs CO_2e/MWh	1,541	1,520	-1%
Grid Loss Factor	%	4.2%	5.3%	+26%

[4] A kilowatt-hour (kWh) is a unit of measurement for energy consumption and the amount of energy used by a 1,000-watt appliance running for one hour. A megawatt hour (MWH) is equal to 1,000 kWh.

*Change in commercial and municipal use combined since municipal use was not separated out from commercial in 2017.

Key Drivers of Change in Electricity Emissions

The reduction in community electricity emissions is driven by a combination of lower commercial electricity consumption, and a reduced electricity emissions factor. Together, these changes offset an increase in residential electricity use and the grid transmission and distribution loss factor from 2017 to 2022.

Key drivers of change include:

- **Reduced total electricity usage:** Total electricity consumption in 2022 was 4% lower than in 2017, contributing to the overall reduction in emissions.
    - **Reduced commercial electricity consumption:** Electricity used in commercial buildings accounted for approximately 34% of total electricity emissions in 2022. As shown in
    - **Table** 5, total combined commercial and municipal electricity use decreased by 17% between 2017 and 2022. While the reason for this reduction is unknown, it could be connected to commercial energy efficiency measures and/or a reduction in commercial activity or the number of businesses operating in Crested Butte.
    - **Municipal electricity consumption:** Electricity used in municipal buildings and facilities was not separated out from commercial use in 2017 but accounted for approximately 7% of total community electricity emissions in 2022.
    - **Increased residential electricity consumption:** Electricity used in residential buildings accounted for 54% of total electricity emissions in 2022 and consumption was 8% higher in 2022 compared to 2017.
- **Reduced electricity emissions factor**: The local emissions factor (CO_2e per MWH) provided by Gunnison County Electric Association (GCEA) has decreased by 1% since 2017, as shown in
- **Table** 5. This change resulted in a 6% decrease in emissions associated with residential, commercial, and municipal electricity use, larger than the 4% reduction in total consumption. The emissions factor of GCEA's electricity supply is forecasted to continue decreasing as more renewable generation is brought online.
- **Increased transmission and distribution loss factor:** The loss factor associated with electricity use increased from 4.2% in 2017 to 5.3% in 2022. Grid losses accounted for 4% of total electricity emissions in 2017 and 5% in 2022.

Solar Generation

In 2022 there was a total of 226kW of solar photovoltaic (PV) capacity installed in Crested Butte, including 126kW of residential, 70kW of commercial and 30kW of municipal solar. This installed solar generates approximately 343,700kWh of local renewable electricity each year and reduces the total amount of electricity that residents, businesses, and the Town of Crested Butte need to purchase from the grid. Monitoring the amount of installed local renewable generation going forward will enable the Town to track the impact on electricity use and emissions.

Natural Gas

Total natural gas emissions in 2022 were 9,310 $MTCO_2e$ and accounted for 44% of total energy sector emissions, up from 38% in 2017. As shown in **Table 6**, total natural gas emissions were 20% higher in 2022 than 2017. **Table 6** shows the change in natural gas use between 2017 and 2022.

Table 6: Natural Gas Emissions, 2017 and 2022

Subsector	2017 $MTCO_2e$	2022 $MTCO_2e$	Percent Change
Residential Buildings	3,500	4,580	+31%
Commercial Buildings	2,790	2,590	+5%
Municipal Buildings	Not calculated	350	
Process & Fugitive	1,460	1,790	+23%
Total	**7,750**	**9,500**	**+20%**

*Change in commercial and municipal emissions combined since municipal was not separated out from commercial in 2017.

Figure 7. Natural Gas Emissions by Sub-sector, 2017 and 2022

Table 7: Natural Gas Inputs

Sector	Unit[5]	2017 Input	2022 Input	Percent Change
Residential Use	MCF	64,090	86,000	34%
Commercial Use	MCF	51,074	48,659	8%
Municipal Use	MCF	0	6,511	
Total	**MCF**	**115,164**	**141,170**	**23%**
Emissions Factor	MT/MCF	0.055	0.053	-2%
Leakage Rate	g CH_4/MCF	425	425	-

*Change in commercial and municipal use combined since municipal use was not separated out from commercial in 2017.

[5] MCF is an abbreviation for thousand cubic feet, a measurement of natural gas.

Key Drivers of Change in Natural Gas Emissions

Changes to natural gas consumption as well as an update to the associated fugitive emissions impacted natural gas emissions, driving the overall increase in energy emissions.

- **Increased natural gas consumption**: Total natural gas usage was 23% higher in 2022 compared to 2017.
    - **Increased residential natural gas consumption**: Residential buildings account for 49% of total natural gas emissions and consumption increased by 34% in 2022 compared to 2017. Residential natural gas use has increased steadily since at least 2019, with a 12% increase between 2019 and 2023. The 2022 increase compared to 2017 is also associated with 42% higher in Heating Degree Days (HDDs)[6], indicating that 2022 was a colder year than 2017 with a significantly higher home heating demand. Additional years of data will be needed to understand if there is a trend in natural gas use.
    - **Increased commercial natural gas consumption**: Natural gas in commercial buildings accounted for 28% of natural gas consumption. As shown in
    - **Table** 7, municipal natural gas use was not separated out from commercial use in 2017. Total combined commercial and municipal natural gas use increased by 8% between 2017 and 2022. Commercial gas use has been relatively steady between 2019 and 2023. Similar to residential natural gas use, the increase in commercial use in 2022 compared to 2017 is likely linked to the higher HDDs.
    - **Municipal natural gas consumption**: Natural gas used in municipal buildings and facilities was not separated out from commercial use in 2017 but accounted for 4% of natural gas emissions in 2022.
- **Updated natural gas emissions factor:** The 2022 inventory uses standard natural gas emissions factors updated annually by The Climate Registry. The emissions factor used in the 2017 inventory was 2% higher than that used in the 2022 inventory.
- **No change in natural gas leakage rate:** The 2017 and 2022 emissions inventories include an estimate of natural gas process and fugitive emissions based on survey data of natural gas system leaks in the United States. Leakage rates of the natural gas system have been found to be significantly higher than is estimated by the EPA and can vary significantly between municipalities and utilities. The inventory utilizes surveyed leakage rates in Denver, CO, which are slightly below the median leakage rate for U.S. cities surveyed. These emissions accounted for 19% of natural gas emissions in 2022.

[6] Heating Degree Days (HDD) are a measure of how cold the weather was over a time period and are used as an indicator of the amount of energy needed to heat a building over that period.

4. TRANSPORTATION EMISSIONS

This section provides an overview of transportation emissions, including on-road transportation within the Town boundary, as well as a portion of emissions from public transit that is attributable to the mileage driven by buses within the Town.

Emissions Snapshot

Total transportation emissions in 2022 were 1,740 $MTCO_2e$, accounting for 7% of total community emissions as shown in **Table 8**, down from 8% in 2017. The difference between 2017 and 2022 emissions was negligible shown in **Table 8** and **Figure 8** and Transit emissions were not calculated for 2017. **Table 9** shows the change in transportation sector inputs.

Table 8: Transportation Emissions, 2017 and 2022

Subsector	2017 $MTCO_2e$	2022 $MTCO_2e$	Percent Change
On-road Transportation	1,740	1,530	-12%
Transit	Not calculated	210	-
Total	**1,740**	**1,740**	**0%**

Figure 8. Transportation Emissions by Sub-sector, 2017 and 2022

Table 9: Transportation Inputs

Category	Source	Unit	2017 Inputs	2022 Inputs	Percent Change
On-Road Miles Traveled	Vehicle Miles Traveled (VMT)	VMT	3,567,016	3,578,796	0%
Public Transit	Diesel – Gunnison Valley RTA	Gallons	N/A	331	-
	CNG – Gunnison Valley RTA	GGE[7]	N/A	1,423	-
	Diesel – Mountain Express	Gallons	N/A	18,970	-
	VMT – Gunnison Valley RTA	VMT	N/A	9,011	-
	VMT – Mountain Express	VMT	N/A	85,364	-

[7] Gasoline gallon equivalent (GGE) is used to measure the amount of compressed natural gas (CNG) used.

Key Drivers of Change in Transportation Emissions

A reduction in on-road transportation emissions was negated by the inclusion of transit emissions in 2022, resulting in negligible change in total transportation emissions between 2017 and 2022.

- **Reduced vehicle emissions:** Total on-road vehicle emissions accounted for 8% of total transportation emissions and 6% of community emissions in 2022. On-road emissions decreased by 12% from 2017 to 2022.
    - **Negligible change in on-road VMT:** On-road VMT was back-calculated using an updated methodology for 2017 and there was negligible change in estimated VMT between 2017 and 2022.
    - **Increased internal combustion engine vehicle efficiency:** Since 2016, vehicle efficiencies have increased, and the national allocation of gasoline vehicles by class has shifted, leading to a larger percentage of more efficient vehicles on the road and a reduction in emissions per vehicle miles traveled.
    - **Electric vehicles:** Emissions associated with electricity used to power electric vehicles (EVs) were included in the 2022 inventory. While EVs represent a very small percentage of total emissions, tracking the impact of transportation electrification will be important as EV adoption increases.
- **Transit:** The 2022 inventory separates out emissions associated with public transit routes inside the Town of Crested Butte. This sub-sector accounts for 12% of transportation emissions.

Active Transportation

While the majority of visitors to Crested Butte drive to the Town, 95% of trips with an origin and destination within Crested Butte are completed on foot or by bike. This very high percentage of active transportation trips helps reduce Crested Butte's in-Town community transportation emissions.

Transportation Outside Crested Butte Town Limits

While this emissions inventory does not account for the impacts of transportation associated with Crested Butte but occurring outside of Town limits, also known as Scope 3 transportation emissions, the Climate Action Plan may still consider actions to reduce the impact of visitor and resident travel to and from Crested Butte.

5. OTHER EMISSIONS

This section provides an overview of emissions associated with the disposal of solid waste and wastewater generated inside Town limits in landfills located outside of Crested Butte.

Emissions Snapshot

Total solid waste emissions in 2022 were 330 $MTCO_2e$ and wastewater treatment process and fugitive emissions were 340 $MTCO_2e$ as shown in **Table 10**. Together, solid waste and wastewater treatment emissions accounted for just 3% of total community emissions. The 2022 solid waste emissions were 38% higher than the updated 2017 emissions and wastewater treatment emissions were 6% higher as shown in **Table 10** and **Figure 9**.

Table 11 shows the waste and wastewater inputs.

