

# Pitkin County Climate Action Plan

Pitkin County has long been committed to climate action and sustainability to preserve natural resources for current and future generations.

The County recognizes that the changing climate has the potential to significantly affect the environment and the economy. By acting now to reduce greenhouse gas (GHG) emissions, the County can dampen the severity of these impacts.

There are elements of County infrastructure, such as buildings, fleets and the landfill, that generate emissions in the course of providing services to the community. The *Pitkin County Climate Action Plan* focuses on County agencies and initiatives that can reduce emissions. This plan makes an important contribution to emissions reduction and shows the County's leadership. The plan was developed to serve as a guide for departments to drive robust and meaningful reductions.

## Relationship to the Strategic Plan

Pitkin County is an organization with a long history of environmental stewardship that values the natural and built environment. This is reflected in the *Pitkin County Strategic Plan*. The Strategic Plan strives for Pitkin County to “continue to be a healthy, safe, vibrant and sustainable community, enhancing the quality of life for everyone who lives, works and visits here, while conserving the natural environment” and prioritizes a “flourishing natural and built environment” as a Core Focus Area. See diagram below:

Figure 1: Pitkin County Strategic Plan



The Strategic Plan action items for achieving the *Flourishing Natural & Built Environment* Core Focus include the following climate-change-related direction:

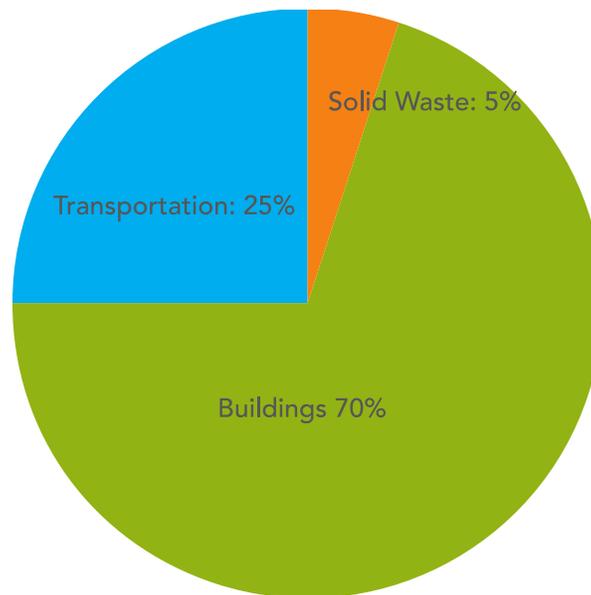
- *Adopt responsible land-use and building practices that support a co-existence of natural and built environments.*
- *Support and encourage food production at a local and regional level.*
- *Promote activities that are climate-change neutral and supportive of appropriate renewable and alternative energy.*
- *Preserve the local, regional and global environment through sustainable land-use measures.*
  - *Ensure that land-use and building codes promote state-of-the-art energy efficiency.*

### **Greenhouse Gas Emissions**

In order to support pivotal values defined in the Strategic Plan, Pitkin County prepared the *2014 Pitkin County Greenhouse Gas Emissions Inventory* (attached). This will be updated every three years and is just one part of the ongoing planning process to assess, plan and mitigate emissions.

The *Greenhouse Gas Emissions Inventory* defines the source and the quantity of emissions generated across Pitkin County. In 2014, total community GHG emissions across the Pitkin County community were approximately 551,900 metric tons of carbon dioxide equivalent. The figure below shows the emissions by sector. The largest sector is the energy used to heat and power buildings, at 70 percent, followed by fuel from cars, trucks, public transit buses and aircrafts (25 percent) and the decomposition of solid waste at the landfill (5 percent).

Figure 2: Pitkin County GHG Emissions by Sector



In order to effectively address these emissions, each department in Pitkin County that affects the noted sectors above is working toward reducing its GHGs. In collaboration with one another and as part of this Climate Action Plan, each department has developed a three-year work plan to reduce GHG emissions.

### Scope

Emissions from county operations are bundled into the community-wide results. But while county-generated emissions likely represent a small portion of overall emissions, they represent an important piece as the County has a greater ability to influence its own operations than other industries.

The Pitkin County Climate Action Plan does not address all actions to reduce emissions. The County is also collaborating with others in the valley to work together on climate action and to produce an overall climate action plan for the greater community.

With the exception of the Public Health Department, this plan focuses on reducing GHG emissions rather than adapting to the impacts of climate change.

### Timeline

This is a three-year work plan to reduce GHG emissions from 2017 to 2020 if approved for funding on an annual basis by the Board of County Commissioners.

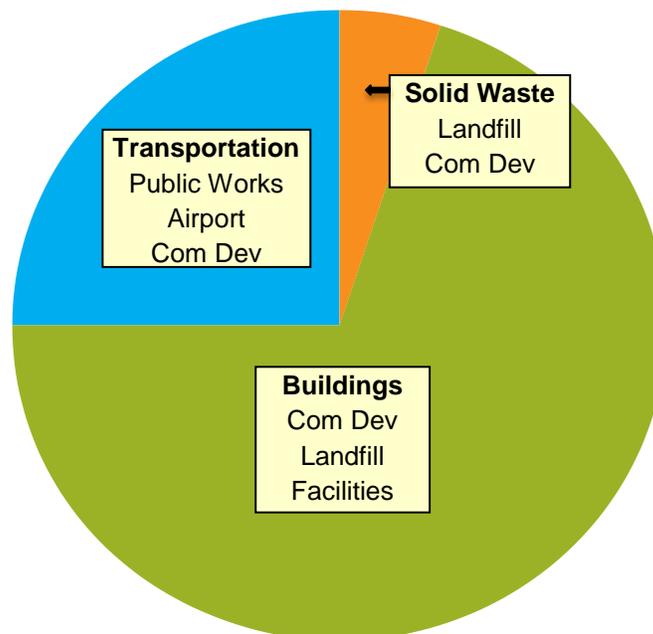
The following Pitkin County Climate Action Plan will be presented to the BOCC upon each budget review and will be reported on at each department update.

### Responsible Departments

The process for developing this plan involved the following departments: Aspen/Pitkin County Airport, Building Department, Planning/Zoning/Engineering Departments, Landfill, Environmental Health Department, Public Works Department, and Public Health Department.

The following chart illustrates Pitkin County departments primarily responsible for each sector of the GHG emission reduction work plan:

Figure 3: Pitkin County Departments



*Note: The Public Health Department is not included in the above chart. The Public Health Work Plan is primarily concerned with building local resilience and adapting to the impacts of the changing climate rather than reducing emissions.*

**AIRPORT CAP – DRAFT JUNE, 2017**

<b>CLIMATE ACTION PLAN 2017-2020</b>							
<b>Rank #</b>	<b>Goal &amp; Sub Tasks (if needed)</b>	<b>Collaboration Needs Internal/External</b>	<b>Resource Needs (Staff, Equipment)</b>	<b>Start Year/Quarter End Year/Quarter</b>	<b>Anticipated Obstacle(s)</b>	<b>Com Dev Anticipated Solution(s)</b>	<b>Anticipated Budget Needed</b>
<b>Terminal/Building Energy – dominant source is existing terminal</b>							
1.	Replace the new terminal with larger and notably more energy efficient terminal	CORE collaboration/grants; Potentially add CORE representative to terminal design team	Funding	Envir: 2017 Design: 2018-2019 Const: 2019-2022	Cost of the terminal relative to other airport needs – could use additional funding sources		\$89M
2.	Consider geo thermal or other renewables as part of the terminal complex	CORE collaboration/grants; Potentially add CORE representative to terminal design team	Funding	Envir: 2017 Design: 2018-2019 Const: 2019-2022	Cost of the terminal relative to other airport needs – could use additional funding sources		Unknown
<b>Airport Fleet Vehicles</b>							
3.	Identify high emission vehicles that are in line for replacement, and replace earlier	Infrastructure requirements; grants (VALE, VW potential options)	Potential funding sources review	2018	Airport's need to be consistent in its procurement with County specifications/vendors		Unknown
<b>Airfield Electrical</b>							
4.	Consider replacing airfield lighting with LED lighting	CORE collaboration/grants; review of LED ROI relative to ASE climate (may need heater to keep clear of snow)	Funding/Review of ROI relative to LED due to weather	With proposed airfield changes (2023-2028)	Funding availability; Potential operational barriers due to climate at ASE (snow could require use of heaters which may offset the benefits of this option)		Unknown
<b>Tenant Owned and Controlled Sources</b>							
5.	Aircraft: Encourage reliance on alternative fuels	Meet with Rocky Mountain Institute to discuss collaboration	Ability to manufacture in the valley	Unknown	Ability to manufacture fuel near its use. Transporting from Denver is not cost effective.		Unknown
6.	APU use of apron parking – installation of preconditioned air and electric GPUs	Examine use of FAA VALE grants/CORE grants	Funding	Unknown	Cost effectiveness and potential need for an expanded apron with fixed/less flexible parking positions		Unknown
7.	Rental Cars: With new facility, include energy efficiency and water conservation in the QTA	Coordination with rental car companies/lease agreements	Funding and specification to be developed	Unknown	Cost effectiveness		Unknown
<b>Ground Access Vehicles</b>							
8.	Investigate rewards for increase vehicle occupancy/ride share	Potential for County employees	Partnership with local entity (SkiCo) to provide rewards	Unknown	Value of the rewards/multi seasonal, number of merchants/businesses participating		Unknown
9.	Increase ridership of public transportation	Work with planning process to provide easier access to BRT station in future	RFTA, funding	Unknown	Cost and social norms of riding public transportation with luggage, solving the luggage transport and frequency of travel		Unknown
10.	Require taxi and airport shuttles to meet a MPG standard		Legal review and development of an ordinance	Unknown	Opposition from providers, requirement to change vehicles		Unknown
11.	Rental Cars: require rental car operators to meet a MPG standard for on-site rental agreements	Coordination with rental car companies/lease agreements	Legal review and development of lease requirements.	Unknown	Opposition from providers, requirement to change vehicles		Unknown

**LANDFILL CAP – DRAFT MAY, 2017**

<b>CLIMATE ACTION PLAN 2017-2020</b>							
<b>Rank #</b>	<b>Goal &amp; Sub Tasks (if needed)</b>	<b>Collaboration Needs Internal/External</b>	<b>Resource Needs (Staff, Equipment)</b>	<b>Start Year/Quarter End Year/Quarter</b>	<b>Anticipated Obstacle(s)</b>	<b>Com Dev Anticipated Solution(s)</b>	<b>Anticipated Budget Needed</b>
1.	New Waste and Recycling Ordinance-goal to increase waste diversion	Community Stakeholders	Enforcement personnel	2017/2 <sup>nd</sup> 2019/1 <sup>st</sup>		Enforcement assistance	
2.	Expand compost program	Engineering Consultants		2017/3rd	Space constraints, community opposition	None	
3.	Expanded Diversion Programs- Textiles, Mattresses		Landfill Staff (Once a month collection)			None	
4.	Stormwater Mitigation/Leachate Collection System	Engineering Consultants			CDPHE Denial of Proposed Technology	None	\$200,000
5.	Waste Diversion Plan-Diversion Goals	Consultants/Com Dev (Permit Requirements)			Community opposition, particularly from homeowners and builders.	Diversion requirements in building and demo permits.	
6.	Shredded Tires as Alternative Daily Cover	Overton Recycling				None	
7.	Landfill Expansion	Engineering Consultants State CDPHE			CDPHE. Community opposition	None	Approx. \$1.2 million

**BUILDING DEPT. CAP – DRAFT 4.19.17**

<b>BUILDING WORK PLAN 2017-2020</b>							
<b>Rank #</b>	<b>Goal &amp; Sub Tasks (if needed)</b>	<b>Collaboration Needs Internal/External</b>	<b>Resource Needs (Staff/Equipment)</b>	<b>Start Year/Quarter End Year/Quarter</b>	<b>Anticipated Obstacle(s)</b>	<b>Community Development Anticipated Solution(s)</b>	<b>Anticipated Budget</b>
1.	Energy Addendum			2016 – Final Mid 2017	More public outreach before adoption.	Public outreach – May/June 2017 Adoption – July 2017	CORE Grant \$20,000/Do e
2.	Landfill C & D	Landfill Department	<ul style="list-style-type: none"> <li>▪ FTE for Auditing</li> <li>▪ Existing staff review of demo permits</li> </ul>	2017 – Adopt 2018	Training the construction industry Education Enforcement	Revise Building Code to review demo/deconstruction plans.	(See Landfill budget for anticipated FTE)
3.	2015 IECC Adopted			Done Adopted			
4.	REMP Rewrite	CORE consultant	Staff review at building permit	Underway adoption mid 2017 with addendum	<ul style="list-style-type: none"> <li>▪ Public Outreach</li> <li>▪ Enforcement and follow up</li> </ul>	Revision to REMP regulations	CORE Grant assessed with Addendum
5.							
6.							

**PLANNING/ZONING/ENGINEERING CAP – DRAFT 10.12.17**

<b>PLANNING/ZONING/ENGINEERING WORK PLAN 2017-2018</b>							
<b>Rank #</b>	<b>Goal &amp; Sub Tasks (if needed)</b>	<b>Collaboration Needs Internal/External</b>	<b>Resource Needs (Staff/Equipment)</b>	<b>Start Year/Quarter End Year/Quarter</b>	<b>Anticipated Obstacle(s)</b>	<b>Community Development Anticipated Solution(s)</b>	<b>Anticipated Budget</b>
1.	GHGI	CORE, Aspen & other Communities	Long Range Staff CORE Staff	2016-2017 Adopted	Updating every three years		Grants
2.	Colorado Climate Action Plan	All departments internally	Staff	2017-January 2018	Work load/funding	On-going department integration	Budget funding per year
3.	LU Code siting improvements	CORE, Building Department	Staff/consultants	2017-2018	Time/capacity for Staff	Consultant help	*\$50,000 2017 *\$50,000 2018 *Already allocated
4.	Work with County Building & Maintenance Department to develop a Work Program for inclusion within the Climate Action Plan. Include an action item within Work Program to track and review energy use of all Pitkin County buildings for greenhouse gas emissions measurement purposes.	Building & Maintenance Dept., CORE, Holy Cross Cooperative, Black Hills Energy	Staff	2017-2018	Time/capacity for Staff	Assistance from CORE	
5.							



**PUBLIC WORKS CAP – DRAFT MAY, 2017**

<b>CLIMATE ACTION PLAN 2017-2020</b>							
<b>Rank #</b>	<b>Goal &amp; Sub Tasks (if needed)</b>	<b>Collaboration Needs Internal/External</b>	<b>Resource Needs (Staff, Equipment)</b>	<b>Start Year/Quarter End Year/Quarter</b>	<b>Anticipated Obstacle(s)</b>	<b>Com Dev Anticipated Solution(s)</b>	<b>Anticipated Budget Needed</b>
1.	Utilize opportunities for renewable energy  COMPLETED: Purchase of 98 kW from CEC  In Progress Install 103 kW at PW yard  Install ~125 kW at Landfill	Facilities, Engineering, Com Dev  Contractor – Sol Energy – PW Staff	Staff time, Consulting work for feasibility, planning, and design  Staff time, consulting work, CORE (grant)  Staff time, consulting work, CORE (grant)	Ongoing  1/17 – 3/17  1/17 – 3/18	Pushback from CoA for buildings in town, budget, feasibility (lack of sun) at some facilities		125k  150k
2.							

**PUBLIC HEALTH CAP – DRAFT OCTOBER, 2017**

**Climate Change and Public Health**

Significantly reducing greenhouse gas emissions is important in slowing climate change and minimizing impacts. Public Health focuses on prevention, and this is true in relation to climate change initiatives. Primary prevention includes mitigation strategies, such as Vehicle Anti-Idling Policies, which can reduce greenhouse gas emissions. Secondary/Tertiary prevention involves creating resilience and adaptation. Efforts to prepare for climate change and reduce the associated health burden are important, since some degree of climate change will continue and have a significant economic, social, and environmental impact on communities, even after reducing greenhouse gas emissions. Climate change adaptation is anticipating adverse effects of climate change, identifying vulnerable populations and taking action to prevent or minimize damage or negative impacts or taking advantage of opportunities that may occur.

The ability to cope and adapt differs across populations, economic sectors, and communities. There is a gap between high and low income populations based on their vulnerability to climate change and their readiness to adapt to droughts, extreme weather events, and natural disasters, such as wildfires. The Public Health strategies provided in the Pitkin County Climate Action Plan are community based rather than internal, and include primary, secondary and tertiary prevention strategies, with a particular focus on those most vulnerable to climate change events.

**Public and Environmental Health Work Plan 2017-2020**

Rank #	Goal & Sub Tasks (if needed)	Collaboration Needs Internal/External	Resource Needs (Staff/Equipment)	Start Year/Quarter End Year/Quarter	Anticipated Obstacle(s)	Anticipated Solution(s)	Anticipated Budget
1.	Grey Water Regulation Adoption	State Health, Division of Water Resources, Com Dev, IGAs with other jurisdictions if desired, Board of Health	Staff Time	Underway. Final adoption late 2017	Water Rights for private well owners	Work with Division of Water Resources to have applicant demonstrate water rights at application for permit.	
2.	OTWS Regulation update Subtasks: 1. Stakeholder Meeting(s) 2. Creation of Regulation based on CDPHE Reg #43 and Stakeholder feedback 3. Review by Attorney's Office 4. Adoption of Regulation by Board of Health	State Health, Com Dev, Attorney's Office, Board of Health	Staff Time	June 2017 June 2018			
3.	RMCO Public Health Stakeholder Group	Com Dev/BOCC, State Health, Board of Health	Staff Time	Underway Finish-?	Follow up with RMCO and CDPHE to continue efforts		
4.	Vehicle Anti-Idling Policy for unincorporated Pitkin County	Board of Health, CORE, Attorney's Office	Staff Time	July 2017 June 2018	Education of the Public, Enforcement	Stakeholder meetings and outreach	

PUBLIC HEALTH CAP - DRAFT OCTOBER, 2017

5.	<p>GOAL: Vulnerable populations identification and protection steps to reduce climate-related risks</p> <p>SUBTASKS:</p> <ol style="list-style-type: none"> <li>1. Update State Health GIS Inclusion Project mapping data of vulnerable populations and hazard risk</li> <li>2. Support emergency preparedness for long-term care facilities and other vulnerable pop. service locations</li> <li>3. Subsidize energy efficiency upgrades and weatherization for low-income homeowners and renters</li> <li>4. Provide support during extreme events (e.g. utility bill assistance resources, shut-off prevention in heat waves or extreme cold, transportation for evacuations or to cooling Workcenters, etc.)</li> </ol>	State Health, Geographic Information Systems (GIS), Emergency Management, Human Service, Community Development and CORE	Staff Time	Q1 2018- Q4 2020	<p>Data to identify vulnerable populations is not always accurate or up-to-date</p> <p>Connecting with vulnerable populations to provide protection have barriers such as language, geographic isolation, physical and cognitive disability</p>	<p>Find updated data sources and ensure for reliability</p> <p>Find resources(help with cultural competency, older adult friendly, disability friendly) to help with outreach and connections.</p>	
5.	<p>GOAL: Improved public health preparedness, response, and communication to adverse weather events, poor air quality, etc</p> <p>SUBTASKS:</p> <ol style="list-style-type: none"> <li>1. Update all Public Health Emergency Plans</li> <li>2. Create Press Release templates to activate during events</li> </ol>	State Health, Regional Emergency Preparedness and Response Team, Emergency Support Function-8, Emergency Management	Staff Time	Q4 2017-Q2 2018	<p>Plans need to be tested once updated</p> <p>Communication needs to be accessible to everyone in the population (easy to read and understand, in English and Spanish), in written and oral form</p>	<p>Schedule table top and events to exercise updated plans</p> <p>Find resources(help with cultural competency, older adult friendly, disability friendly) to help with outreach and connections.</p>	Budget will be needed for communication strategies \$5,000

**PUBLIC HEALTH CAP - DRAFT OCTOBER, 2017**

6.	<p>GOAL: Improved disease education, surveillance and response to food-borne and zoonotic diseases</p> <p>SUBTASKS:</p> <ol style="list-style-type: none"> <li>1. Create 2017 surveillance baseline data</li> <li>2. Continue to do mosquito monitoring to inform mosquito control practices</li> <li>3. Bring food safety trainings to Pitco</li> </ol>	State Health, Restaurant and other food retailers, Colorado State University Extension, Attorney	Staff Time	Q2 2017-Q4 2020	<p>Need funding for food safety trainings in both English and Spanish</p> <p>Need continued funding for mosquito monitoring</p>	<p>Find and schedule appropriate trainings</p> <p>Build annual budgets to reflect these costs</p>	<p>Food safety trainings \$5,000</p> <p>Mosquito monitoring \$ 5,500</p>
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Attachment 2

# 2014 PITKIN COUNTY GREENHOUSE GAS EMISSIONS INVENTORY



**A REPORT BY THE COMMUNITY OFFICE FOR RESOURCE EFFICIENCY (CORE)  
PREPARED FOR PITKIN COUNTY, 2017**



# 2014 PITKIN COUNTY GREENHOUSE GAS EMISSIONS INVENTORY

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## ACKNOWLEDGEMENTS

The Community Office for Resource Efficiency (CORE) performed this inventory on behalf of Pitkin County, Colorado. CORE is a nonprofit organization that works cooperatively with businesses, individuals, utilities, and government entities to create measurable improvements in energy and water efficiency in order to benefit the environment and develop a more sustainable economy. The organization has also completed GHG inventories on behalf of regional partners (the Town of Snowmass Village and the Town of Basalt).

The *2014 Pitkin County Greenhouse Gas Emissions Inventory* was made possible by the assistance and support of Ashley Perl (Climate Action Manager, City of Aspen), Chris Menges (Data Research and Project Planner, City of Aspen), Mona Newton (Executive Director, CORE), Lara Whitley (Community Engagement and Marketing Manager, CORE). A special thanks to Emily Artale and Hillary Dobos (Lotus Sustainability) for providing insight and expertise.