Table 10: Solid Waste and Wastewater Treatment Emissions, 2017 and 2022

Subsector	2017 $MTCO_2e$	2022 $MTCO_2e$	Percent Change
Solid Waste Total	**240**	**330**	**38%**
Wastewater Treatment Processes	10	10	0%
Wastewater Fugitive Emissions	310	330	6%
Wastewater Total	**320**	**340**	**6%**
Other Total	**560**	**670**	**20%**

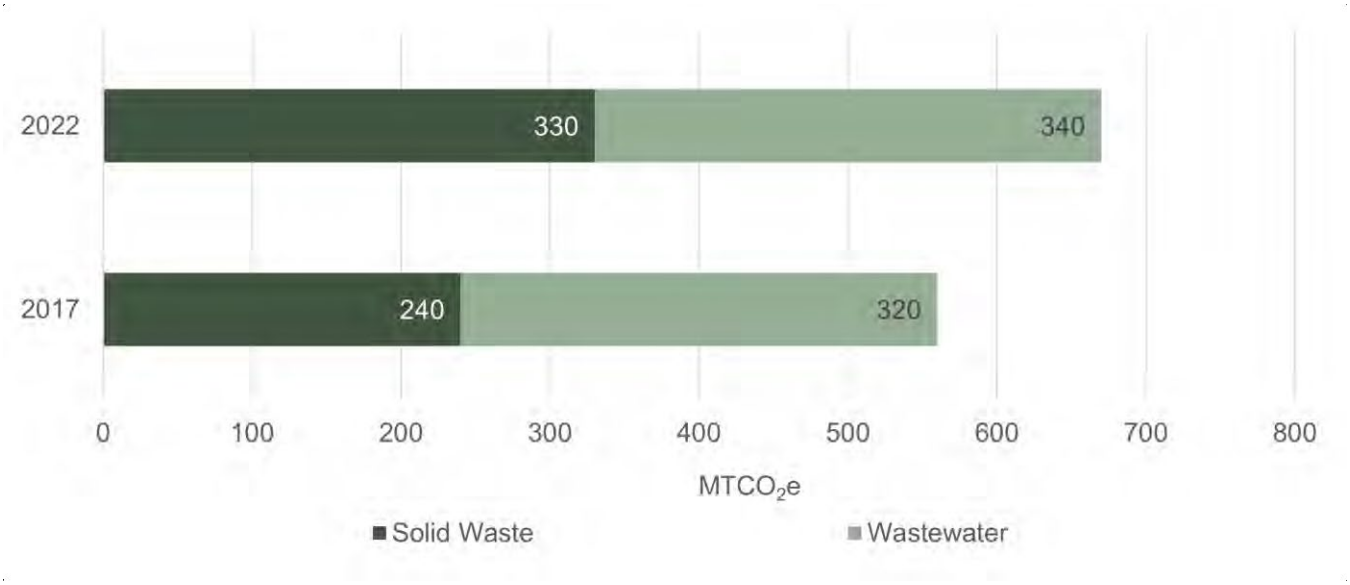


Figure 9. Solid Waste and Wastewater Treatment Emissions, 2017 and 2022

Table 11: Waste Inputs

Sector	Unit	2017 Amount	2022 Amount	Percent Change
Total Landfilled Waste	tons	466	629	35%
Average Daily Population	people	2,673	2,818	5%

Key Drivers of Change in Other Emissions

Both solid waste and wastewater emissions for 2017 were recalculated to allow for comparison using emissions factors and methodology aligned with current best practices. The increase in emissions for both sub-sectors from 2017 to 2022 was therefore directly in-line with change in the inputs used for calculation.

- **Community waste generation:** Both the volume of waste sent to landfill and emissions associated with waste generation increased, by 35% and 38% respectively between 2017 and 2022. While this increase could be driven by increased visitor numbers, additional years of data will be required to infer a trend.
- **Wastewater treatment process and fugitive emissions:** Wastewater treatment emissions are tied to the processes used for treatment and directly proportional to the population served. Both the average daily population served by Crested Butte's wastewater treatment plant and the emissions associated with treatment increased from 2017 to 2022, by 5% and 6% respectively.

Waste Diversion

In 2022, 30% of Crested Butte's total waste generation was diverted from landfill, including 263 tons of material sent for recycling and 11 tons of material composted locally. Diverting waste from landfill reduces waste emissions and tracking the total diversion rate over time will enable the Town to monitor the impact of actions to reduce and divert waste in the future.

6. FUTURE EMISSIONS IN CRESTED BUTTE

Based upon the Town of Crested Butte's 2022 GHG emissions inventory, community scale and town operations-scale GHG emissions forecasts were created to understand potential GHG emissions in 2030. For each scale, a Business as Usual (BAU) and Adjusted Business as Usual (ABAU) forecast of future annual emissions were created to serve as a baseline against which to measure the estimated impact of Climate Action Plan actions on 2030 emissions. The forecasts do not account for the impact of any new actions identified in the Climate Action Plan.

Future Community Emissions

The projection of future community emissions includes the same emissions scopes outlined in the Community Emissions Summary. The community emissions forecast also includes emissions associated with Town operations.

Business as Usual

Under the BAU scenario, community emissions are forecast to increase by an estimated 7% between 2022 and 2030 when accounting for the following known factors and existing Town commitments that will impact future emissions:

- **Expected population growth:** Population is a key driver of activities, including energy use, waste generation and some transportation activities. The BAU includes forecasted growth in the average daily population of Crested Butte. The average daily population, which takes into account both full-time residents and visitors, is based on a forecast of Average Daily Annual population developed to inform future Wastewater Treatment Plant operations (Kingdom and Charbonnet 2021). A summary of average rates of change between 2023-2030 is provided below in Table 12.
- **The Town's adoption of up-to-date building and energy codes:** The Town of Crested Butte has adopted the 2021 International Building and Energy Codes along with additional efficiency and all-electric provisions that will limit the emissions impact of future construction. Although the Town has all-electric new construction codes, a significant portion of the Towns existing building stock is unoccupied for a portion of the year, and in some cases the full year. A 2022 Crested Butte market study indicated housing units in the Town were approximately 68% occupied in 2020, with many of those unoccupied units being used occasionally, recreationally, or seasonally, or for short term rentals. A more recent local census count performed in 2023 found 66% of housing is occupied full time. Due to Town of Crested Butte land largely being built out as well as the prevalence of unoccupancy, the analysis assumes existing housing stock to have higher utilization year-round from increased visitors, in lieu of new builds. This results in slight growth in natural gas use in the residential housing stock being forecasted.

Municipal property growth is forecast to occur between 2023-2030 and is described in the

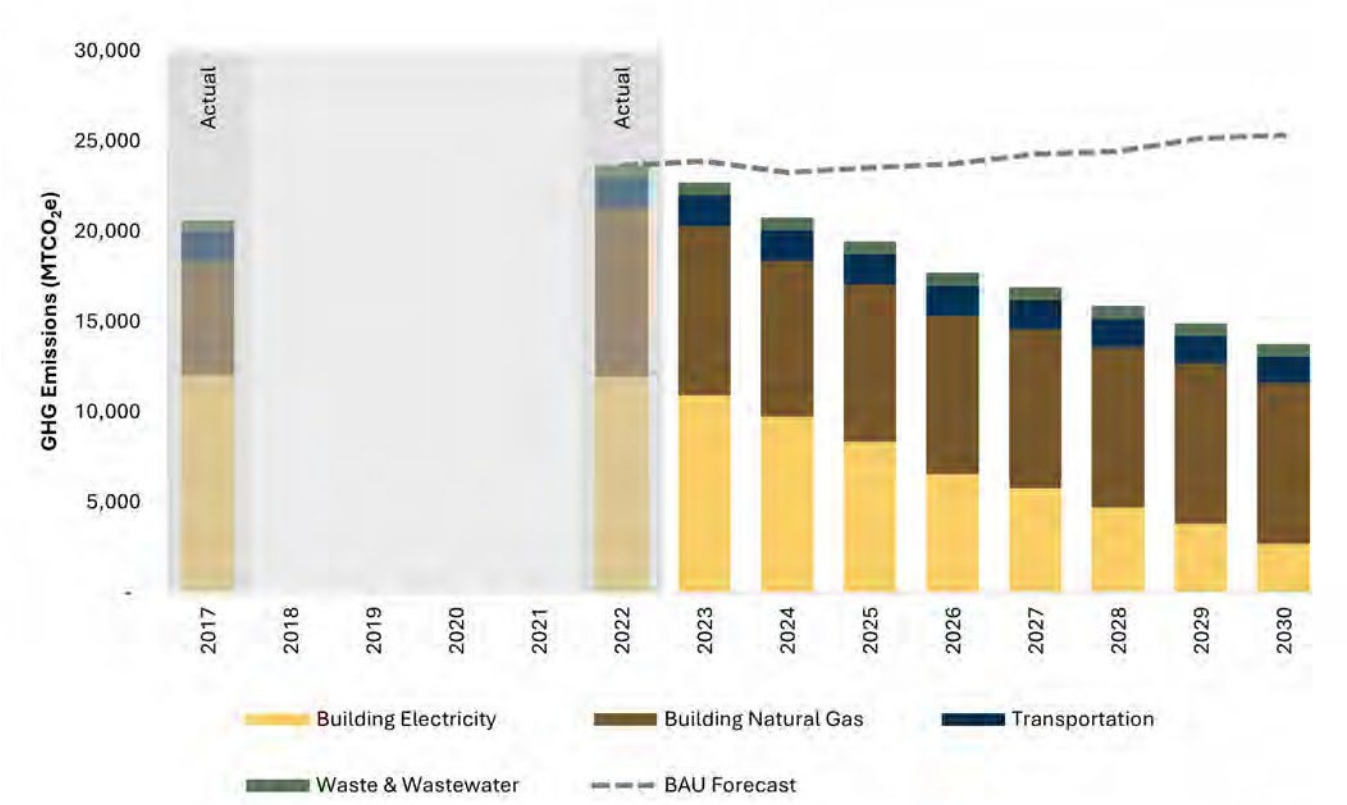


Figure 10. Crested Butte Community Adjusted Business As Usual (ABAU) Emissions Forecast with Business As Usual (BAU) line for comparison

- Future Town Emissions section.
- Commercial electricity and natural gas use is not forecasted to grow. Commercial sector energy use in 2022 has declined slightly since 2017, and employment levels in the Town are forecasted to remain stable to 2030.

Table 12. BAU average rates of change by emissions forecast categories

Metric	Category	Tied Rate of Change	2023-2030 Average Percent Change (annual)
Electricity - GCEA - Residential	Building Electricity	WWTP ADA	1.1%
Electricity - GCEA - Commercial	Building Electricity	Employment	No change
Electricity - GCEA - Municipal	Building Electricity	Town Building kWh	11.7%
Natural Gas - Atmos - Residential	Building Natural Gas	WWTP ADA	1.1%
Natural Gas - Atmos - Commercial	Building Natural Gas	Employment	No change
Natural Gas - Atmos - Municipal	Building Natural Gas	Constant	No change
Electricity - GCEA - T&D Losses	Building Electricity	Electricity T&D Loss	5.3%
Fugitive Natural Gas - Atmos	Building Natural Gas	Based on change in natural gas use	-0.4%
On-road vehicle transportation - community gasoline	Transportation	WWTP ADA	1.1%
On-road vehicle transportation - community diesel	Transportation	Employment	No change
On-road vehicle transportation - community electric	Transportation	WWTP ADA	1.1%
On-road vehicle transportation - municipal gasoline	Transportation	Town Fleet Gasoline Use	-11.5%
On-road vehicle transportation - municipal diesel	Transportation	Constant	No change
On-road vehicle transportation - municipal electric	Transportation	Town Fleet EV kWh	27.7%
Transit - gasoline	Transportation	WWTP ADA	1.1%
Transit - diesel	Transportation	WWTP ADA	1.1%
Transit - electric	Transportation	WWTP ADA	1.1%
Transit - CNG	Transportation	WWTP ADA	1.1%
Waste - Solid waste disposal	Waste & Wastewater	WWTP ADA	1.1%
Waste - Recycling	Waste & Wastewater	WWTP ADA	1.1%
Waste - Compost	Waste & Wastewater	WWTP ADA	1.1%
Wastewater treatment - Process	Waste & Wastewater	WWTP ADA	1.1%
Wastewater treatment - Fugitive	Waste & Wastewater	WWTP ADA	1.1%

Adjusted Business as Usual

Under the ABAU scenario, community emissions are expected to decrease by an estimated 42% between 2022 – 2030 when accounting for the following external commitments:

- **Increased renewables generation in our electricity supply:** Tri-State Generation and Transmission (Tri-State), the wholesale electricity provider to Gunnison County Electric Association (GCEA), has committed to reducing GHG emissions by 89% by 2030 from a 2005 baseline, resulting in an anticipated 78% reduction in Crested Butte's electricity emissions from 2022 to 2030. The planned reduction in electricity emissions factor is shown in Table 13.