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### PITKIN COUNTY CONTACTS:

**Cindy Houben**

Community Development Director  
cindy.houben@pitkincounty.com  
(970) 920-5097

**Ellen Sassano**

Long-Range Planner  
ellen.sassano@pitkincounty.com  
(970) 920-5098

### PRIMARY AUTHOR:

**Sarah Gruen**

Energy Programs Specialist  
Community Office for Resource Efficiency  
sarah@aspencore.org  
(970) 925-9775



# 2014 PITKIN COUNTY GREENHOUSE GAS EMISSIONS INVENTORY

## TABLE OF CONTENTS:

EXECUTIVE SUMMARY .....	3
INTRODUCTION .....	4
Climate Background	
SCOPE .....	5
Boundaries	
METHODOLOGY.....	7
Buildings	
Transportation	
Solid Waste	
Wastewater	
BACKGROUND.....	9
Pitkin County Climate Change Commitments	
Local Climate Change Commitments	
INVENTORY RESULTS .....	12
GHG Emissions by Sector	
GHG Emissions by Source	
BUILDINGS SECTOR .....	14
Emissions by Jurisdiction	
Homes & Businesses	
Public Facilities	
Renewable Energy	
Energy Supply	
TRANSPORTATION SECTOR.....	17
Passenger Vehicles	
Public Transit	
Airport	
SOLID WASTE SECTOR.....	20
Construction & Demolition Waste	
Municipal Solid Waste	
Per Capita Waste	
WASTEWATER SECTOR.....	22
Fugitive Emissions	
NEXT STEPS.....	23
SOURCES.....	24

## APPENDICES

- Appendix A - Inventory Summary Charts
- Appendix B - 2008 Climate Action Plan
- Appendix C - A Resolution of the Board of County Commissioners of Pitkin County, Colorado Endorsing Climate Protection (Resolution #034-2012)

## LIST OF FIGURES

- Figure 1: GHG Emissions by Sector
- Figure 2: Emissions Inventory Overlap
- Figure 3: Climate Action Planning Framework
- Figure 4: Timeline of Climate Milestones
- Figure 5: One MTCO<sub>2</sub> Visualized
- Figure 6: GHG Emissions by Sector
- Figure 7: GHG Emissions by Source
- Figure 8: GHG Emissions by City
- Figure 9: GHG Emissions by Energy Fuel Type
- Figure 10: Where does Holy Cross get its Energy?
- Figure 11: Transportation GHG Emissions
- Figure 12: Average Daily State Highway VMT
- Figure 13: Airport GHG Emissions
- Figure 14: Waste GHG Emissions
- Figure 15: MSW Composition
- Figure 16: Per Capita Waste

# 2014 PITKIN COUNTY GREENHOUSE GAS EMISSIONS INVENTORY

## EXECUTIVE SUMMARY

Pitkin County has long been committed to climate action. For more than a decade, the County has made greenhouse gas (GHG) emission reduction a priority, and has invested in energy efficiency, renewable energy, alternative transportation and waste minimization, among other efforts. These measures undoubtedly translated into a reduction of GHG emissions, however without tracking the amount of emissions in Pitkin County, it was impossible to know to exactly what extent. With this report, the *2014 Pitkin County Greenhouse Gas Emissions Inventory*, Pitkin County now has a snapshot of overall emissions and a baseline against which emissions reduction trends can be assessed.

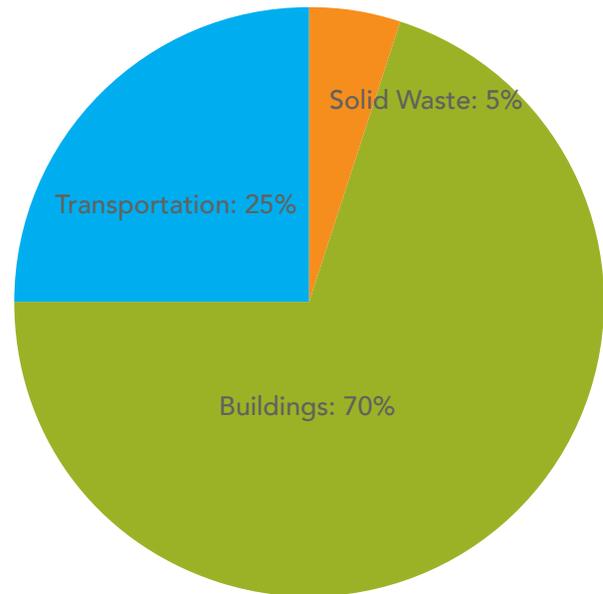
**In 2014, Pitkin County emitted an estimated 551,900 metric tons of greenhouse gas emissions, measured in carbon dioxide equivalent (CO<sub>2</sub>e).**

The results are divided into the following categories:

- **BUILDINGS:** emissions from the energy (electricity, natural gas, and propane) used to heat and power homes and businesses
- **TRANSPORTATION:** emissions from the fuel used to operate personal vehicles, trucks, public transit buses, and aircrafts
- **SOLID WASTE:** emissions from the decomposition of solid waste at the Pitkin County Landfill and fuel used for on-site vehicles
- **WASTEWATER:** emissions that naturally occur during wastewater treatment

Consistent with national and regional trends, the Buildings sector was responsible for the vast majority of emissions (70%). The Transportation sector contributed about 25% of overall emissions, primarily due to the fuel used in passenger vehicles. Other emissions originated from the decay of solid waste at the landfill (5%) and during wastewater treatment (0.1%).

FIGURE 1: GHG EMISSIONS BY SECTOR



*Note: The Wastewater sector is not included in Figure 1 as emissions generated from wastewater-related activities account for less than 1% of overall emissions.*

The inventory results set the stage for a more sustainable and resilient Pitkin County. These results may be used to inform policy development and direct climate action planning strategies. To assess the effectiveness of climate action, emissions should continue to be monitored, with a comprehensive inventory analysis performed regularly.

# 2014 PITKIN COUNTY GREENHOUSE GAS EMISSIONS INVENTORY

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## INTRODUCTION

**“We are the first generation to feel the effect of climate change and the last generation who can do something about it.”**

-- GOVERNOR JAY INSLEE, WASHINGTON STATE

As the urgency of climate change increases, it is crucial that action is taken at all levels. In particular, local government has an essential role to play in making meaningful reductions in greenhouse gas (GHG) emissions.

Pitkin County has long recognized how local action can play a significant role in influencing global emissions trends. Now, to acknowledge the magnitude of the climate challenge, Pitkin County is taking deliberate steps to strategically reduce its contribution of GHGs through the preparation of an emissions inventory.

The first of its kind for Pitkin County, this emissions inventory provides a baseline against which progress towards reducing emissions can be measured. The overall quantity of emissions generated is detailed and the dominant emissions sources are profiled. The four identified emissions sources are: buildings energy, transportation, waste, and wastewater treatment. The inventory excludes emissions from certain other sources (including cement production, refrigerant and fire suppressant leakage) as these are outside of the scope of analysis.

The *2014 Pitkin County Greenhouse Gas Emissions Inventory* captures emissions from activities across the county. This snapshot of emissions illuminates that activities that are the greatest contributors to GHG emissions, and therefore also the greatest opportunities for emissions reductions. Results may be used to assess emissions reduction trends, inform strategic policy development, and direct climate action planning.

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## CLIMATE BACKGROUND

Leading scientists agree that carbon emissions from human activities have increased the concentration of GHGs in the atmosphere and have destabilized the Earth’s climate. The consequences of this destabilization are felt around the world: 2016 was the hottest year in recorded history, following a series of record-breaking years (2015, 2014).<sup>1</sup>

Locally, the effects of a changing climate is no longer theoretical: in Pitkin County there are now 23 fewer days of winter as compared to the 1980s.<sup>2</sup> This dramatic decrease of winter (almost a month less) impacts the timing of the winter season, and spring runoff patterns. These, and other climate change impacts, have the potential to influence the Pitkin County community in complex and profound ways. By modifying Earth’s natural systems, the economic prosperity, public health, and quality of life for residents and visitors alike is threatened. The severity of climate change and the magnitude of these impacts are dependent on the current and the future GHG trends.

It is clear that the burning of fossil fuels is adding too much carbon to the atmosphere. As such, communities around the world are developing ambitious strategies to reduce emissions (referred to as “climate action planning”), as well as strategies to prepare for the impacts climate change will have on natural and human systems (referred to as “resiliency planning”).

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# 2014 PITKIN COUNTY GREENHOUSE GAS EMISSIONS INVENTORY

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## SCOPE

**GHGs can be generated from variety of sources, but the man-made emissions from everyday activities (including the use of fossil fuels for generating electricity, heating homes, and driving around town) are the focus of this analysis.**

Broadly, inventories are categorized as a local government operations approach or a community-wide approach. The local government operation approach is solely focused on emissions from government facilities and operations. A community-wide approach is an examination of the emissions generated by the entire community. The *2014 Pitkin County Greenhouse Gas Emissions Inventory* is a community-wide analysis, examining the collective carbon footprint across Pitkin County (in both unincorporated and incorporated territory).

This inventory quantifies the most prevalent GHGs that contribute to climate change: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O). For all data presented in this inventory, results are reflected in metric tons of carbon dioxide equivalent (MTCO<sub>2</sub>e). This unit represents each GHG's relative potency (atmospheric lifetime and heat-trapping ability) in an equivalent volume of carbon dioxide. To measure relative potency, calculations use the latest values as defined in the Intergovernmental Panel on Climate Change's (IPCC) 5th Assessment Report 100-year potentials.

This report was prepared in 2017 using data that was collected in 2016. At the time of data collection, the calendar year 2014 represented the most readily available, accurate, and complete data set. Additionally, the calendar year 2014 aligns Pitkin County's inventory with those of regional partners.

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## BOUNDARIES

Prior to the preparation of the *2014 Pitkin County Greenhouse Gas Emissions Inventory*, Aspen, Snowmass Village and Basalt had already completed community-wide inventories for 2014. Despite this availability of data, it was determined that compiling and summing these inventory results would be problematic. Instead, the research team instead decided to perform a stand-alone inventory for Pitkin County using county-specific data. The chosen approach and provides an aggregated total for each sector at the county-level, and does not isolate emissions for specific territories within Pitkin County for a more accurate and complete snapshot of emissions.

An additive approach in which the results of the existing inventories were compiled and summed was considered. Due to differences in scope, and due to the potential to double count emissions, an additive approach would have resulted in the double counting of emissions sources.

Pitkin County, Aspen, Snowmass Village and Basalt may all claim responsibility for a portion, or the entirety, of emissions for a particular sector. For instance, all community inventories account for emissions that result from the fuel used by public transit as the Roaring Fork Transit Authority's fleet spans multiple jurisdictions. Each community has incorporated this emissions source as a component of their carbon footprint. This is also the case with the airport. Therefore, a direct summation of inventory results would result in the double counting of emissions and skew the regional perspective.