Table 13. Tri-State's planned reduction in electricity emissions supplied by the grid

Electricity Emissions Factor	2025	2027	2030
Tri-State Generation Emissions Reduction from 2005 (percent)	47%	67%	89%

- In addition to a reduction in Tri-State's grid mix, GCEA as a member of Tri-State's cooperative is permitted to generate renewable electricity locally. GCEA has several renewable resources anticipated to be online by 2025, as shown in Table 14. In total, these resources are anticipated to generate over 8.1 million kWh of additional renewable energy.

Table 14. GCEA local renewable energy generation resources

Local Renewable Generation	2023	2024	2025
GCEA Renewable Resources by Year	120 kW Solar Garden program (existing) Doyleville wind turbine (existing)	Previous generation, plus Taylor River Hydro	Previous generation, plus Oh, Be Joyful Solar array

- **More fuel-efficient vehicles:** Along with the vehicle miles travelled with Crested Butte, vehicle fuel efficiency is a key driver of transportation emissions. The State of Colorado has adopted fuel efficiency standards that will reduce the emissions per mile of gas and diesel vehicles.
    - The EIA estimates fuel economy for light duty vehicles to increase from an average of 24.4 MPG in 2022 to 28.6 MPG in 2030.
    - The EIA estimates fuel economy for heavy duty vehicles to increase from an average of 7.5 MPG in 2022 to 8.6 MPG in 2030. For purposes of conservative analysis, freight trucks were assumed to make up heavy duty vehicles in Crested Butte for their relatively low fuel efficiency.
- **Transition to electric vehicles (EVs):** The transition from gas and diesel vehicles to electric, combined with more renewable electricity will drive down transportation emissions. The ABAU builds in an expected rate of electric vehicle transition associated with the State's Zero Emission Vehicle requirements and adoption forecasts. Specific sales rates for select years by vehicle class are shown below in Table 15, as specified by the State of Colorado's Advanced Clean Cars and Advanced Clean Trucks requirements. With these requirements in combination with an anticipated 6% vehicle replacement rate, it is estimated that there will be a 19% increase in light duty EV's and a 7% increase in heavy duty EV's in the Town of Crested Butte between 2023-2030.

Table 15. State of Colorado required EV sales rates by vehicle class

EV Sales Rates	2026	2028	2030
Light Duty (Based upon CO Advanced Clean Cars)	35% of sales are EV	51% of sales are EV	68% of sales are EV
Heavy Duty (Based upon CO Advanced Clean Trucks, Class 7-8)	10% of sales are EV	20% of sales are EV	30% of sales are EV

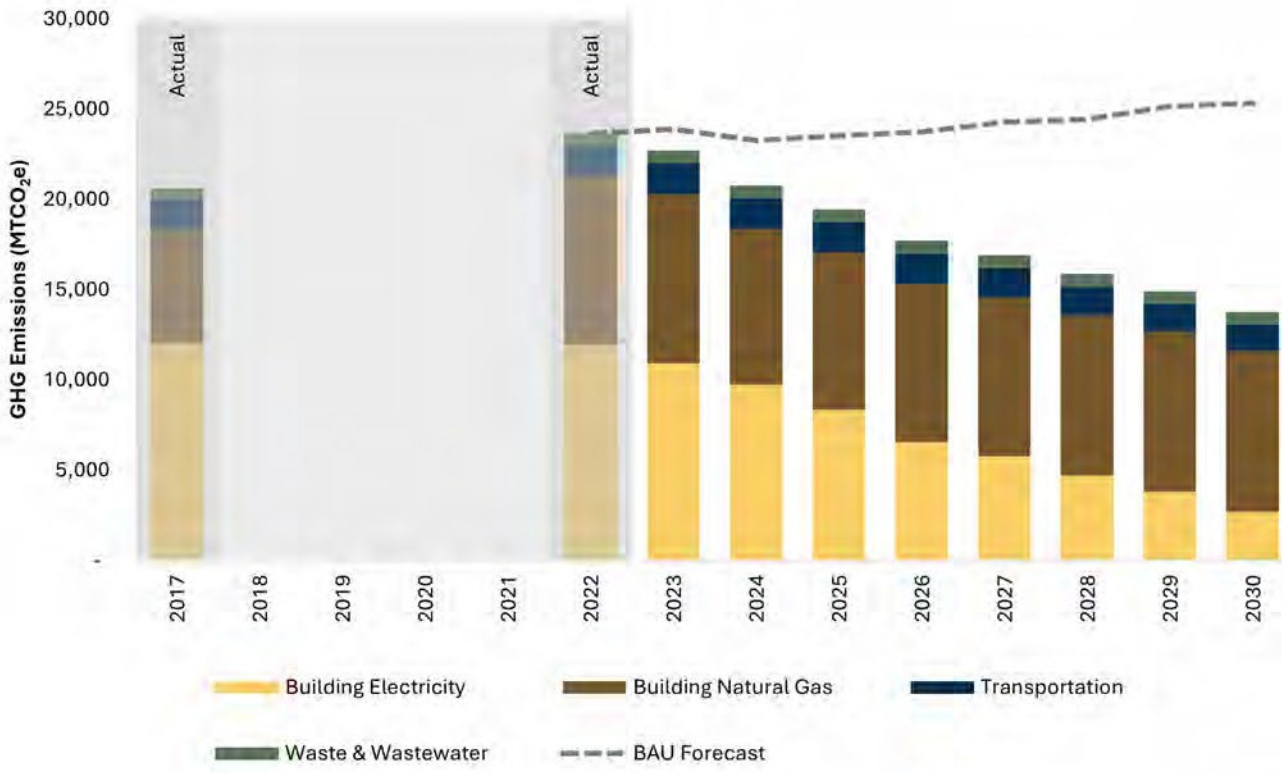


Figure 10. Crested Butte Community Adjusted Business As Usual (ABAU) Emissions Forecast with Business As Usual (BAU) line for comparison

Future Town Emissions

Similar to community-wide GHG emissions forecast, BAU and ABAU forecasts of future annual emissions specific to the Town's municipal operations were created to understand potential emissions in 2030. The emissions forecasts do not account for the impact of any new actions identified in this plan but serve as a baseline against which to measure the estimated impact of the actions on 2030 Town emissions.

Business as Usual

Under the BAU scenario, Town emissions in 2030 would be 59% higher in 2030 than 2022 due to planned new construction and redevelopment projects.

- **Planned new and redeveloped Town facilities:** A number of new Town facilities are planned for construction or redevelopment between now and 2030, according to the Facility Use Plan. Adhering to the Town of Crested Butte's all-electric building code, these properties are forecast to use 100% electricity. The properties and their estimated size and EUI are shown in Table 16.
    - The affordable housing development assumes 45 units at 1,046 square feet per unit, based upon the median US multifamily size.
    - The childcare/healthcare square footage is based upon the lot size, and the Emergency Services building is based upon a previously Town-reported square footage.
    - EUI's are based upon Energy Star Portfolio Manager benchmarking by building type.
    - In addition to the new properties shown in Table 16, the Wastewater Treatment Plant is planning to implement an energy efficiency project saving approximately 164,000 kWh and is also planning to build a new aeration building completely offset by on-site solar.

Table 16. Municipal new property assumptions

New Town Properties	Estimated Square Footage	Assumed EUI	Estimated Completion Date
Affordable Housing - Town Parcel 1	47,070	59.6	1/1/2029
Childcare/Healthcare - Town Parcel 2	10,000	51.2	1/1/2029
Emergency Services New Building (New Marshals' Office)	28,500	63.5	1/1/2027

- **Electrification of the Town's light duty fleet:** The Town is planning to electrify 18 light duty (LD) vehicles in their fleet between 2023-2030 based upon the Town's 2023 fleet replacement schedule. The Town has been electrifying some of its light duty fleet through 2022, but not its heavy duty fleet, potentially due to the limited current availability of electric heavy duty vehicles. Assumptions related to the light duty fleet are below in Table 17. On average, the Town is forecast to replace 2 light duty vehicles per year between 2023-2030.

Table 17. Municipal fleet electrification assumptions

Fleet Metrics	Unit	Value
Average LD Miles Driven per Year	mi/year	7,000
Existing LD Fleet MPG	miles per gallon	24.4
New EV LD Fleet mile per kWh	mile per kWh	2.5
Existing LD Fleet Gasoline per Vehicle	Gallons per vehicle, per year	286.7
New EV LD Fleet kWh per Vehicle	kWh per vehicle per year	2,800.0
Likelihood of New LD EV	percent	100%

Adjusted Business as Usual

Under the ABAU scenario, Town emissions will be 27% lower in 2030 than 2022 as a result of the same utility and state commitments described in the community ABAU section, driven particularly by a reduction in the emissions associated with electricity generation.

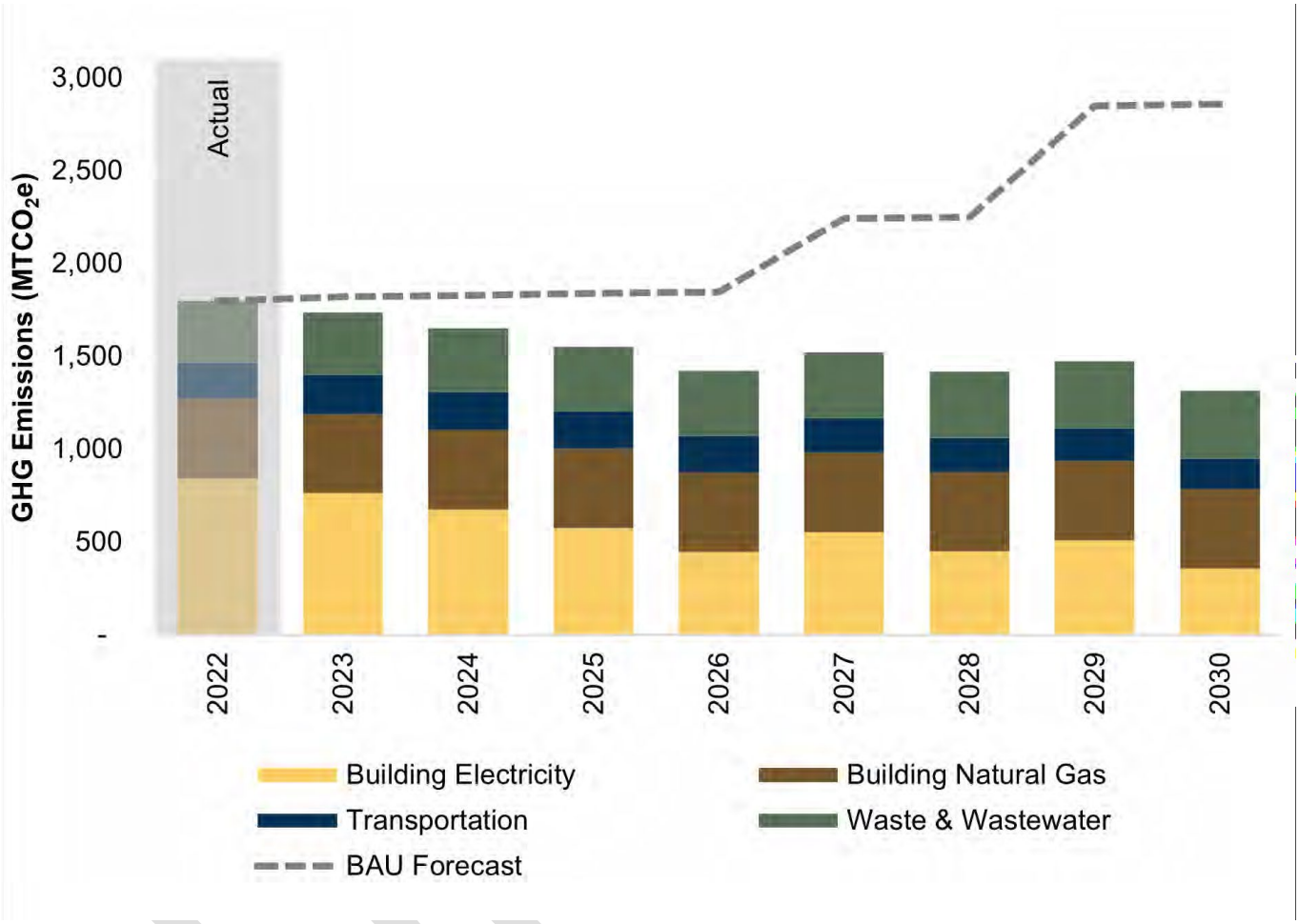


Figure 11. Crested Butte Town Operations Adjusted Business As Usual (ABAU) with Business As Usual (BAU) line for comparison

Appendix II:
2030 CAP Action Details

Appendix II. 2030 CAP Action Details

Buildings (B)

The Town can take action to reduce the impact of municipal buildings and those belonging to residents and businesses in Crested Butte. A summary of the expected impact, cost effectiveness, and time commitment for each action are shown in the table below. Calculation inputs, assumptions, and other key action details can be found in the following sections.