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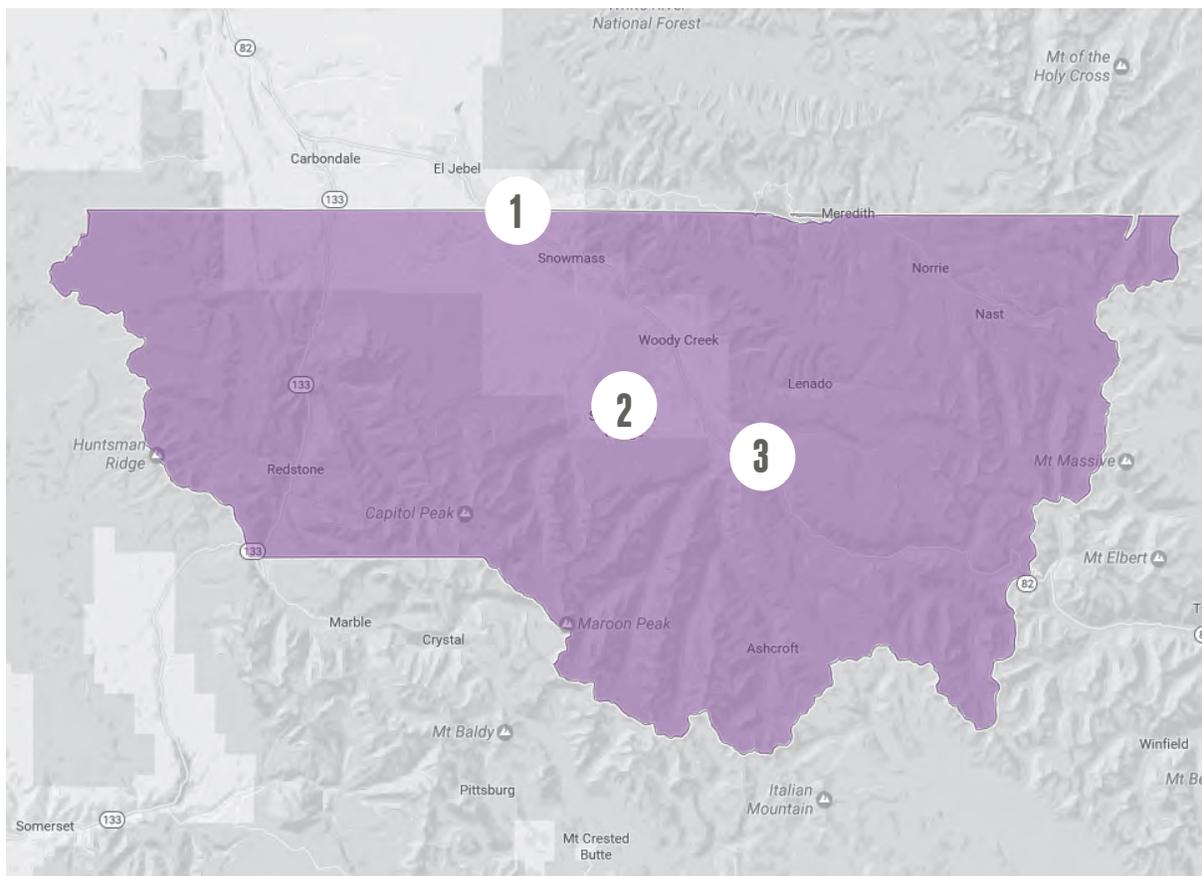
# 2014 PITKIN COUNTY GREENHOUSE GAS EMISSIONS INVENTORY

## SCOPE CONTINUED

Additionally, while each inventory applies the same basic methodology (ICLEI's US Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions), there are important differences that should be noted. These differences are accentuated by the availability of local data, which defines the granularity of results and the defined scope. For instance, the *2014 Aspen Community-wide GHG Inventory* includes portions of unincorporated Pitkin County as it covers the Aspen Urban Growth Boundary.

The figure below illustrates the relationship between the four stand-alone emissions inventories. The *2014 Pitkin County Emissions Inventory* includes the emissions from across Pitkin County, the entirety of the purple shaded region. This includes the emissions generated within both incorporated and unincorporated territory. Aspen, Basalt, and Snowmass Village also monitor emissions within their territory. The result is that Pitkin County, Aspen, Basalt, and Snowmass Village all have an emissions inventory that reflects their unique community profile.

FIGURE 2: EMISSIONS INVENTORY OVERLAP



**1: BASALT | 2: SNOWMASS VILLAGE | 3: ASPEN**

# 2014 PITKIN COUNTY GREENHOUSE GAS EMISSIONS INVENTORY

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## METHODOLOGY

This inventory was conducted using an industry-accepted methodology and data-reporting tool developed by the Local Governments for Sustainability (ICLEI). ICLEI's standardized US Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions informs the methodology, and their ClearPath software supports the quantification and reporting of emissions. This approach is widely accepted as best practice and is used by governments across the world, including regional partners Eagle County and the City of Aspen.

This section is an overview of the methodology and that data that were used to calculate emissions for each sector. Broadly speaking, emissions are determined by the amount of energy (electricity, natural gas, gasoline, diesel) consumed, as well as the GHG emission factor for that fuel. The GHG emission factor (also referred to as the "emission coefficient") identifies the amount of gases released per unit of fuel (kWh, therm, gallon, etc.) consumed.

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## BUILDINGS

The utility providers and fuel suppliers provided energy usage data. Holy Cross Energy and Aspen Electric provided emission factors to account for carbon dioxide emissions based on electricity generation. The methane and nitrous oxide emissions for electricity were based on regional averages. The natural gas and propane emissions factors were based on national averages.

## DATA CONSIDERATIONS

It is likely that the emissions from propane consumption are dramatically underreported. The research team was unable to obtain data from two of the three vendors that served Pitkin County in 2014. Propane data is notoriously challenging to obtain; as an unregulated fuel, propane suppliers are not required to report sales data. It is also worth noting that annual sales data from propane suppliers may not directly equate to annual usage as some residences or businesses may not refill their propane tanks annually.

The GHG emissions that result from electric transmission and distribution (T&D) losses are not included in this inventory. While it is safe to assume the electricity transmission system is not 100% efficient, quantifying these emissions is outside the scope of this analysis.

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## TRANSPORTATION

The Transportation sector is an estimate of the emissions that result from energy used for transportation within Pitkin County. Transportation is composed of three subsectors: emissions from passenger vehicles, public transit, and airport-related activities.

## VEHICLES

The preferred tool for calculating a community's transportation-related emissions is a travel demand model. While expensive, a travel demand model represents a robust approach to quantifying emissions. Lacking a travel demand model, and lacking robust studies on local vehicle travel habits (frequency, purpose, and length of personal and commute trips), an alternative methodology to determine vehicle miles travelled (VMT) was prepared.

Rick Heede, an expert in emissions inventories and the principal at Climate Mitigation Services developed the applied VMT approach. The methodology relied on CDOT traffic statistics for the portions of State Highway 82 and State

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# 2014 PITKIN COUNTY GREENHOUSE GAS EMISSIONS INVENTORY

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## **METHODOLOGY CONTINUED**

Highway 133 within Pitkin County, along with local vehicle fuel efficiency data. This approach likely underestimates GHG emissions due to the notable data limitations. The CDOT data does not account for traffic on local, county, or city streets. Experts suggest that traffic on the local, county, and city streets represents a large portion of vehicle traffic in Pitkin County.

It should be noted that electric vehicles (EVs) are not represented in this analysis. In 2014, EVs represented a very small portion of vehicles on Pitkin County roads: in Aspen, estimates revealed that EVs represent about 0.03% of the overall share of vehicles.<sup>3</sup>

## **PUBLIC TRANSIT**

Roaring Fork Transit Authority (RFTA) and the Snowmass Village Shuttle provided data. Route mileage, vehicle fleet type and fuel type were used to estimate the amount of fuel used and emissions generated. Emissions from RFTA buses, which travel from outside of the county are counted.

## **AIRPORT**

To quantify airport-related emissions, the findings of ASE's internal inventory were applied. The Airport's inventory followed best practices established by the Transportation Research Board to calculate emissions for both private and commercial activities.

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## **WASTE**

The Waste sector quantifies emissions from all waste at the Pitkin County Landfill. Waste emissions were calculated using the mass of waste entering the landfill and the composition of the waste stream. The composition of the waste stream (portion of waste categorized as organic, paper, plastic, glass, metal, etc.) was determined based on the waste characterization study conducted for the *Roaring Fork Comprehensive Waste Diversion Plan*. This sector examines the estimated future methane emissions that result from the anaerobic breakdown of biodegradable materials.

## **DATA CONSIDERATIONS**

Following the standard ICLEI protocol, this analysis considers only the emissions associated with the decay of biodegradable waste. The emissions from the production of goods and services are not included in this inventory, as the County has very limited authority or opportunity to influence these emissions. Nevertheless, studies show that the vast majority of a product's lifecycle emissions are created before the waste is disposed of, during the mining of virgin materials, manufacturing, packaging, distribution and use.

Recycling and composting are acknowledged as diversion programs that lower the total mass of waste disposed of at the landfill. Composting operations were outside the scope of this inventory.

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## **WASTEWATER TREATMENT**

Wastewater emissions were informed by the amount of water treated and the nitrogen content of the treated wastewater. In accordance with ICLEI protocol, the energy used during wastewater treatment at the centralized facilities within Pitkin County is included in the Buildings sector rather than the Wastewater sector.

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# 2014 PITKIN COUNTY GREENHOUSE GAS EMISSIONS INVENTORY

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## BACKGROUND

This emissions inventory is the latest in a series of actions Pitkin County has taken to advance climate protection and sustainability, starting almost a decade ago. Building on the previously established emissions reduction targets and the 2012 *Endorsing Climate Protection Resolution*, Pitkin County has now completed an emissions inventory.

An emissions inventory is a key piece of climate action planning, see the best practice framework in Figure 3. Climate action planning is an ongoing, iterative process designed to provide a roadmap to motivate action and to track progress. The emissions inventory is often the first step, providing the background information to drive emissions reduction efforts. Following this standard framework, Pitkin County should use the inventory results to develop strategies to accelerate emissions reduction, and to implement new programs.

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FIGURE 3: CLIMATE ACTION PLANNING FRAMEWORK



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## PITKIN COUNTY CLIMATE CHANGE COMMITMENTS

It is important to recognize past and ongoing emissions-reduction activities, while acknowledging that the threat of climate change calls for more aggressive efforts. By virtue of these past and on-going programs, the community's emissions are assumed to be less than they otherwise would be. Of note are the 2006, 2008 and 2012 climate commitments.

In 2006, the Pitkin County Board of County Commissioners passed a resolution committing to the *U.S. Mayors Climate Protection Agreement*. Under the agreement, Pitkin County pledged to reduce global warming pollution levels to seven percent below 1990 levels by 2012.

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# 2014 PITKIN COUNTY GREENHOUSE GAS EMISSIONS INVENTORY

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## **BACKGROUND CONTINUED**

To reach this goal, the Pitkin County Board of County Commissioners adopted *Energy Action Plan*, see Appendix B. The *Energy Action Plan* identified four main goals:

1. Establish Pitkin County as a local leader in sustainability practices.
2. Commit to goals and deadlines to improve efficiency, promote resource conservation to reduce local greenhouse gas emissions, improve air quality, and enhance community livability.
3. Adopt programs and policies that promote both environmental and fiscal sustainability.
4. Improve the quality and productivity of Pitkin County work environments.

Then, the 2012 *Endorsing Climate Protection Resolution* builds on the 2008 Plan commitments. The resolution calls for implementation of the actions outlined and recognizes additional areas in which the County can reduce emissions within the community and its own operations, see Appendix C.

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FIGURE 4: TIMELINE OF CLIMATE MILESTONES

- 
- 2000:** Adopted the Renewable Energy Mitigation Program (REMP), setting an energy budget for homes and seeding renewable energy projects
  - 2006:** Committed to an emissions reduction goal through the *U.S. Mayors Climate Protection Agreement*
  - 2008:** Adopted the *Energy Action Plan* and launched associated programs
  - 2011:** Launched the Energy Smart Colorado program to stimulate energy efficiency in homes and buildings
  - 2012:** Emissions reduction goals expired
  - 2012:** Reinvigorated climate efforts through the *Endorsing Climate Protection Resolution*
  - 2015:** Approval of robust energy building codes
  - 2016:** Joined the Colorado Communities for Climate Action coalition
  - 2016/7:** Development of Caucus Master Plans incorporating sustainability
  - 2017:** Performed a baseline GHG emissions inventory for 2014
- 

*Note: This is a partial list of Pitkin County's climate action achievements.*

# 2014 PITKIN COUNTY GREENHOUSE GAS EMISSIONS INVENTORY

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## **BACKGROUND CONTINUED**

### **LOCAL CLIMATE CHANGE COMMITMENTS**

Local jurisdictions are already engaging in significant climate action work and have been essential partners in achieving regional climate successes. Pitkin County's efforts can support, and be supported by, these local commitments for GHG reductions. A summary of key commitments is listed below.

#### **ASPEN:**

- Emissions Inventories: completed for 2004, and updated for 2007, 2011, and 2014
- Emissions Reduction Targets: 30% reduction by 2020; 80% reduction by 2050 (measured against a 2004 baseline)
- Climate Action Plan: the *2017 Climate Action Plan* is an update of the *2007 Climate Action Plan*. The Action Plan covers 2017 through 2050 as a living document.

#### **BASALT:**

- Emissions Inventory: completed for 2014
- Emissions Reduction Targets: 25% by 2025; 80% by 2050 (measured against a 2014 baseline)
- Climate Action Plan: adopted the *Climate Action Plan for the Eagle County Community*, along with the *Basalt Climate Action Plan* in 2017.

It should be noted that only a portion of Basalt is within Pitkin County; the bulk of it is within Eagle County.

#### **SNOWMASS VILLAGE:**

- Emissions Inventories: completed for 2009 and updated for 2014
- Emissions Reduction Target: 20% by 2020 (measured against a 2009 baseline)
- Climate Action Plan: the *2015 Resiliency and Sustainability Plan* is an update of the 2009 *Sustainability Plan*

#### **UNINCORPORATED PITKIN COUNTY:**

Pitkin County recognizes nine distinct caucuses, which are responsible for making recommendations to the county on issues affecting the caucus areas. The majority of the Master Plans acknowledge environmental protection as a core value.

In particular, the *Crystal River Valley Master Plan* calls for climate change mitigation efforts through renewable energy and energy efficiency, citing the objective to "meet or exceed the goal of reducing energy from non-renewable sources by at least 20% throughout the County by 2020."

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# 2014 PITKIN COUNTY GREENHOUSE GAS EMISSIONS INVENTORY

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## INVENTORY RESULTS

In 2014, Pitkin County (including the municipalities within Pitkin County) emitted an estimated 551,900 metric tons of GHGs, measured in carbon dioxide equivalent (CO<sub>2</sub>e).

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To better facilitate understanding inventory results, the emissions results are broken down into the main emission-generating sectors and emission-generating sources (see Figure 6 and Figure 7).

- The emission sector considers where the emissions are generated. Examples include the energy used in buildings and the fuel used in transportation.
- The emission source considers how the emissions are generated. Examples include fuels such as natural gas and electricity.

The following sections contain a discussion of results by sector.

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FIGURE 5: ONE MTCO<sub>2</sub> VISUALIZED



GHG emissions are not tangible; the emissions generated from vehicle tailpipes or household energy use cannot be seen. To contextualize the inventory results, visualization can be a useful tool. In Figure 5, one metric ton of carbon dioxide is shown as a cube almost 27 feet high.<sup>4</sup> For the Pitkin County community, a year of emissions can be visualized as 552,000 hot air balloons taking off.<sup>5</sup>

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# 2014 PITKIN COUNTY GREENHOUSE GAS EMISSIONS INVENTORY

## INVENTORY RESULTS CONTINUED

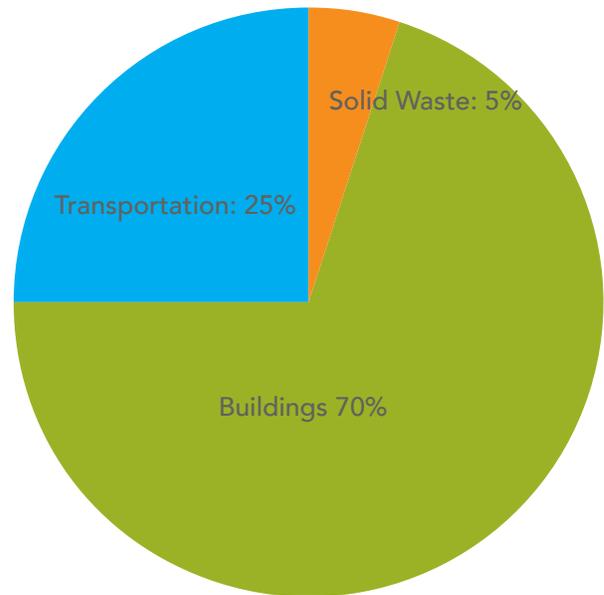
### GHG EMISSIONS BY SECTOR

The dominant emissions-generating sectors are categorized as follows:

- **BUILDINGS:** emissions from the energy used to heat and power buildings (electricity, natural gas, and propane)
- **TRANSPORTATION:** emissions from the fuel used to operate personal vehicles, trucks, public transit buses, and aircrafts
- **SOLID WASTE:** emissions from the decomposition of solid waste at the Pitkin County Landfill and fuel used for on-site vehicles
- **WASTEWATER:** emissions that naturally occur during wastewater treatment

Consistent with regional and national trends, the vast majority of emissions were generated from the energy used in buildings (70% or 386,898 MTCO<sub>2</sub>e). The emissions from the fuel used in transportation contributed 25% of overall emissions. The emissions generated during the decay of solid waste at the landfill contributed 5% of overall emissions, with the emissions generated during wastewater treatment at 0.1% of overall emissions.

FIGURE 6: GHG EMISSIONS BY SECTOR

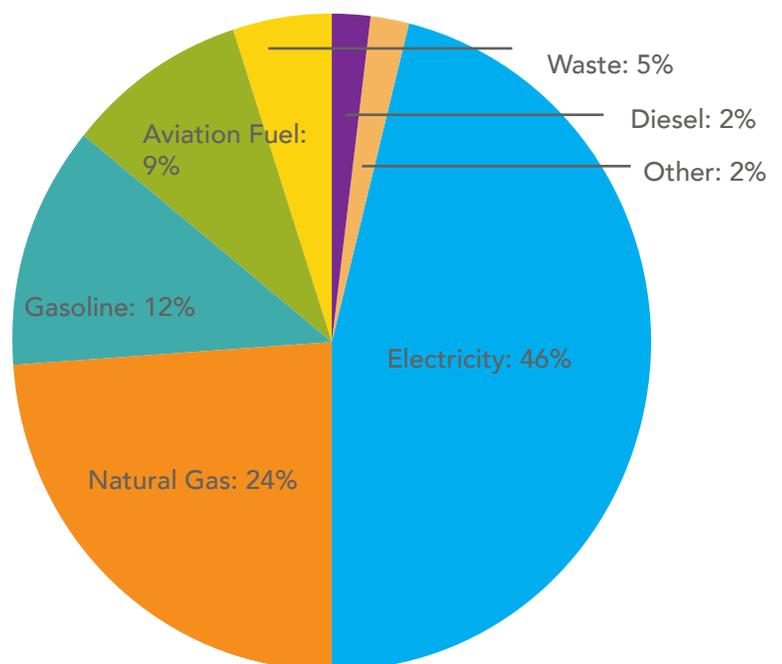


*Note: the Wastewater sector is not included in Figure 6 as emissions generated from wastewater-related activities account for less than 1% of overall emissions.*

### GHG EMISSIONS BY SOURCE

To reveal additional emissions trends, Figure 7 shows the breakdown of emissions by fuel source to reveal additional trends. Electricity is the greatest contributor of fuel-sourced emissions, responsible for almost half of the community's overall emissions (at 46%). The natural gas used in buildings and the gasoline used in vehicles also contributed a significant amount of emissions (at 24% and 12%, respectively). A lesser amount of emissions result from aviation fuel, landfilled waste, and alternative fuels (such as compressed natural gas and biodiesel).

FIGURE 7: GHG EMISSIONS BY SOURCE



# 2014 PITKIN COUNTY GREENHOUSE GAS EMISSIONS INVENTORY

## BUILDINGS SECTOR

Seventy percent of overall emissions were generated from the use of energy (electricity, natural gas, and propane) to heat and power buildings.

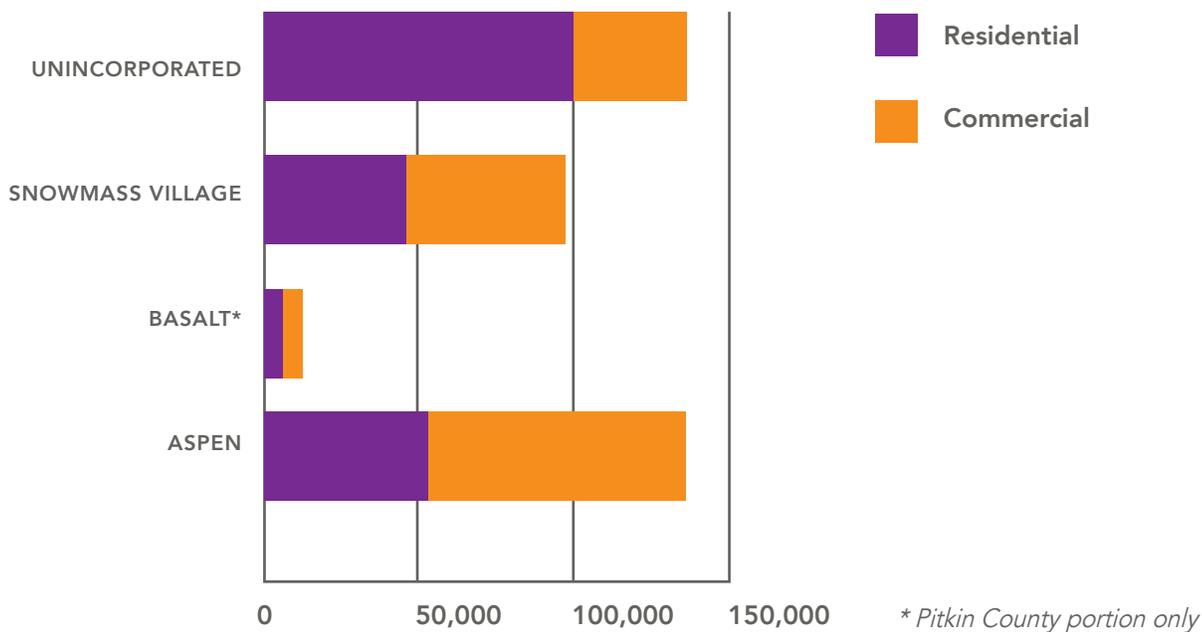
### BUILDINGS AT A GLANCE:

- Seventy percent of all Pitkin County emissions are a result of the electricity, natural gas, and propane used in buildings. This is five times larger than any other sector.
- The greatest contributors to Buildings sector emissions were the homes and businesses in Aspen and in unincorporated Pitkin County.
- The electricity serving Pitkin County was largely generated by the burning of fossil fuels: over 60% of Holy Cross Energy's electricity is generated by coal-fired power plants.

### EMISSIONS FROM ENERGY USE BY JURISDICTION

The greatest share of energy-related emissions in Pitkin County was from buildings in Aspen, closely followed by buildings in unincorporated Pitkin County, at 139,636 MTCO<sub>2</sub>e and 138,987 MTCO<sub>2</sub>e, respectively (or 72% of the total). Snowmass Village was the third greatest source of emissions at 98,048 MTCO<sub>2</sub>e (or 25% of the total). Buildings in the Pitkin County-portion of Basalt generated the remaining amount at 11,233 MTCO<sub>2</sub>e (or 3% of emissions).

FIGURE 8: GHG EMISSIONS BY CITY (MTCO<sub>2</sub>E)



It should be noted that the number of buildings within each jurisdiction largely influences the above results. While one electric utility account does not necessarily equate to one building, comparing the number of electric utility accounts provides context to the results shown above. Aspen has the highest number of accounts (6,586), followed by unincorporated Pitkin County (5,008), Snowmass Village (3,396), and Basalt (699).