Strategy	Action	Scope of Impact	2030 Carbon Reduction ($MTCO_2e$)	Cumulative Cost (2025 – 2030)	Cost Effectiveness ($/MTCO_2e$)	2025-2030 Average Annual Town Staff Time (FTE)
B1: Enable climate-friendly future development	A. Incorporate climate considerations into zoning code	Community-wide	n/a - enabling	n/a – included in Community Plan	n/a	n/a
BD-1: Enable climate-friendly future development	B. Enable climate-friendly construction and development through flexible design guidelines and a review of permitting processes	Community-wide	n/a - enabling	n/a – included in Historic Preservation Plan	n/a	n/a
B2: Accelerate efficiency improvements and electrification in existing residential buildings	A. Require an energy assessment for residential Level 1, 2, and 3 remodels	Community-wide	n/a - enabling	$4,300 - $6,500	n/a	<0.1
B2: Accelerate efficiency improvements and electrification in existing residential buildings	B. Require an energy assessment for vacation rental units	Community-wide	n/a - enabling	$10,800 - $16,200	n/a	0.1 - 0.2
B2: Accelerate efficiency improvements and electrification in existing residential buildings	C. Provide Town-funded energy efficiency and electrification incentives for all residential buildings	Community-wide	1,163	$89,500 - $95,000	$77 - $82	0.08 - 0.1
BD.3: Accelerate efficiency improvements and	A. Require an energy assessment for	Community-wide	n/a - enabling	$4,300 - $6,500	n/a	<0.1

electrification in existing commercial buildings	commercial Level 1, 2, and 3 remodels					
B3: Accelerate efficiency improvements and electrification in existing commercial buildings	B. Provide Town-funded energy efficiency and electrification incentives for all commercial buildings	Community-wide	661	$68,300 - $69,500	$103 - $105	0.08 - 0.1
B3: Accelerate efficiency improvements and electrification in existing commercial buildings	C. Require energy use disclosure and benchmarking for commercial buildings	Community-wide	5	$8,600 - $13,000	$1,813 - $2,741	0.83 - 1.24
B4: Close the gap on new construction electrification and efficiency	A. Require all-electric commercial kitchen equipment for new construction	Community-wide	19	$10,900 - $16,300	$587 - $878	<0.1
B5: Lead the way with efficiency improvements and electrification of Town buildings	A. Develop a municipal building energy efficiency and renewable energy plan and perform updated audits of all municipal facilities	Town Operations	n/a - enabling	$55,600 - $68,000	n/a	<0.1
B5: Lead the way with efficiency improvements and electrification of Town buildings	B. Begin implementing electrification and efficiency improvements identified in energy efficiency and renewable energy plan	Town Operations	49	$20,800 - $31,100	$426 - $636	0.2 - 0.4
B5: Lead the way with efficiency improvements and electrification of Town buildings	C. Monitor Town facilities' energy use and include within a regular Climate Action Report	Town Operations	16	$0 - $0	$0 - $0	<0.1
	Community Total	Community-wide	1,847	$196,700 - $223,000	$106 - $121	1.2 - 1.8
	Town Total	Town Operations	65	$76,400 - $99,100	$1,173 - $1,521	0.2 - 0.4
	Sector Total	All	1,912	$273,100 - $322,100	$143 - $168	1.4 - 2.2

Strategy B1: Enable climate-friendly future development

B1.A. Incorporate climate considerations into zoning code

Adjust the current zoning code to incorporate climate considerations, for example in decisions about maximum or minimum density.

2030 Carbon Reduction (MTCO2e)	Cumulative Cost (2025 – 2030)	Cost Effectiveness ($/MTCO2e)	Average Annual Town Staff Time (FTE)
n/a - enabling	n/a – included elsewhere	n/a	<0.1

2025 - 2030 targets to achieve savings

n/a

GHG Calculations

No emissions savings are calculated for this action as it is not directly influencing GHG emissions. This change, however, will impact future community growth and emissions.

Cost Calculations

An update to Crested Butte's zoning code has been identified as an action for the Community Plan. This update has been budgeted for elsewhere and therefore no cost has been calculated to incorporate climate-friendly considerations as part of the Climate Action Plan.

Key Metrics & Success Measures Evaluation

» **Scope of Impact:** Community-wide
» **Action Type:** Require
» **Targets:** Incorporation of climate considerations into the Community Plan and zoning code update
» **Emissions impact in 2030:** No direct emissions impact (enabling action)
» **Total Cost 2025 – 2030:** Included in development of Community Plan
» **Cost Effectiveness (2025-2030 Cost / 2030 $MTCO_2e$):** Included in development of Community Plan
» **Anticipated Average Annual Staff Time (FTE):** Included in development of Community Plan
» **Implementation Timeline:** Near-Term

Success Measures Evaluation

Meaningfully reduces GHG emissions	Provides a substantial return on investment
N/A	N/A

Sets a bold example among mountain communities	Is proactive before reactive	Leverage regional initiatives and partnerships
		

Provides significant co-benefits			
Social equity and affordability	Public health and wellbeing	Supports local businesses and economy	Enhances climate resilience and environmental quality
			

B1.B. Enable climate-friendly construction and development through flexible design guidelines and a review of permitting processes

Adjust the current historical buildings requirements, downtown design standards, and other code to allow building upgrades needed to improve efficiency and implement beneficial electrification actions.

2030 Carbon Reduction (MTCO2e)	Cumulative Cost (2025 – 2030)	Cost Effectiveness ($/MTCO2e)	Average Annual Town Staff Time (FTE)
n/a	n/a	n/a	n/a

2025 - 2030 targets to achieve savings

n/a

GHG Calculations

No emissions savings are calculated for this action as it is not directly influencing GHG emissions. However, this change is important for allowing building upgrades that will impact emissions as modeled below.

Cost Calculations

An update to Crested Butte's design standards and guidelines has been identified as an action in the Historic Preservation and Community Plans. This update has been budgeted for elsewhere and therefore no cost has been calculated to incorporate climate-friendly design and permitting considerations as part of the Climate Action Plan.

Key Metrics & Success Measures Evaluation

» **Scope of Impact:** Community-wide
» **Action Type:** Encourage
» **Targets:** Incorporation of climate considerations into the updated design guidelines
» **Emissions impact in 2030:** No direct emissions impact (enabling action)
» **Total Cost 2025 – 2030:** Included in implementation of Historic Preservation Plan
» **Cost Effectiveness (2025-2030 Cost / 2030 MTCO$_2$e):** Included in implementation of HPP
» **Anticipated Average Annual Staff Time (FTE):** Included in implementation of Historic Preservation Plan
» **Implementation Timeline:** Near-Term

Success Measures Evaluation

Meaningfully reduces GHG emissions	Provides a substantial return on investment
N/A	N/A

Sets a bold example among mountain communities	Is proactive before reactive	Leverage regional initiatives and partnerships

Provides significant co-benefits			
Social equity and affordability	Public health and wellbeing	Supports local businesess and economy	Enhances climate resilience and environmental quality

Strategy B2: Accelerate efficiency improvements and electrification in existing residential buildings

B2.A. Require an energy assessment for residential Level 1, 2, and 3 remodels

Change building and/or energy code requirements to include electrification and energy efficiency requirements to help improve performance of existing residential buildings. Under the new code, all level 3 remodel permits will require electrification in disturbed areas and all permits will require an energy audit to be completed and some measures to be implemented during the remodel.

2030 Carbon Reduction (MTCO2e)	Cumulative Cost (2025 – 2030)	Cost Effectiveness* ($/MTCO2e)	Average Annual Town Staff Time (FTE)
n/a - enabling	$4,300 - $6,500	n/a	<0.1

2025-2030 targets needed to achieve savings

- 100% of applicable permits receive an energy assessment

GHG Calculations

- No GHG savings are anticipated. This action is anticipated to enable GHG savings in other actions

Cost Calculations

- The calculations for this action incorporate costs associated with:
  - Gathering stakeholder input to inform code changes
  - Development and delivery of trainings to support code implementation
  - Outreach to inform the community about the changes

Key Metrics & Success Measures Evaluation

» **Scope of Impact:** Community-wide
» **Action Type:** Require
» **Targets:** 100% applicable permits receive an energy assessment following code update
» **Emissions impact in 2030:** No direct emissions impact (enabling action)
» **Total Cost 2025 – 2030:** $4,300 - $6,500
» **Cost Effectiveness (2025-2030 Cost / 2030 $MTCO_2e$):** No direct emissions impact
» **Anticipated Average Annual Staff Time:** <0.1 FTE
»**Implementation Timeline:** Near-Term

Success Measures Evaluation

Meaningfully reduces GHG emissions	Provides a substantial return on investment
N/A	N/A

Sets a bold example among mountain communities	Is proactive before reactive	Leverage regional initiatives and partnerships
	+	

Provides significant co-benefits			
Social equity and affordability	Public health and wellbeing	Supports local businesess and economy	Enhances climate resilience and environmental quality

B2.B. Require an energy assessment for vacation rental units

Require an energy assessment for all vacation rental units as part of the business license renewal process.

2030 Carbon Reduction (MTCO2e)	Cumulative Cost (2025 – 2030)	Cost Effectiveness* ($/MTCO2e)	Average Annual Town Staff Time (FTE)
n/a - enabling	$10,800 - $16,200	n/a	0.1 - 0.2

2025-2030 targets needed to achieve savings

- 100% (191) vacation rental units with an energy assessment by 2030

GHG Calculations

- No GHG savings are anticipated. This action is anticipated to enable GHG savings in other actions

Cost Calculations

- The calculations for this action incorporate costs associated with:
  - Gathering stakeholder input to inform code changes
  - Development and delivery of trainings to support code implementation
  - Outreach to inform the community about the changes
- Higher costs for initial outreach and engagement are estimated since this is a regulation that is not seen in peer communities, although it is similar to Boulder's SmartRegs program (City of Boulder, 2024) with a more focused scope but a faster roll out

- Ongoing costs for this regulation are also high due to level of effort needed to confirm compliance that largely falls outside of existing Town workflows

Key Metrics and Success Measures Evaluation

» **Scope of Impact:** Community-wide
» **Action Type:** Require
» **Targets:** 100% (191) vacation rental units completing an energy assessment 2025-2030
» **Emissions impact in 2030:** No direct emissions impact (enabling action)
» **Total Cost 2025 – 2030:** $10,800 - $16,200
» **Cost Effectiveness (2025-2030 Cost / 2030 MTCO$_2$e):** No direct emissions impact
» **Anticipated Average Annual Staff Time:** 0.1 – 0.2 FTE
» **Implementation Timeline:** Near-Term

Success Measures Evaluation

Meaningfully reduces GHG emissions	Provides a substantial return on investment
N/A	N/A

Sets a bold example among mountain communities	Is proactive before reactive	Leverage regional initiatives and partnerships
	+	

Provides significant co-benefits			
Social equity and affordability	Public health and wellbeing	Supports local businesses and economy	Enhances climate resilience and environmental quality
			

B2.C. Provide Town-funded energy efficiency and electrification incentives for all residential buildings

Create a Town-funded energy efficiency and electrification incentive program for all residential properties.

2030 Carbon Reduction (MTCO2e)	Cumulative Cost (2025 – 2030)	Cost Effectiveness* ($/MTCO2e)	Average Annual Town Staff Time (FTE)
1,163	$89,500 - $95,000	$77 - $82	0.08 - 0.1

2025-2030 targets needed to achieve savings:

- 87 residential homes converted to all electric
- 447 homes implementing energy efficiency actions
- 191 vacation rental properties implementing efficiency improvements
- Achieve 10% annual adoption by the residential sector for efficiency or electrification upgrades
- Achieve a 10% improvement in average HERS score of homes after energy efficiency upgrades

GHG Calculations

- The GHG impact of this action is based on 10% of residential properties upgrading annually, where approximately 12% of upgrades electrify their residence with associated energy efficiency gain and 88% perform energy efficiency improvements not tied to electrification
- While a net decrease in natural gas use is anticipated, a net increase in electricity use is expected as a result of residential electrification and efficiency measures in 2030

Cost Calculations

- The cost calculations for this action assume a match of GCEA's custom incentives at $0.15 per kWh and $4 per Dth. Estimated total incentives of $46,900 between 2025 and 2030 for energy efficiency improvements through this program assuming a utility incentive match program design based on energy savings

Key Metrics and Success Measures Evaluation

» **Scope of Impact:** Community-wide

» **Action Type:** Encourage

» **Targets:**

- 87 residential properties electrified to remove natural gas use by 2030
- 447 residential properties implementing energy efficiency improvements by 2030
- 191 vacation rental properties implementing an energy efficiency or electrification upgrade by 2030

» **Emissions impact in 2030:** 1,163 $MTCO_2e$

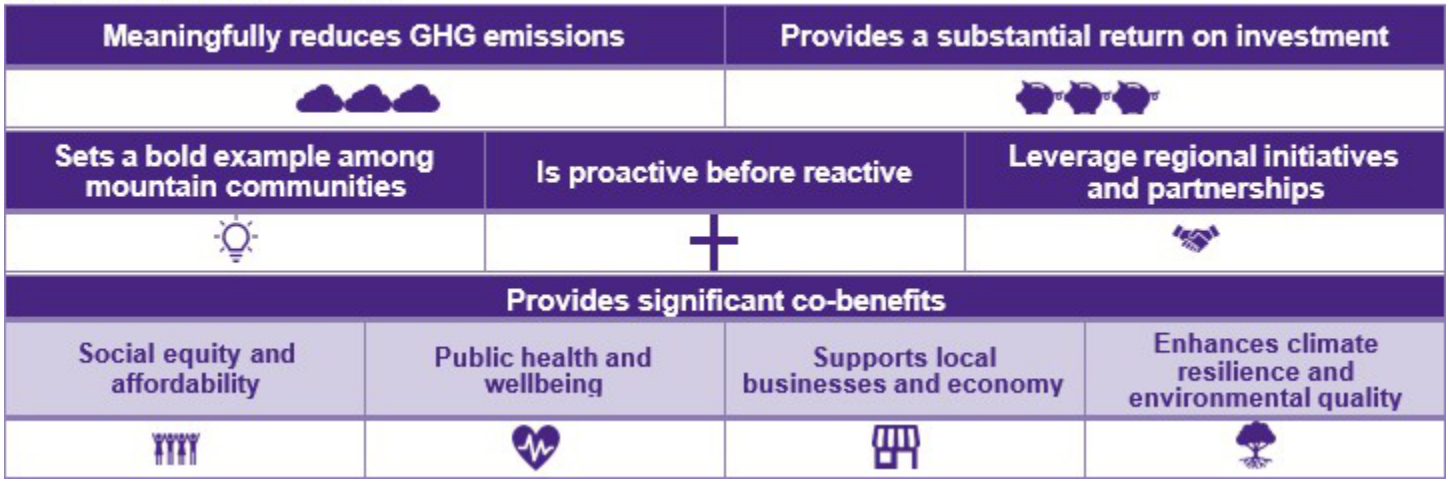
» **Total Cost 2025 – 2030:** $89,500 - $95,000

» **Cost Effectiveness (2025-2030 Cost / 2030 $MTCO_2e$):** $77 - $82

» **Anticipated Average Annual Staff Time:** <0.1 – 0.1 FTE

» **Implementation Timeline:** Near-Term

Success Measures Evaluation



Strategy B3: Accelerate efficiency improvements and electrification in existing commercial buildings

B3.A. Require an energy assessment for commercial Level 1, 2, and 3 remodels

Change building and/or energy code requirements to include electrification and energy efficiency requirements to help improve performance of existing commercial buildings at time of building improvements. Under the new code, all level 3 remodel permits will require electrification in disturbed areas and all permits will require an energy audit to be completed and some measures to be implemented during the remodel.

2030 Carbon Reduction (MTCO2e)	Cumulative Cost (2025 – 2030)	Cost Effectiveness* ($/MTCO2e)	Average Annual Town Staff Time (FTE)
n/a - enabling	$4,300 - $6,500	n/a	<0.1

2025-2030 targets needed to achieve savings

- 100% of applicable permits receive an energy assessment

GHG Calculations

- No GHG savings are anticipated. This action is anticipated to enable GHG savings in other actions

Cost Calculations

- The calculations for this action incorporate costs associated with:
  - Gathering stakeholder input to inform code changes
  - Development and delivery of trainings to support code implementation
  - Outreach to inform the community about the changes

Key Metrics and Success Measures Evaluation

» **Scope of Impact:** Community-wide
» **Action Type:** Require
» **Targets:** 100% applicable permits receive an energy assessment following code update
» **Emissions impact in 2030:** No direct emissions impact (enabling action)
» **Total Cost 2025 – 2030:** $4,300 - $6,500
» **Cost Effectiveness (2025-2030 Cost / 2030 MTCO$_2$e):** No direct emissions impact
» **Anticipated Average Annual Staff Time:** <0.1 FTE

Success Measures Evaluation

Meaningfully reduces GHG emissions	Provides a substantial return on investment
N/A	N/A

Sets a bold example among mountain communities	Is proactive before reactive	Leverage regional initiatives and partnerships
	+	

Provides significant co-benefits			
Social equity and affordability	Public health and wellbeing	Supports local businesses and economy	Enhances climate resilience and environmental quality

B3.B. Provide Town-funded energy efficiency and electrification incentives for all commercial buildings

Create a Town-funded energy efficiency and electrification incentive program for businesses

2030 Carbon Reduction (MTCO2e)	Cumulative Cost (2025 – 2030)	Cost Effectiveness* ($/MTCO2e)	Average Annual Town Staff Time (FTE)
661	$68,300 - $69,500	$103 - $105	0.08 - 0.1

2025-2030 targets needed to achieve savings:

- 16 commercial properties converted to all electric
- 43 commercial properties implemented energy efficiency measures
- Achieve a 10% improvement in average EUI for renovated properties equivalent to 97.5 kBtu/sq. ft., down from 114.7 kBtu/sq. ft. current average through energy efficiency measures

GHG Calculations

- The GHG impact of this action is based significant outreach & engagement to help businesses reduce energy use. This analysis assumes a 21% annual adoption in energy efficiency and electrification upgrades in the commercial sector, based on 106 business licenses in the town. Of the upgrades, this analysis assumes approximately 15% of upgrades electrify the commercial property with associated energy efficiency impact, while 85% perform energy efficiency upgrades to the property unrelated to electrification
- While a net decrease in natural gas use is anticipated, a net increase in electricity use is expected as a result of commercial electrification and efficiency measures in 2030

Cost Calculations

The cost calculations for this action assume a match of GCEA's custom incentives at $0.15 per kWh and $4 per Dth. Estimated total incentives of $62,900 between 2025 and 2030 for energy efficiency improvements through this program assuming a utility incentive match program design based on energy savings.

Key Metrics and Success Measures Evaluation

» **Scope of Impact:** Community-wide
» **Action Type:** Encourage
» **Targets:**
  - 16 commercial properties electrified to remove natural gas use by 2030
  - 43 commercial properties implementing energy efficiency improvements by 2030
» **Emissions impact in 2030:** 661 $MTCO_2e$
» **Total Cost 2025 – 2030:** $68,300 - $69,500

» **Cost Effectiveness (2025-2030 Cost / 2030 $MTCO_2e$):** $103 - $105
» **Anticipated Average Annual Staff Time (FTE):** 0.8 – 0.1 FTE
» **Implementation Timeline:** Near-Term

Success Measures Evaluation

Meaningfully reduces GHG emissions	Provides a substantial return on investment
	

Sets a bold example among mountain communities	Is proactive before reactive	Leverage regional initiatives and partnerships
		

Provides significant co-benefits			
Social equity and affordability	Public health and wellbeing	Supports local businesses and economy	Enhances climate resilience and environmental quality
			

B3.C. Require energy use disclosure and benchmarking for commercial buildings

Require annual energy disclosures and benchmarking for commercial buildings over a certain size to disclose energy use and compare against other similar businesses to encourage energy efficiency actions beyond energy disclosures (for large buildings) required by the state.

2030 Carbon Reduction (MTCO2e)	Cumulative Cost (2025 – 2030)	Cost Effectiveness* ($/MTCO2e)	Average Annual Town Staff Time (FTE)
5	$8,600 - $13,000	$1,813 - $2,741	0.8 - 1.2

2025-2030 targets needed to achieve savings

- Benchmarking of commercial properties accounting for 25% of total community commercial energy use
- Reporting businesses improve energy efficiency by 2.4% from baseline

GHG Calculations

- Assumes that a benchmarking program would apply to the largest commercial properties equivalent to 25% of commercial business energy use in Crested Butte
- For those commercial properties that benchmark, a 2.4% energy savings from energy use is achieved by benchmarking, consistent with findings from other commercial benchmarking programs

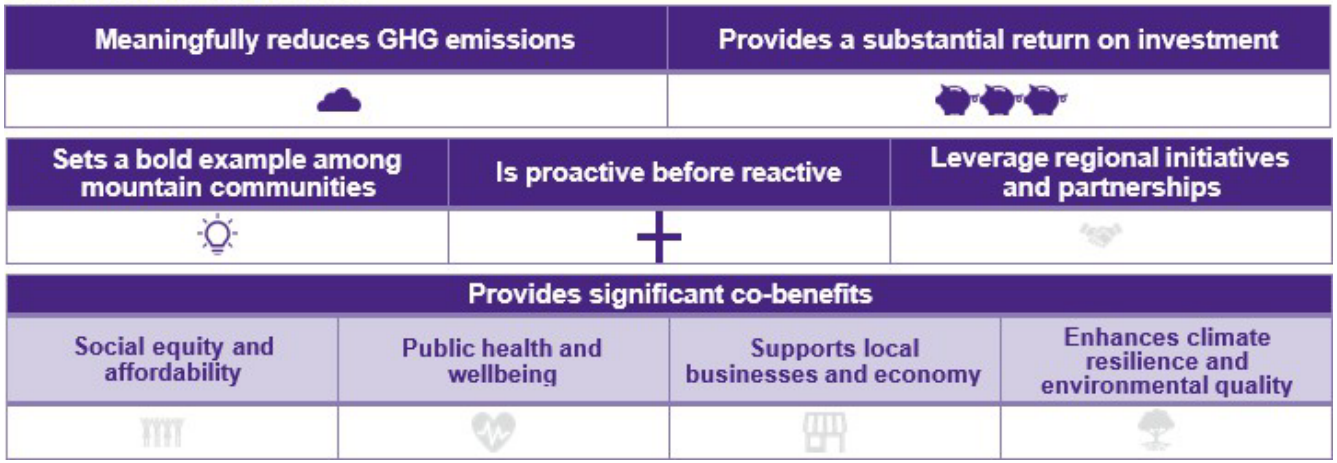
Cost Calculations

- The calculations for this action incorporate costs associated with:
  - Gathering stakeholder input to inform regulation changes
  - Development and delivery of trainings to support implementation
  - Outreach to inform the community about the changes

Key Metrics and Success Measures Evaluation

» **Scope of Impact:** Community-wide
» **Action Type:** Require
» **Targets:** Benchmarking of commercial properties accounting for 50% commercial energy use by 2030
» **Emissions impact in 2030:** 5 $MTCO_2e$
» **Total Cost 2025 – 2030:** $8,600 - $13,000
» **Cost Effectiveness (2025-2030 Cost / 2030 $MTCO_2e$):** $1,813 - $2,741
» **Anticipated Average Annual Staff Time:** 0.8 – 1.2 FTE
» **Implementation Timeline:** Mid-Term

Success Measures Evaluation



Strategy B4: Close the gap on new construction electrification and efficiency

B4.A. Require all-electric commercial kitchen equipment for new construction

Update existing new construction building code to require electrification of commercial kitchen equipment for new construction, the only electrification measure not currently required by existing building code.