# 2014 PITKIN COUNTY GREENHOUSE GAS EMISSIONS INVENTORY

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## ***BUILDINGS SECTOR CONTINUED***

### **HOMES & BUSINESSES**

An examination of overall emissions in Pitkin County revealed that the energy used in buildings was greater in the residential sector than the commercial sector (at 56% and 44%, respectively). This is primarily a result of the large share of emissions from the residential sector of unincorporated Pitkin County.

An analysis of emissions across Aspen, Basalt and Snowmass Village, shows that the opposite is true: energy use in the commercial sector, rather than the residential sector, represented a greater overall portion of emissions. These unique community profiles are shown in Figure 8. In these municipalities, a larger percentage of GHG emissions are concentrated in a relatively small number of commercial buildings (as determined by the number of utility accounts).

For this analysis, the utility provider or fuel supplier's account classifications were maintained. Therefore, the commercial accounts may include some multi-family apartment buildings. Public facilities are also largely included in the commercial category.

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### **PUBLIC FACILITIES**

Emissions from Pitkin County-owned buildings contributed a small percentage of overall Buildings sector emissions (less than 1%). Nevertheless, this segment is very important: as Pitkin County has more direct control over its own operations, it can act as a community leader by implementing energy-reduction measures in its facilities. It is important to note that reducing energy consumption not only means fewer GHG emissions, but also fewer dollars dedicated to utility bills. Therefore, energy-efficiency projects can free up funds that could be used for other services.

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### **RENEWABLE ENERGY**

Renewable energy generation facilities in Pitkin County included rooftop solar photovoltaic systems, solar thermal systems, and hydropower systems. The inventory analysis is focused on the amount of energy supplied from utilities and consumed across Pitkin County, but the amount of energy generated by renewable energy systems is embedded in this data. Overall utility-supplied energy use, and therefore overall emissions, is reduced when buildings rely on renewable energy systems for heat and power. Additionally, the energy produced from renewable generation sources in Pitkin County help to reduce the amount of utility energy consumed and may contribute to the carbon intensity of the grid.

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# 2014 PITKIN COUNTY GREENHOUSE GAS EMISSIONS INVENTORY

## BUILDINGS SECTOR CONTINUED

### ENERGY USAGE & ENERGY GENERATION

The two fundamental drivers of buildings-related emissions are:

- The amount of energy consumed, and
- The carbon intensity of the energy supply (the carbon emissions generated per unit of energy used).

### ENERGY CONSUMPTION

More than half of the energy consumed in Pitkin County was natural gas (57%) however, a greater percentage of emissions were from the consumption of electricity (see Figure 10). Roughly 66% of the Buildings sector emissions were generated by electricity use with 34% generated by the combustion of natural gas use.

Holy Cross Energy and Aspen Electric are the two electricity providers powering Pitkin County homes and businesses. Holy Cross Energy is a member-owned electrical cooperative serving over 55,000 consumers in Western Colorado, including the majority of Pitkin County. Aspen Electric is Aspen's municipal utility, which delivers electricity to 2/3 of Aspen.<sup>6</sup>

### ELECTRICITY GENERATION

The electricity supplied by each provider has dramatically different carbon intensities due to the fuel mix (or "fuel portfolio") used to generate electricity.

In 2014 Aspen Electric was primarily supplied by renewable energy with 74% clean and renewable sources. These include wind, hydroelectric, and solar.<sup>7</sup>

In 2014 the majority of Holy Cross Energy's electricity was generated by fossil fuels, with 62% of the electricity generated by coal-fired power plants. An estimated 20% of energy was supplied by renewable sources.<sup>8</sup>

It should be recognized that both utilities have made great strides to increase the amount of renewable energy supplying their grids, essentially tripling their energy from renewable sources. In 2004, Aspen Electric was approximately 35% renewable, with Holy Cross at approximately 6% renewable.<sup>9</sup>

FIGURE 9: GHG EMISSIONS BY ENERGY FUEL TYPE

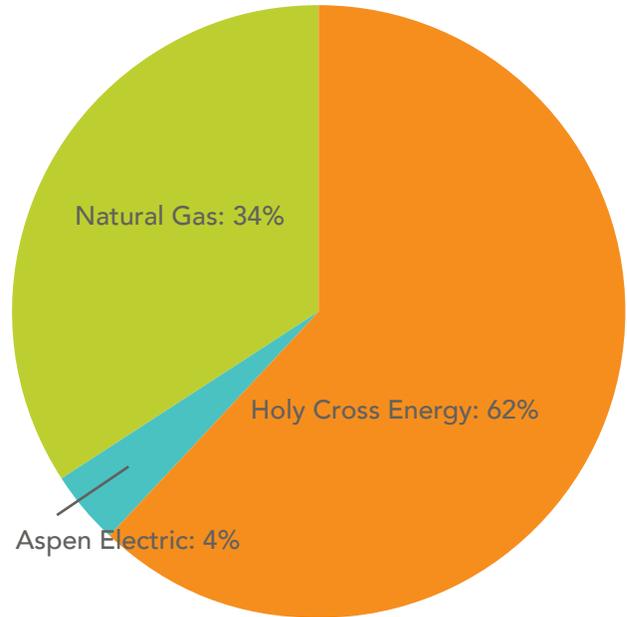
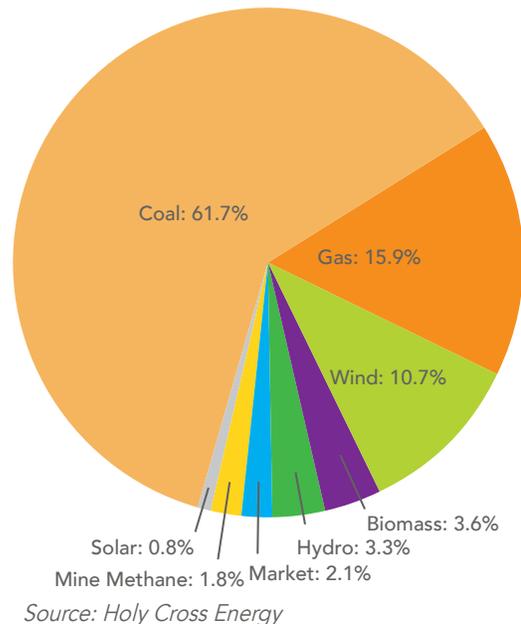


FIGURE 10: WHERE DOES HOLY CROSS GET ITS ENERGY?



# 2014 PITKIN COUNTY GREENHOUSE GAS EMISSIONS INVENTORY

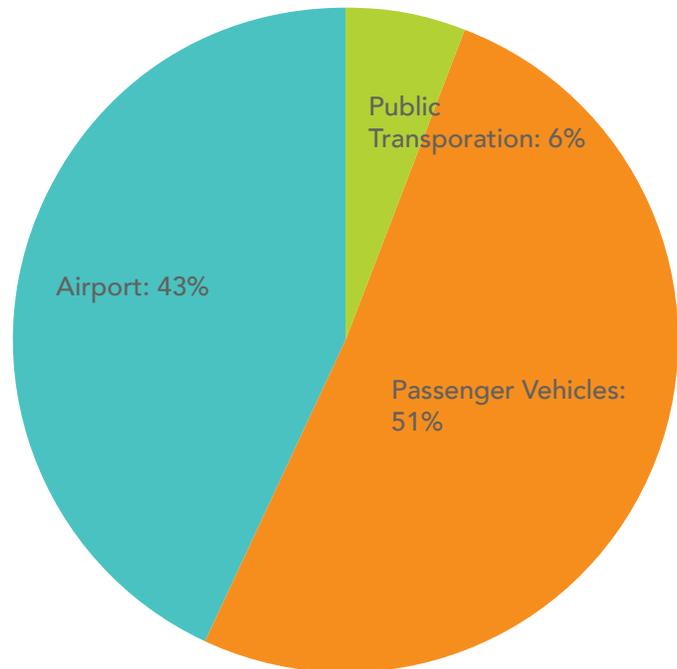
## TRANSPORTATION SECTOR

Twenty five percent of overall emissions were generated by the fuel used to power cars, trucks, motorcycles, transit buses, and aircrafts.

### TRANSPORTATION AT A GLANCE:

- As with many other cities, transportation is one of the primary sources of a community's emissions.
- The fuel used to power cars, trucks and motorcycles is responsible for just over half of the sector's emissions, at 51% and nearly 13% of overall emissions. Nearly all of the fuel used by passenger vehicles is fossil fuel-based (either gasoline and diesel).
- The fuel loaded into aircrafts and the fuel used to power ground support equipment at the Aspen Pitkin County Airport (ASE) is responsible for 43% of the Transportation sector's emissions.
- Public transit has a relatively small impact on overall emissions. As buses have the ability to carry more passengers, they can be a more effective use of fuel per person per mile. Both the Roaring Fork Transit Authority (RFTA) and the Snowmass Village Shuttle strive to use efficient vehicles and fuels.

FIGURE 11: TRANSPORTATION GHG EMISSIONS (MTCO2E)

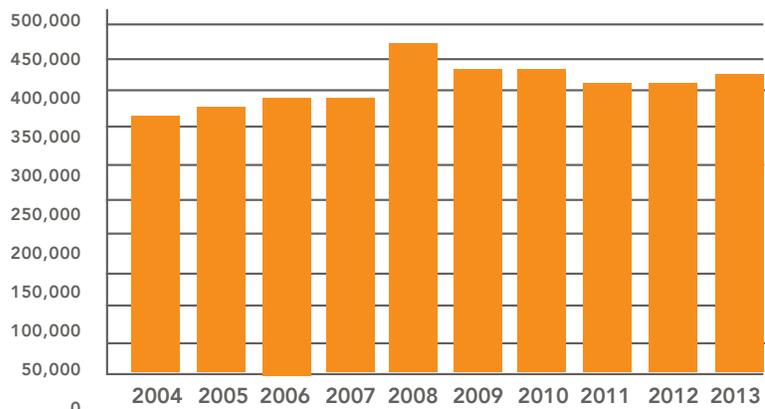


### PASSENGER VEHICLES

Tailpipe emissions from passenger vehicles (cars and trucks) contributed the greatest amount of emissions to the Transportation sector. In particular, gasoline vehicles are the most significant contributor of GHG emissions and represent the most common vehicles on the road.

According to CDOT traffic count data, traffic volumes in Pitkin County have grown slightly as compared to 2004. Vehicle miles of travel (VMT) have increased 15%, primarily due to traffic in the summer months.<sup>10</sup>

FIGURE 12: AVERAGE DAILY STATE HIGHWAY VMT



# 2014 PITKIN COUNTY GREENHOUSE GAS EMISSIONS INVENTORY

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## *TRANSPORTATION SECTOR CONTINUED*

### **PUBLIC TRANSIT**

The Pitkin County community benefits from being a member of Roaring Fork Transit Authority (RFTA), one of the largest rural public transit systems in the state. All RFTA buses rely on some form of alternative fuels: VelociRFTA Bus Rapid Transit buses run on compressed natural gas (CNG); other buses run on B5 (a 5% biodiesel/95% petroleum diesel blend). These cleaner fuels emit fewer GHG pollutants as compared to conventional transportation fuels.

To better understand the climate impact of public transit, it is helpful to compare not only the fuel efficiency of the vehicle (miles per gallon, or “mpg”), but also the passenger miles per gallon (or “pmpg”). Often buses have a greater quantity of tailpipe emissions than cars, but buses have the ability to carry more passengers. This makes the case for how buses can be a more effective use of fuel per person per mile.