2030 Carbon Reduction (MTCO2e)	Cumulative Cost (2025 – 2030)	Cost Effectiveness ($/MTCO2e)	Average Annual Town Staff Time (FTE)
19	$10,900 - $16,300	$587 - $878	<0.1

2025-2030 targets to achieve savings

- 2-3 new commercial kitchens transitioned to all electric

GHG Calculations

- The GHG impact of this action is calculated based on this historical average number of commercial new construction permits and a target for 2-3 new commercial kitchens being transitioned from natural gas to electric cooking equipment by 2030

Cost Calculations

- The calculations for this action incorporate estimated costs associated with:
  - Gathering stakeholder input to inform code changes
  - Development and delivery of trainings to support code implementation
  - Outreach to inform the community about the changes
- Since this is a code requirement that is not common in peer communities and has received some pushback from community members, higher levels of engagement are expected to be required to build community understanding and compliance

Key Metrics and Success Measures Evaluation

» **Scope of Impact:** Community-wide
» **Action Type:** Require
» **Targets:** 3 all-electric new construction commercial kitchens by 2030
» **Emissions impact in 2030:** 19 $MTCO_2e$
» **Total Cost 2025 – 2030:** $10,900 - $16,300
» **Cost Effectiveness (2025-2030 Cost / 2030 $MTCO_2e$):** $587 - $878

» **Anticipated Average Annual Staff Time:** <0.1 FTE
» **Implementation Timeline:** Long-Term

Success Measures Evaluation

Meaningfully reduces GHG emissions	Provides a substantial return on investment

Sets a bold example among mountain communities	Is proactive before reactive	Leverage regional initiatives and partnerships

Provides significant co-benefits			
Social equity and affordability	Public health and wellbeing	Supports local businesses and economy	Enhances climate resilience and environmental quality

B4.B. Estimate and track building materials used in construction

Leverage a 2025 building code update to establish methods for tracking building materials used in new construction.

2030 Carbon Reduction (MTCO2e)	Cumulative Cost (2025 – 2030)	Cost Effectiveness ($/MTCO2e)	Average Annual Town Staff Time (FTE)
n/a - enabling	Not calculated	n/a	Not calculated

2025-2030 targets to achieve savings

- Tracking process established

GHG Calculations

- No direct emissions impact from this action

Cost Calculations

- No cost was calculated for this action

Key Metrics and Success Measures Evaluation

» **Scope of Impact:** Community-wide
» **Action Type:** Enabling & Lead by Example
» **Targets:** Tracking process established
» **Emissions impact in 2030:** No direct emissions impact (enabling action)
» **Total Cost 2025 – 2030:** Not calculated
» **Cost Effectiveness (2025-2030 Cost / 2030 MTCO$_2$e):** n/a
» **Anticipated Average Annual Staff Time:** <0.1 FTE
» **Implementation Timeline:** Mid-Term

Success Measures Evaluation

Meaningfully reduces GHG emissions	Provides a substantial return on investment
N/A	N/A

Sets a bold example among mountain communities	Is proactive before reactive	Leverage regional initiatives and partnerships

Provides significant co-benefits			
Social equity and affordability	Public health and wellbeing	Supports local businesses and economy	Enhances climate resilience and environmental quality

Strategy B5: Lead the way with efficiency improvements and electrification of Town buildings

B5.A. Develop a municipal building energy efficiency and renewable energy plan and perform updated audits of all municipal facilities

Use existing municipal building energy efficiency audits to inform the development of an energy efficiency and renewable energy plan. Complete updated ASHRAE level II audits on all Town buildings to understand energy efficiency, renewable energy, and electrification opportunities and update the plan to reflect new opportunities.

2030 Carbon Reduction (MTCO2e)	Cumulative Cost (2025 – 2030)	Cost Effectiveness ($/MTCO2e)	Average Annual Town Staff Time (FTE)
n/a	$55,600 - $68,000	n/a	<0.1

2025-2030 targets to achieve savings

n/a

GHG Calculations

No emissions savings are calculated for this action as it is not directly influencing GHG emissions. Developing the energy efficiency and renewable energy plan, and performing updated audits of municipal facilities are, however, important to inform upgrades modeled in action BD-5 B.

Cost Calculations

The cost calculation for this action includes the estimated cost of an updated energy audit for all Town of Crested Butte facilities (123,591 square feet at an estimated average of $0.50 per square foot (Pacific Northwest National Labratory, 2011).

Key Metrics and Success Measures Evaluation

» **Scope of Impact:** Town Operations
» **Action Type:** Lead-by-example
» **Targets:** Develop an energy efficiency and electrification plan, conduct updated audits of all municipal facilities by 2026
» **Emissions impact in 2030:** No direct emissions impact (captured through Action B5.B)
» **Total Cost 2025 – 2030:** $55,600 - $68,000
» **Cost Effectiveness (2025-2030 Cost / 2030 MTCO$_2$e):** No direct emissions impact
» **Anticipated Average Annual Staff Time:** <0.1 FTE
» **Implementation Timeline:** Near-Term

Success Measures Evaluation

Meaningfully reduces GHG emissions	Provides a substantial return on investment
N/A	N/A

Sets a bold example among mountain communities	Is proactive before reactive	Leverage regional initiatives and partnerships
	+	

Provides significant co-benefits			
Social equity and affordability	Public health and wellbeing	Supports local businesses and economy	Enhances climate resilience and environmental quality

B5.B. Begin implementing electrification and efficiency improvements identified in energy efficiency and renewable energy plan

Based on the Facilities Energy Efficiency and Renewable Energy plan, develop upgrade budgets for priority energy efficiency and electrification improvements to be included in the annual budgeting process and install upgrades annually.

2030 Carbon Reduction (MTCO2e)	Cumulative Cost (2025 – 2030)	Cost Effectiveness* ($/MTCO2e)	Average Annual Town Staff Time (FTE)
49	$20,800 - $31,100	$426 - $636	0.2 - 0.4

2025-2030 targets needed to achieve savings

- 1 Town facility is upgraded each year to include either energy efficiency or full building electrification (3 energy efficiency upgrades and 3 properties electrified between 2025 and 2030)

GHG Calculations

- Town upgrades alternate between implementing energy efficiency upgrades or fully electrifying natural gas space heating, water heating, and cooking end uses with its one annual upgrade.
- It is assumed a 50% likelihood that either energy efficiency (a 10% reduction in energy use is assumed) or full electrification with estimated savings associated with those improvements occurs for one property annually.

- Town facility electricity use is expected to see a net increase as a result of energy efficiency and building electrification measures.

Cost Calculations

- The cost calculations for this action assume an average 20-year payback for electrification and energy efficiency work and are based on estimated energy savings.
- Note that the costs shown are incremental investments above and beyond typical equipment replacement costs.

Key Metrics and Success Measures Evaluation

» **Scope of Impact:** Town Operations
» **Action Type:** Lead-by-example
» **Targets:** 3 municipal property energy efficiency upgrades 2025 – 2030, 3 municipal properties electrified 2025 - 2030
» **Emissions impact in 2030:** 49 $MTCO_2e$
» **Total Cost 2025 – 2030:** $20,800 - $31,100
» **Cost Effectiveness (2025-2030 Cost / 2030 $MTCO_2e$):** $426 - $636
» **Anticipated Average Annual Staff Time:** 0.2 - 0.4 FTE
» **Implementation Timeline:** Near-Term

Success Measures Evaluation

Meaningfully reduces GHG emissions	Provides a substantial return on investment
	

Sets a bold example among mountain communities	Is proactive before reactive	Leverage regional initiatives and partnerships
		

Provides significant co-benefits			
Social equity and affordability	Public health and wellbeing	Supports local businesses and economy	Enhances climate resilience and environmental quality
			

B5.C. Monitor Town facilities' energy use and include within a regular Climate Action report.

Energy benchmarking for all Town facilities along with energy use disclosure in an annual sustainability report.

2030 Carbon Reduction (MTCO2e)	Cumulative Cost (2025 – 2030)	Cost Effectiveness* ($/MTCO2e)	Average Annual Town Staff Time (FTE)
16	$0	$0	<0.1

2025-2030 targets needed to achieve savings

- 100% Town facility energy use benchmarked by 2030

GHG Calculations

- All municipal energy use is subject to a benchmarking program.
- A 2.4% energy savings from municipal energy use is achieved by benchmarking, consistent with findings from other commercial benchmarking programs.

Cost Calculations

- Includes upfront costs to get the Town set up in ENERGY STAR Portfolio Manager and enter all the baseline data for the buildings gathered for this plan.
- Ongoing costs include time to gather and input data as well as time to identify the cause of any data oddities and determine solutions.
- Savings are assumed to arise from equipment setting or other no-cost adjustments. Equipment replacement needs that may be identified through this process are not included here.

Key Metrics and Success Measures Evaluation

» **Scope of Impact:** Town Operations
» **Action Type:** Lead-by-example
» **Targets:** 100% municipal building energy use benchmarked by 2030
» **Emissions impact in 2030:** 16 $MTCO_2e$
» **Total Cost 2025 – 2030:** $0
» **Cost Effectiveness (2025-2030 Cost / 2030 $MTCO_2e$):** No cost
» **Anticipated Average Annual Staff Time:** <0.1 FTE
» **Implementation Timeline:** Near-Term

Success Measures Evaluation

Provides significant co-benefits			
Social equity and affordability	Public health and wellbein!I	Supports local businesses and economy	Enhances climate resilience and environmental quality

Renewable Energy (R)

Actions that increase the amount of renewable energy used by municipal buildings, residents, and businesses in Crested Butte. A summary of the expected impact, cost effectiveness, and time commitment for each action are shown in the table below. Calculation inputs and assumptions can be found in the following sections.