# 2014 PITKIN COUNTY GREENHOUSE GAS EMISSIONS INVENTORY

## TRANSPORTATION SECTOR CONTINUED

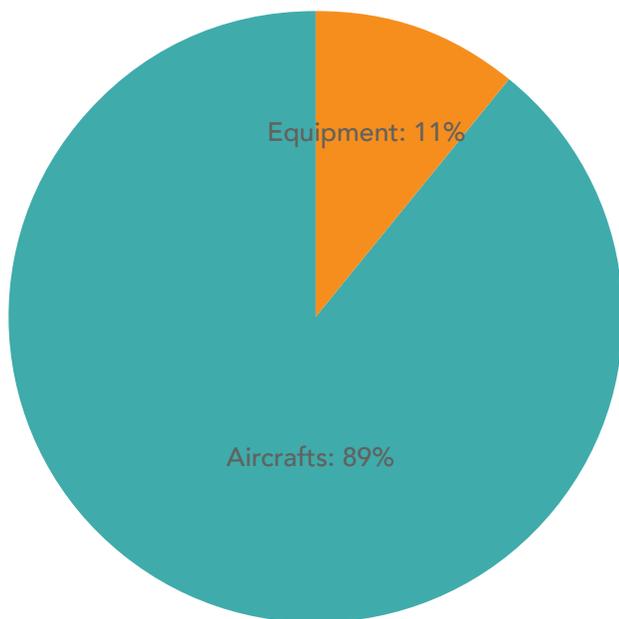
### AIRPORT

ASE has been a leader in tracking and reporting emissions. ASE was one of the first airports in the U.S. to generate an airport-wide emissions inventory, and has continued to prepare inventories to address emission reduction opportunities.

Emission sources at the airport include the terminal, ground support equipment, ground access vehicles, aircrafts, runway lighting, and more. Following the ICLEI emissions accounting standards, this sector quantifies the emissions from equipment (ground support and ground access vehicles) and aircrafts. The energy (natural gas and electricity) is captured in the Energy sector. Additionally, it should be noted that the quantification of emissions does not include fuel loaded elsewhere on incoming aircrafts, only the fuel loaded at ASE.

Consistent with national trends, the fuel loaded into aircrafts (both private and commercial) represents the greatest share of airport-related emissions. Emissions from aircrafts can increase and decrease depending on a variety of factors, including the fuel type, number of passengers being served, distances of flights into and out of ASE, and the number of takeoffs and landings.

FIGURE 13: AIRPORT GHG EMISSIONS (MTCO<sub>2</sub>E)



There are limited opportunities for Pitkin County to influence airport-related emissions. The County owned and controlled sources are limited to airport fleet vehicles, and energy use in facilities. The Federal Aviation Administration and the airlines largely control the flights into and out of the airport, as well as the amount and type of fuel used.

# 2014 PITKIN COUNTY GREENHOUSE GAS EMISSIONS INVENTORY

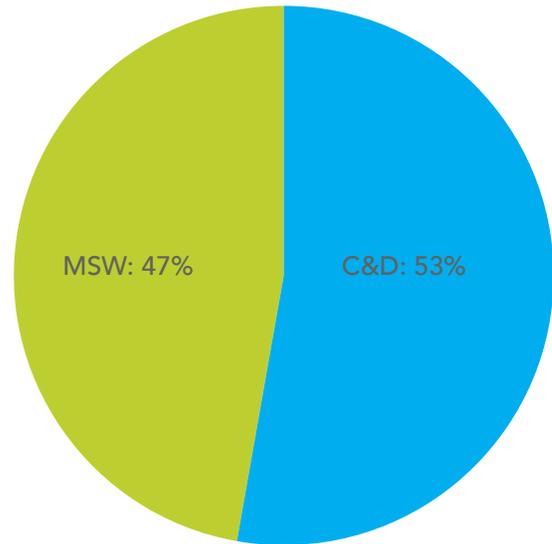
## SOLID WASTE SECTOR

Five percent of overall emissions were generated by the decay of solid waste at the Pitkin County Landfill, and from the equipment used on-site.

### SOLID WASTE AT A GLANCE:

- Emissions from the Solid Waste sector were fairly evenly split between municipal solid waste (the trash generated by homes and businesses) and construction and demolition waste (the building material debris from new construction, renovations, and demolition projects).
- More than 50% of the waste that entered the landfill could have been diverted through recycling and composting programs.
- Per capita waste generation in Pitkin County is 11.8 pounds of waste per day, which is greater than the US average of 4.5 pounds of waste per day.

FIGURE 14: WASTE GHG EMISSIONS (MTCO<sub>2</sub>E)



*Note: the fuel used to operate on-site landfill equipment is not visualized in Figure 11, as total emissions are less than 1% of Solid Waste sector emissions.*

### CONSTRUCTION & DEMOLITION WASTE (C&D)

The decay of biodegradable C&D waste (such as wood) represents 53% of Solid Waste sector emissions. It should be noted that the mass of C&D and characterization of C&D materials could fluctuate year-to-year, as the waste is largely dependent on the local economy and demolition projects. That being said, the mass of C&D waste delivered to the landfill in 2014 was not an outlier; it represented a fairly typical year.

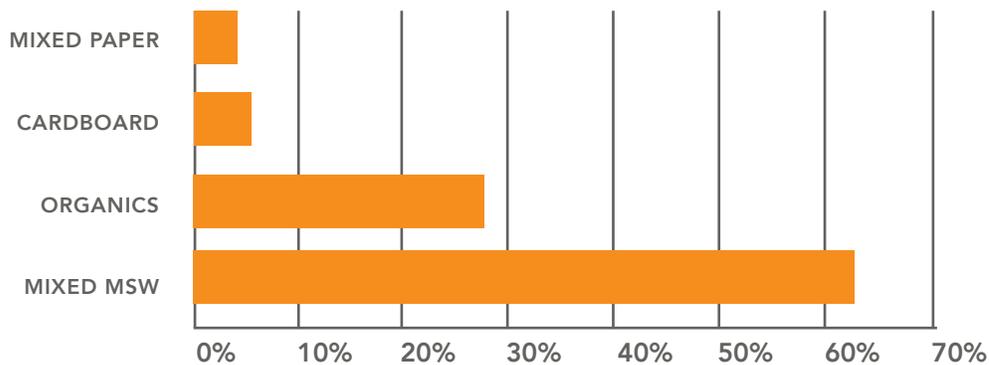
# 2014 PITKIN COUNTY GREENHOUSE GAS EMISSIONS INVENTORY

## SOLID WASTE SECTOR CONTINUED

### MUNICIPAL SOLID WASTE (MSW)

The mass of biodegradable materials and recyclable items in household and commercial trash contributes nearly half of the Solid Waste sector emissions. A 2015 waste audit revealed that Pitkin County's waste stream is just over 25% organic material: with 16.6% as food scraps and 10.5% as yard trimmings.<sup>11</sup> Organic waste buried in a landfill generates methane, a GHG that is more potent than carbon dioxide. However, the same food scraps and yard trimmings generate carbon dioxide when decomposing in a compost pile.

FIGURE 15: MSW COMPOSITION

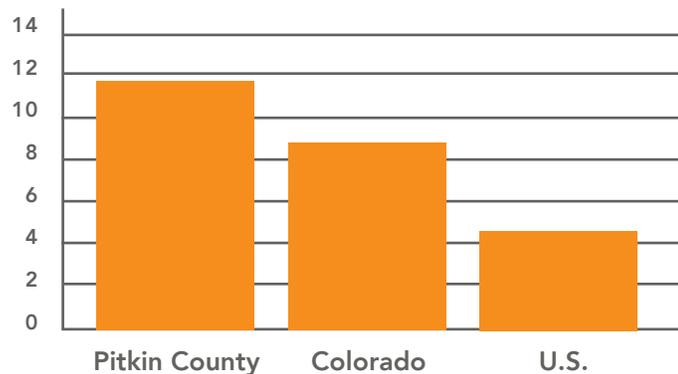


Source: Roaring Fork Valley Comprehensive Waste Diversion Plan

### PER CAPITA WASTE

Per person, the volume of trash generated in Pitkin County is significantly greater than statewide and national averages. The average Pitkin County resident is responsible for 11.8 pounds of trash per day.<sup>12</sup> Lacking precise data on waste generation by tourist and transient populations, all waste generated across Pitkin County is allocated to the full time residents.

FIGURE 16: PER CAPITA WASTE



# 2014 PITKIN COUNTY GREENHOUSE GAS EMISSIONS INVENTORY

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## WASTEWATER SECTOR

Less than half of 1% of overall emissions are generated by wastewater treatment.

### WASTEWATER AT A GLANCE

A limited amount of GHG emissions were released as unintended or indirect consequences of wastewater treatment.

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### FUGITIVE EMISSIONS

The wastewater treatment process filters bacteria and pathogens from wastewater before it is returned to the environment. As a by-product of this treatment (both in centralized wastewater treatment plants and septic systems), GHGs are released into the atmosphere.

At wastewater treatment plants, two key stages spur naturally occurring chemical processes. First, emissions are generated when pollutants (such as nitrates) are removed from the wastewater. Then, emissions are generated when the treated wastewater (referred to as "effluent") is discharged into the river. Similarly, in septic systems, the anaerobic digestion of the organic materials in waste releases methane, which escapes into the atmosphere.

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# 2014 PITKIN COUNTY GREENHOUSE GAS EMISSIONS INVENTORY

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## NEXT STEPS

The inventory is a snapshot of the emissions in Pitkin County in 2014. The County may choose to use this information to help inform and direct the good work that is already occurring, and build on it with more ambitious commitments.

### USING THIS BACKGROUND INFORMATION, THE COUNTY MAY CHOOSE TO:

- **ENGAGE THE COMMUNITY:** share inventory findings to increase public awareness of and participation in sustainability efforts
- **UPDATE THE EMISSIONS REDUCTION TARGET:** an emissions reduction target identifies a goal, helps to track progress, and motivates action. The best practice approach is to adopt an interim and long-term goal. An emissions reduction target can be made for the community, as well as for internal operations.
- **COMPLETE A COUNTY OPERATIONS GHG EMISSIONS INVENTORY:** an inventory of county operations identifies the emissions generated by county activities, including fleet activity, waste management, and facility energy use. Currently these emission sources are bundled into the community-wide results.
- **PERFORM FORECASTING AND MODELING:** forecasting can help to better understand the community's future emission reduction potential. The effects of federal, state, and local measures as well as projected demographic, economic, and operational changes are modeled. The results of forecasting and modeling help to contextualize the scale of the response that is required.
- **UPDATE THE 2008 ENERGY ACTION PLAN:** the *2008 Energy Action Plan* and the *2012 Energy Resolution* could be updated to reflect current priorities and to propose new emissions reduction strategies.
- **IDENTIFY, DEVELOP, AND IMPLEMENT EMISSION REDUCTION PROGRAMS:** enact programs and policies to meet GHG reduction goal(s).
- **CONTINUE TO TRACK EMISSIONS:** best practice is to monitor emissions regularly, and update the emissions inventory every three to five years.
- **CONTINUE TO ENGAGE IN BROADER ADVOCACY EFFORTS:** encourage policies at the regional, state, and national level that create green jobs and reduce emissions.