Strategy	Action	Scope of Impact	2030 Carbon Reduction ($MTCO_2e$)	Cumulative Cost (2025 – 2030)	Cost Effectiveness ($/MTCO_2e$)	2025-2030 Average Annual Town Staff Time (FTE)
R1: Encourage local renewable energy generation	A. Provide educational resources to increase voluntary adoption of local renewable generation and evaluate coordinating "group buy" programs.	Community-wide	78	$15,000 - $45,000	$193 - $580	0.2 - 0.5
R1: Encourage local renewable energy generation	B. Partner with GCEA to support the installation of local renewable generation up to allowable caps	Community-wide	16	$7,500 - $22,500	$477 - $1,431	0.1 - 0.3
R1: Encourage local renewable energy generation	C. Expand the Renewable Energy Mitigation Program (REMP) to require renewable energy generation or fee-in-lieu for buildings over a certain size	Community-wide	22	$3,200 - $4,900	$143 - $219	<0.1
R2: Push to accelerate widespread grid decarbonization	A. Advocate for increased renewable energy generation at the local, state, and federal levels	Community-wide	n/a	$13,500 - $16,500	n/a	0.1 - 0.2
R3: Assess renewable energy to serve Town facilities	A. Install renewable energy generation to meet Town energy needs	Town Operations	247	Not calculated	Not calculated	<0.1
	Community-Wide Total	Community-wide	116	$25,700 - $72,400	$222 - $626	0.4 - 0.8
	Town Operations Total	Town Operations	247	Not calculated	Not calculated	<0.1
	Total	All	362	$25,700 - $72,400	$222 - $626	0.5 – 1.0

Strategy R1: Encourage local renewable energy generation

R1.A. Provide educational resources to increase voluntary adoption of local renewable generation and evaluate coordinating "group buy" programs

This action focuses on increasing voluntary adoption of local renewable energy through coordinating a group buy to bring down the cost of on-site installation to individual households and businesses through collective purchasing power. Pairing with educational resources will help to raise awareness of existing incentives and rebates available to support local renewable energy generation. Significant incentives already exist to support local renewable energy and studies have shown that additional local incentives may have limited impact on adoption, hence the focus on coordination and education (Matisoff & Johnson, 2017) (van Valkengoed & Werff, 2022).

2030 Carbon Reduction (MTCO2e)	Cumulative Cost (2025 – 2030)	Cost Effectiveness* ($/MTCO2e)	Average Annual Town Staff Time (FTE)
78	$15,000 - $45,000	$193 - $580	0.2 - 0.5

2025-2030 targets needed to achieve savings:

- 3 business and 3 residential solar arrays installed annually (triple the historical rate of installs)

GHG Calculations

- Total installed solar capacity 419 kW installed between 2025-2030 based on average system sizes of 5 kW per residential system and 23 kW per commercial system installed
- Installed solar capacity offsets grid supplied electricity with the emissions factor forecasted in the ABAU

Cost Calculations

- The calculations for this action incorporate costs associated with:
    - Education and outreach associated with coordinating and administering a group buy
    - Education and outreach related to existing incentives for local renewable energy generation
- Moderate level of effort estimated. There are well established group buy programs, but a significant amount of community outreach is still needed

Key Metrics and Success Measures Evaluation

» **Scope of Impact:** Community-wide
» **Action Type:** Encourage
» **Targets:** Triple the current number of solar permits filed to achieve 3 business and 3 residential solar arrays per year, resulting in 84kW per year installed generation capacity
» **Emissions impact in 2030:** 78 $MTCO_2e$
» **Total Cost 2025 – 2030:** $15,000 - $45,000
» **Cost Effectiveness (2025-2030 Cost / 2030 $MTCO_2e$):** $193 - $580
» **Anticipated Average Annual Staff Time:** 0.2 – 0.5 FTE
» **Implementation Timeline:** Near-Term

Success Measures Evaluation

Meaningfully reduces GHG emissions	Provides a substantial return on investment
	

Sets a bold example among mountain communities	Is proactive before reactive	Leverage regional initiatives and partnerships
		

Provides significant co-benefits			
Social equity and affordability	Public health and wellbeing	Supports local businesses and economy	Enhances climate resilience and environmental quality
			

R1.B. Partner with GCEA to support the installation of local renewable generation up to allowable caps

Work with GCEA to maximize local clean electricity generation within existing TriState generation caps to achieve a total of 6MW installed by 2030.

2030 Carbon Reduction (MTCO2e)	Cumulative Cost (2025 – 2030)	Cost Effectiveness* ($/MTCO2e)	Average Annual Town Staff Time (FTE)
16	$7,500 - $22,500	$477 - $1,431	0.1 - 0.3

2025-2030 targets needed to achieve savings:

- Achieve 6MW total installed local generation by 2030
- New 0.8MW solar array installed by 2030, with RECs attributed to local businesses or residents

GHG Calculations

- Installed renewable energy reduces the emissions factor for grid supplied electricity by 1.4%. in 2030

Cost Calculations

- Ongoing costs for outreach and engagement activities including printing materials, meeting venue and/or food costs, as well as any travel costs
- Staff time to attend meetings, gather information/data, and coordinate implementation of actions

Key Metrics and Success Measures Evaluation

» **Scope of Impact:** Community-wide
» **Action Type:** Encourage
» **Targets:** 0.8MW additional local renewable generation installed
» **Emissions impact in 2030:** 16 $MTCO_2e$
» **Total Cost 2025 – 2030:** $7,500 - $22,500
» **Cost Effectiveness (2025-2030 Cost / 2030 $MTCO_2e$):** $477 - $1,431
» **Anticipated Average Annual Staff Time:** 0.1 – 0.3 FTE
» **Implementation Timeline:** Mid-Term

Success Measures Evaluation

Meaningfully reduces GHG emissions	Provides a substantial return on investment

Sets a bold example among mountain communities	Is proactive before reactive	Leverage regional initiatives and partnerships

Provides significant co-benefits			
Social equity and affordability	Public health and wellbeing	Supports local businesses and economy	Enhances climate resilience and environmental quality

R1.C. Expand the Renewable Energy Mitigation Program (REMP) to require renewable energy generation or fee-in-lieu for buildings over a certain size

Evaluate the existing REMP program and add a requirement for on-site renewable energy generation or payment of a fee-in-lieu for all newly constructed buildings over a certain size.

2030 Carbon Reduction (MTCO2e)	Cumulative Cost (2025 – 2030)	Cost Effectiveness* ($/MTCO2e)	Average Annual Town Staff Time (FTE)
22	$3,200 - $4,900	$143 - $219	<0.1

2025-2030 targets needed to achieve savings:

- 2 business and 17 residential solar arrays installed between 2025-2030

GHG Calculations

- Total installed solar capacity 120 kW installed between 2025-2030 based on average system sizes of 5 kW per residential system and 23 kW per commercial system installed
- Based on total generated power from installed solar offsetting grid electricity delivered at the emissions factor outlined in the ABAU

Cost Calculations

- The calculations for this action incorporate costs associated with:
  - Gathering stakeholder input to inform policy adoption
  - Development and delivery of trainings to support implementation
  - Outreach to inform the community about the new requirements
- Moderate level of effort needed to pass this ordinance as there are similar ordinances in peer communities, but the ordinance can be complex to implement

Key Metrics and Success Measures Evaluation

» **Scope of Impact:** Community-wide
» **Action Type:** Require
» **Targets:** 3 installations or payments in lieu each year, resulting in 24kW per year installed generation capacity
» **Emissions impact in 2030:** 22 $MTCO_2e$
» **Total Cost 2025 – 2030:** $3,200 - $4,900
» **Cost Effectiveness (2025-2030 Cost / 2030 $MTCO_2e$):** $143 - $219
» **Anticipated Average Annual Staff Time:** <0.1 FTE
» **Implementation Timeline:** Mid-Term

Success Measures Evaluation

Meaningfully reduces GHG emissions	Provides a substantial return on investment
	

Sets a bold example among mountain communities	Is proactive before reactive	Leverage regional initiatives and partnerships
		

Provides significant co-benefits			
Social equity and affordability	Public health and wellbeing	Supports local businesses and economy	Enhances climate resilience and environmental quality
			

Strategy R2: Push to accelerate widespread grid decarbonization

R2.A. Advocate for increased renewable energy generation at the local, state, and federal levels

Continue to advocate for increased local and utility renewable generation with GCEA and Tri-State, including a greater percentage of renewable energy supply and/or increased allowances for local generation.

2030 Carbon Reduction (MTCO2e)	Cumulative Cost (2025 – 2030)	Cost Effectiveness* ($/MTCO2e)	Average Annual Town Staff Time (FTE)
0	$13,500 - $16,500	n/a	0.1 – 0.2

2025-2030 targets needed to achieve savings:

n/a

GHG Calculations

- This is an enabling action to pursue the potential for additional renewable energy in the Town electricity mix. No savings expected by 2030, rather a strategy to enable future electricity generation GHG emissions reductions.

Cost Calculations

The cost calculations for this action assume ongoing engagement with GCEA and TriState as well as continued participation in Colorado Communities for Climate Action (CC4CA) and engagement at the state and federal level.

Key Metrics and Success Measures Evaluation

» **Scope of Impact:** Community-wide
» **Action Type:** Encourage
» **Targets:** Participate in ongoing advocacy, including opportunities and the local, state, and federal level
» **Emissions impact in 2030:** No direct emissions impact
» **Total Cost 2025 – 2030:** $12,500 - $16,500
» **Cost Effectiveness (2025-2030 Cost / 2030 $MTCO_2e$):** No direct emissions impact
» **Anticipated Average Annual Staff Time:** 0.1 – 0.2 FTE
» **Implementation Timeline:** Near-Term

Success Measures Evaluation

Meaningfully reduces GHG emissions	Provides a substantial return on investment
N/A	N/A

Sets a bold example among mountain communities	Is proactive before reactive	Leverage regional initiatives and partnerships

Provides significant co-benefits			
Social equity and affordability	Public health and wellbeing	Supports local businesses and economy	Enhances climate resilience and environmental quality

Strategy R3: Assess renewable energy to serve Town facilities

R3.A. Evaluate renewable energy generation to meet Town energy needs.

Assess renewable energy installation to generate more energy for Town facilities.

2030 Carbon Reduction (MTCO2e)	Cumulative Cost (2025 – 2030)	Cost Effectiveness* ($/MTCO2e)	Average Annual Town Staff Time (FTE)
247	Not calculated	Not calculated	<0.1

2025-2030 targets needed to achieve savings:

- TBD based on need and opportunity

GHG Calculations

- Installed on-site solar covers all Town electricity needs in 2030

- Based on total generated power from installed solar offsetting grid electricity delivered at the emissions factor outlined in the ABAU

Cost Calculations

- Will be calculated as opportunities for renewable energy generation on Town facilities arise.

Key Metrics and Success Measures Evaluation

» **Scope of Impact:** Town Operations
» **Action Type:** Lead-by-example
» **Targets:** 100% Town electricity needs met through local renewable energy generation
» **Emissions impact in 2030:** 247 $MTCO_2e$
» **Total Cost 2025 – 2030:** $2,590,500 - $3,166,100
» **Cost Effectiveness (2025-2030 Cost / 2030 $MTCO_2e$):** $10,503 - $12,837
» **Anticipated Average Annual Staff Time:** <0.1 FTE
» **Implementation Timeline:** Long Term

Success Measures Evaluation

Meaningfully reduces GHG emissions	Provides a substantial return on investment

Sets a bold example among mountain communities	Is proactive before reactive	Leverage regional initiatives and partnerships

Provides significant co-benefits			
Social equity and affordability	Public health and wellbeing	Supports local businesses and economy	Enhances climate resilience and environmental quality

Waste (W)

Actions that increase the diversion rate and reduce the amount of waste sent to landfill in Crested Butte.

The impact of waste actions is calculated as a cumulative impact downstream landfill waste emissions. As the upstream emissions from the manufacturing of materials is not accounted for in the Town's baseline inventory, the upstream impacts are not estimated here. Additionally, granular waste data by sector was not available during the inventory development and thus the emissions impact of waste actions on downstream disposal is calculated at the community scale.

A summary of the expected cumulative impact, cost effectiveness, and time commitment for waste actions is shown in the table below. Calculation inputs and assumptions can be found in the following sections.