# 2014 PITKIN COUNTY GREENHOUSE GAS EMISSIONS INVENTORY

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## SOURCES

- 1 Gillis, Justin. "Earth Sets a Temperature Record for the Third Straight Year." The New York Times. <https://www.nytimes.com/2017/01/18/science/earth-highest-temperature-record.html>
- 2 Aspen Global Change Institute. "Climate Change in Aspen." 2014.
- 3 Charlier & Associates, Inc. "Aspen VMT Model: Executive Summary." 2015.
- 4 Carbon Visuals. "Actual volume of one metric ton of carbon dioxide gas." <https://www.flickr.com/photos/carbon-quilt/8228691679>
- 5 Eagle County. "Climate Action Plan for the Eagle County Community." 2016.
- 6 Chris Menges. "2014 Aspen Community-wide Greenhouse Gas Inventory." 2015.
- 7 Chris Menges. "2014 Aspen Community-wide Greenhouse Gas Inventory." 2015.
- 8 Holy Cross Energy. "2014 CO2 Emissions Report." 2015.
- 9 Chris Menges. "2014 Aspen Community-wide Greenhouse Gas Inventory." 2015.
- 10 Roaring Fork Transit Authority. "2014 Regional Travel Patterns Study." 2014.
- 11 Weaver Consultants Group. "Roaring Fork Valley Comprehensive Waste Diversion Plan." 2016.
- 12 Weaver Consultants Group. "Roaring Fork Valley Comprehensive Waste Diversion Plan." 2016.

# 2014 PITKIN COUNTY GREENHOUSE GAS EMISSIONS INVENTORY

## APPENDIX A -- INVENTORY SUMMARY CHARTS

### SECTOR SUMMARY

	Physical Units		CO2e Equivalent		Percent of Total
	kWh, therms, gallons		metric tons CO2e		percent
<b>Building Energy: Residential</b>					
Electricity	224,211,670	kWh	150,072	mt CO2e	27.2%
Natural Gas	12,463,337	therms	66,266	mt CO2e	12.0%
Propane	78,812	gallons	445	mt CO2e	0.1%
<b>Total Residential</b>			<b>216,805</b>	<b>mt CO2e</b>	<b>39.3%</b>
<b>Building Energy: Commercial</b>					
Electricity	173,696,479	kWh	103,568	mt CO2e	18.8%
Natural Gas	12,439,447	therms	66,161	mt CO2e	12.0%
Propane	62,422	gallons	364	mt CO2e	0.1%
<b>Total Commercial</b>			<b>170,093</b>	<b>mt CO2e</b>	<b>30.8%</b>
<b>Total Building Energy</b>			<b>386,898</b>	<b>mt CO2e</b>	<b>70%</b>
<b>Transportation: Passenger Vehicles</b>					
Gasoline	135,352,225	VMT	59,684.20	mt CO2e	10.8%
Diesel	11,032,850	VMT	10,040.37	mt CO2e	1.8%
<b>Total Passenger Vehicles</b>	<b>146,385,075</b>	<b>VMT</b>	<b>69,725</b>	<b>mt CO2e</b>	<b>12.6%</b>
<b>Airport</b>					
Aircraft fuel	n/a	n/a	51,974	mt CO2e	9.4%
Ground support equipment & facility energy use	n/a	n/a	6,551	mt CO2e	1.2%
<b>Total Airport</b>			<b>58,525</b>	<b>mt CO2e</b>	<b>10.6%</b>
<b>Transportation: Public Transit</b>					
Roaring Fork Transit Authority (CNG & Biodiesel)	4,844,114	VMT	6,991	mt CO2e	1.3%
Snowmass Village Shuttle (Gasoline & Diesel)	390,588	VMT	726	mt CO2e	0.1%
<b>Total Public Transit</b>	<b>5,234,702</b>	<b>VMT</b>	<b>7,717</b>	<b>mt CO2e</b>	<b>1.4%</b>
<b>Total Transportation</b>			<b>135,966</b>	<b>mt CO2e</b>	<b>25%</b>
<b>Solid Waste</b>					
Mixed solid waste (MSW)	18,774	tons	13,265	mt CO2e	2.4%
Construction & demolition debris (C&D)	33,254	tons	15,126	mt CO2e	2.7%
On-site equipment	n/a	n/a	48	mt CO2e	0.0%
<b>Total Waste</b>			<b>28,459</b>	<b>mt CO2e</b>	<b>5%</b>
<b>Wastewater Treatment</b>					
Denitrification	n/a	n/a	39	mt CO2e	0.0%
Effluent discharge	n/a	n/a	52	mt CO2e	0.0%
Septic systems	n/a	n/a	486	mt CO2e	0.1%
<b>Total Wastewater Treatment</b>			<b>577</b>	<b>mt CO2e</b>	<b>0%</b>
<b>Total</b>			<b>551,900</b>	<b>mt CO2e</b>	<b>100%</b>

# 2014 PITKIN COUNTY GREENHOUSE GAS EMISSIONS INVENTORY

## APPENDIX B -- INVENTORY SUMMARY CHARTS

### SOURCE SUMMARY

	Physical Units		CO2e Equivalent		Percent of Total
		kWh, therms, gallons		metric tons CO2e	percent
<b>Electricity</b>					
Residential Electricity	224,211,670	kWh	150,072	mt CO2e	59.2%
Commercial Electricity	173,696,479	kWh	103,568	mt CO2e	40.8%
<b>Total Electricity</b>	<b>397,908,149</b>	<b>kWh</b>	<b>253,640</b>	<b>mt CO2e</b>	<b>46.0%</b>
<b>Natural Gas</b>					
Residential Natural Gas	12,463,337	therms	66,288	mt CO2e	50.0%
Commercial Natural Gas	12,439,447	therms	66,161	mt CO2e	50.0%
<b>Total Natural Gas</b>	<b>24,902,784</b>	<b>therms</b>	<b>132,449</b>	<b>mt CO2e</b>	<b>24.0%</b>
<b>Gasoline</b>					
Transportation Sector		gallons	59,882	mt CO2e	90.1%
Waste Sector	1,011	gallons	9	mt CO2e	0.0%
Airport Sector		gallons	6,551	mt CO2e	9.9%
<b>Total Gasoline</b>	<b>1,011</b>	<b>gallons</b>	<b>66,442</b>	<b>mt CO2e</b>	<b>12.0%</b>
<b>Aviation Fuel</b>					
Airport Sector		gallons	51,974	mt CO2e	100.0%
<b>Total Aviation Fuel</b>	<b>0</b>	<b>gallons</b>	<b>51,974</b>	<b>mt CO2e</b>	<b>9.4%</b>
<b>Waste</b>					
MSW	18,774	tons	13,265	mt CO2e	46.8%
C&D	33,254	tons	15,126	mt CO2e	53.2%
<b>Total Waste</b>	<b>52,028</b>	<b>gallons</b>	<b>28,411</b>	<b>mt CO2e</b>	<b>5.1%</b>
<b>Diesel</b>					
Transportation Sector		gallons	10,568	mt CO2e	99.6%
Waste Sector	3,817	gallons	39	mt CO2e	0.4%
<b>Total Diesel</b>	<b>3,817</b>	<b>gallons</b>	<b>10,607</b>	<b>mt CO2e</b>	<b>1.9%</b>
<b>Domestic Fuels</b>					
Propane	141,234	gallons	809	mt CO2e	0.1%
Biodiesel	699,819	gallons	6,793	mt CO2e	81.1%
Wastewater Treatment	n/a	n/a	577	mt CO2e	0.1%
CNG	308,900	gallons	198	mt CO2e	2.4%
<b>Total Alternative Fuels</b>	<b>1,149,953</b>	<b>gallons</b>	<b>8,377</b>	<b>mt CO2e</b>	<b>1.5%</b>
<b>Total</b>			<b>551,900</b>	<b>mt CO2e</b>	<b>100%</b>

**RESOLUTION OF THE BOARD OF COUNTY COMMISSIONERS (“BOCC”) OF  
PITKIN COUNTY, COLORADO, ADOPTING THE 2017 PITKIN COUNTY  
CLIMATE ACTION PLAN**

**RESOLUTION NO. 074 -2017**

**RECITALS:**

1. Pursuant to Section 2.8.4 (Actions) of the Pitkin County Home Rule Charter (“HRC”), all matters not required to be acted upon by ordinance or formal resolution may be acted upon by informal resolution.
2. Pitkin County has long been committed to sustainability and to preserve natural resources for current and future generations; and
3. There is an overwhelming consensus of the international scientific community that human activities are warming earth’s climate system and that climate change is a global threat will have significant local impacts that can threaten the County’s tourism economy and public safety; and
4. By acting now to reduce greenhouse gas (GHG) emissions, the County can reduce the severity of these impacts; and
5. Pitkin County has committed to taking steps to reduce its own contributions to climate change by adopting the following climate-related resolutions within the last ten years:
  - Resolution of the Board of County Commissioners of Pitkin County, Colorado, Approving the Pitkin County Energy Action Plan (Resolution No. 046-2008)
  - Resolution of the Board of County Commissioners of Pitkin County, Colorado Endorsing Climate Protection (Resolution #034-2012;) and
6. Based on the 2014 greenhouse gas emissions inventory, Pitkin County is emitting 551,900 metric tons of carbon dioxide equivalent (MTCO<sub>2e</sub>) across the incorporated and unincorporated areas; and
7. Recognizing the importance of Pitkin County’s leadership on this issue, County departments worked collaboratively together to create the Climate Action Plan (CAP) to guide greenhouse gas emission reduction in government operations and services; and
8. The Climate Action Plan incorporated three-year work plans for the following departments and entities: Aspen/Pitkin County Airport, Building Department,

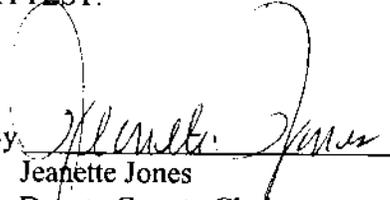
Planning/Zoning/Engineering Departments, Environmental Health Department, Public Works Department, Public Health Department; and

9. The Climate Action Plan is consistent with the Pitkin County Strategic Plan and supports the core focus of a flourishing natural and built environment; and
10. The Board of County Commissioners encourages all County departments to fulfill the CAP; and
11. Pitkin County shall implement the Climate Action Plan based on the availability of resources and monitor progress; and
12. Implementing these actions will directly benefit the County and its citizens; and
13. The BOCC finds that it is in the best interests of the citizens of Pitkin County to approve this Resolution.

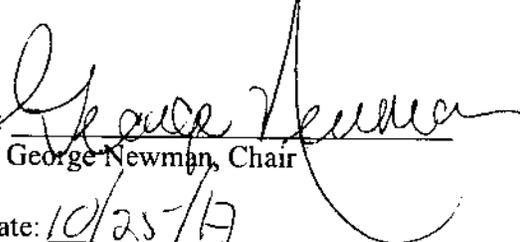
NOW, THEREFORE, BE IT RESOLVED by the Board of County Commissioners of Pitkin County, Colorado that it approves Adoption of The 2017 Pitkin County Climate Action Plan and authorizes the Chair to sign on behalf of the county.

INTRODUCED, READ AND ADOPTED ON THE 25<sup>th</sup> DAY OF OCTOBER, 2017.

ATTEST:

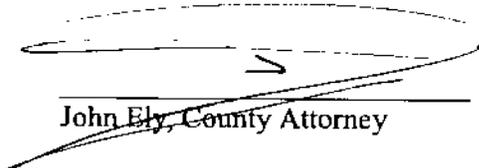
By:   
Jeanette Jones  
Deputy County Clerk

BOARD OF COUNTY COMMISSIONERS

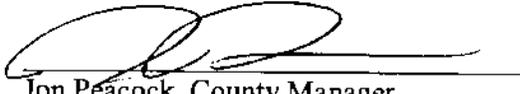
By:   
George Newman, Chair

Date: 10/25/17

APPROVED AS TO FORM:

  
John Ely, County Attorney

MANAGER APPROVAL

  
Jon Peacock, County Manager