Strategy	Action	Scope of Impact	2030 Carbon Reduction ($MTCO_2e$)	Cumulative Cost (2025 – 2030)	Cost Effectiveness ($/$MTCO_2e$)	2025-2030 Average Annual Town Staff Time (FTE)
WMM-1: Increase diversion from landfill and encourage sustainable consumption	A. Require adequate space for trash, recycling, and composting containers and pickup in new development	Community-wide	Not calculated for individual actions	$2,200 - $3,200	Not calculated for individual actions	<0.1
WMM-1: Increase diversion from landfill and encourage sustainable consumption	B. Facilitate the development of new waste diversion infrastructure	Community-wide	Not calculated for individual actions	No cost calculated for this action	Not calculated for individual actions	No time allocated for this action
WMM-1: Increase diversion from landfill and encourage sustainable consumption	C. Incentivize waste reduction and diversion for residents and businesses	Community-wide	Not calculated for individual actions	$29,500 - $44,500	Not calculated for individual actions	0.1 - 0.3
WMM-1: Increase diversion from landfill and encourage	D. Ban certain materials from landfill and enforce requirements for construction and demolition materials recycling	Community-wide	Not calculated for individual actions	$44,600 - $50,000	Not calculated for individual actions	0.6

sustainable consumption						
WMM-1: Increase diversion from landfill and encourage sustainable consumption	E. Adopt a save-as-you-throw ordinance to disincentivize waste generation	Community-wide	Not calculated for individual actions	$2,200 - $3,200	Not calculated for individual actions	<0.1
WMM-1: Increase diversion from landfill and encourage sustainable consumption	F. Develop incentives and programs to encourage waste reduction and diversion by Town employees	Town Operations	Not calculated for individual actions	$1,800 - $2,700	Not calculated for individual actions	<0.1
WMM-1: Increase diversion from landfill and encourage sustainable consumption	G. Develop and implement a Town Environmental Purchasing Policy (EPP)	Town Operations	Not calculated for individual actions	$6,100 – $7,400	Not calculated for individual actions	<0.1
	Total	All	116	$86,400 - $111,000	$742 - $953	0.8 – 1.0

Strategy W1: Increase diversion from landfill and encourage sustainable consumption

2025-2030 targets needed to achieve savings:

- Increase diversion rate to 53%

GHG Calculations

- Reduce landfilled waste by 224 tons from ABAU

W1.A. Require adequate space for trash, recycling, and composting containers and pickup in new development

Require adequate space for collection of trash, recycling, and composting in new development that is easily accessible to building residents.

Cost Calculations

- Cost calculations for this action include stakeholder engagement and outreach associated with code amendment.

- Low outreach and engagement costs are expected for this action since many similar ordinances have been passed in local jurisdictions and aligns with requirements for LEED, so developers should be familiar.

Key Metrics and Success Measures Evaluation

» **Scope of Impact:** Community-wide
» **Action Type:** Require
» **Targets:** Code change to require adequate space for trash, recycling and composting containers in new development
» **Emissions impact in 2030:** No direct emissions impact (enabling action)
» **Total Cost 2025 – 2030:** $2,200 - $3,200
» **Cost Effectiveness (2025-2030 Cost / 2030 MTCO$_2$e):** Not calculated for individual actions
» **Anticipated Average Annual Staff Time:** <0.1 FTE
» **Implementation Timeline:** Near-Term

Success Measures Evaluation

Meaningfully reduces GHG emissions*	Provides a substantial return on investment*
N/A	

**Qualitative/comparative assessment completed since data not available to support impact calculations at the action level*

Sets a bold example among mountain communities	Is proactive before reactive	Leverage regional initiatives and partnerships
	+	

Provides significant co-benefits			
Social equity and affordability	Public health and wellbeing	Supports local businesses and economy	Enhances climate resilience and environmental quality

W1.B. Facilitate the development of new waste diversion infrastructure

Cost Calculations

- The scope of this action is still to be determined, ranging from removing barriers and facilitating the development of new waste diversion infrastructure to incentives or grants for infrastructure. No cost has currently been estimated for this action.

Key Metrics and Success Measures Evaluation

» **Scope of Impact:** Community-wide
» **Action Type:** Encourage
» **Targets:** TBD based on need and opportunities
» **Emissions impact in 2030:** Not calculated for individual actions
» **Total Cost 2025 – 2030:** TBD based on need and opportunities
» **Cost Effectiveness (2025-2030 Cost / 2030 MTCO$_2$e):** Not calculated for individual actions
» **Anticipated Average Annual Staff Time:** TBD
» **Implementation Timeline:** Mid-Term

Success Measures Evaluation

Meaningfully reduces GHG emissions*	Provides a substantial return on investment*
TBD	TBD

**Not calculated since highly dependent on type and magnitude of waste diversion infrastructure*

Sets a bold example among mountain communities	Is proactive before reactive	Leverage regional initiatives and partnerships
	+	

Provides significant co-benefits			
Social equity and affordability	Public health and wellbeing	Supports local businesses and economy	Enhances climate resilience and environmental quality

W1.C. Incentivize waste reduction and diversion for residents and businesses

Encourage sustainable materials or low waste events through Town-funded incentives, education, and outreach.

Cost Calculations

- Cost calculations for this action include:
    - A Town-funded waste reduction grant of about $4,400 per year, based on a similar program implemented in Steamboat Springs, Colorado at $2.70 per person (City of Steamboat Springs, 2024)

    - Outreach and education
- High time commitments from Town staff to develop and administer the program due to the potential scope of this incentive.

Key Metrics and Success Measures Evaluation

» **Scope of Impact:** Community-wide
» **Action Type:** Encourage
» **Targets:** Implementation of town-wide waste reduction and diversion incentives
» **Emissions impact in 2030:** Not calculated for individual actions
» **Total Cost 2025 – 2030:** $29,500 - $44,500
» **Cost Effectiveness (2025-2030 Cost / 2030 MTCO$_2$e):** Not calculated for individual actions
» **Anticipated Average Annual Staff Time:** 0.1 – 0.3 FTE
» **Implementation Timeline:** Near-Term

Success Measures Evaluation

Meaningfully reduces GHG emissions*	Provides a substantial return on investment*
☁	🐷🐷

**Qualitative/comparative assessment completed since data not available to support impact calculations at the action level*

Sets a bold example among mountain communities	Is proactive before reactive	Leverage regional initiatives and partnerships
💡	+	🤝

Provides significant co-benefits			
Social equity and affordability	Public health and wellbeing	Supports local businesses and economy	Enhances climate resilience and environmental quality
👪	❤	🏪	🌳

W1.D. Ban certain materials from landfill and enforce requirements for construction and demolition materials recycling

Require sustainable materials to be used in new construction projects, ban some materials from landfill, and/or require deconstruction.

Cost Calculations

- The calculations for this action incorporate costs associated with:
  - Gathering stakeholder input to inform policy adoption
  - Development and delivery of trainings to support implementation
  - Outreach to inform the community about the new requirements
- High level of cost and time commitment for engagement given the complexity of this regulation. Deconstruction regulations are also rate and infrastructure needed to be successful may not already exist.

Key Metrics and Success Measures Evaluation

» **Scope of Impact:** Community-wide
» **Action Type:** Require
» **Targets:** Adoption of ordinance to ban materials from landfill and/or require deconstruction/construction materials recycling
» **Emissions impact in 2030:** Not calculated for individual actions
» **Total Cost 2025 – 2030:** $44,600 - $50,000
» **Cost Effectiveness (2025-2030 Cost / 2030 MTCO$_2$e):** Not calculated for individual actions
» **Anticipated Average Annual Staff Time:** 0.6 FTE
» **Implementation Timeline:** Mid-Term

Success Measures Evaluation

Meaningfully reduces GHG emissions*	Provides a substantial return on investment*
	

**Qualitative/comparative assessment completed since data not available to support impact calculations at the action level*

Sets a bold example among mountain communities	Is proactive before reactive	Leverage regional initiatives and partnerships
		

Provides significant co-benefits			
Social equity and affordability	Public health and wellbeing	Supports local businesses and economy	Enhances climate resilience and environmental quality
			

W1.E. Adopt a pay-as-you-through ordinance to disincentivize waste generation

Partner with Waste Management to develop and enforce a pay-as-you-throw ordinance with higher trash rates for larger containers or quantities of waste to disincentivize waste generation and encourage recycling and composting by residents and businesses.

Cost Calculations

- The calculations for this action incorporate costs associated with:
  - Gathering stakeholder input to inform policy adoption
  - Development and delivery of trainings to support implementation
  - Outreach to inform the community about the new requirements.
- Low level of effort estimated since this is a common approach to trash service.

Key Metrics and Success Measures Evaluation

» **Scope of Impact:** Community-wide
» **Action Type:** Encourage
» **Targets:** Adopt a pay-as-you-throw ordinance
» **Emissions impact in 2030:** Not calculated for individual actions
» **Total Cost 2025 – 2030:** $2,200 - $3,200
» **Cost Effectiveness (2025-2030 Cost / 2030 MTCO$_2$e):** Not calculated for individual actions
» **Anticipated Average Annual Staff Time:** <0.1 FTE
» **Implementation Timeline:** Mid-Term

Success Measures Evaluation

Meaningfully reduces GHG emissions*	Provides a substantial return on investment*

*Qualitative/comparative assessment completed since data not available to support impact calculations at the action level

Sets a bold example among mountain communities	Is proactive before reactive	Leverage regional initiatives and partnerships

Provides significant co-benefits			
Social equity and affordability	Public health and wellbeing	Supports local businesses and economy	Enhances climate resilience and environmental quality

W1.F. Develop incentives and programs to encourage waste reduction and diversion by Town employees

Develop programs and incentives such as re-use libraries or interdepartmental competitions to reduce waste generation and increase diversion by Town employees.

Cost Calculations

- Cost calculations for this action include incentives and time commitment proportional to the Town waste incentive program.

Key Metrics and Success Measures Evaluation

» **Scope of Impact:** Town Operations
» **Action Type:** Encourage
» **Targets:** Implementation of Town employee waste reduction and diversion incentives
» **Emissions impact in 2030:** Not calculated for individual actions
» **Total Cost 2025 – 2030:** $1,800 - $2,700
» **Cost Effectiveness (2025-2030 Cost / 2030 MTCO$_2$e):** Not calculated for individual actions
» **Anticipated Average Annual Staff Time:** <0.1 FTE
» **Implementation Timeline:** Near-Term

Success Measures Evaluation

Meaningfully reduces GHG emissions*	Provides a substantial return on investment*

*Qualitative/comparative assessment completed since data not available to support impact calculations at the action level

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Provides significant co-benefits			
Social equity and affordability	Public health and wellbeing	Supports local businesses and economy	Enhances climate resilience and environmental quality

W1.G. Develop and implement a Town Environmental Purchasing Policy

Develop an Environmental Purchasing Policy that specifies sustainable purchasing criteria for Town operations such as minimum recycled percentages for paper goods or construction materials, guidelines around reuse, and/or disposal requirements.

Cost Calculations

- Assume 5% additional cost for purchasing Environmentally friendly products for office supplies, cleaning supplies, and tools and equipment from the 2024 Town budget (Town of Crested Butte, 2023)
- Hours estimate for Town staff to develop and pass the policy as well as time annually to adjust and update as needed.
    - Low level of effort estimated since there are many examples and templates available.

Key Metrics and Success Measures Evaluation

» **Scope of Impact:** Town Operations
» **Action Type:** Require / Encourage
» **Targets:** Development and adoption of Environmental Purchasing Policy
» **Emissions impact in 2030:** Not calculated for individual actions
» **Total Cost 2025 – 2030:** $6,100 – $7,400
» **Cost Effectiveness (2025-2030 Cost / 2030 $MTCO_2e$):** Not calculated for individual actions

» **Anticipated Average Annual Staff Time:** <0.1 FTE

» **Implementation Timeline:** Near-Term

Success Measures Evaluation

Meaningfully reduces GHG emissions*	Provides a substantial return on investment*

**Qualitative/comparative assessment completed since data not available to support impact calculations at the action level*

Sets a bold example among mountain communities	Is proactive before reactive	Leverage regional initiatives and partnerships

Provides significant co-benefits			
Social equity and affordability	Public health and wellbeing	Supports local businesses and economy	Enhances climate resilience and environmental quality

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