



City of McCall
RESOLUTION 23-26

A RESOLUTION OF THE CITY OF MCCALL, IDAHO, ADOPTING THE MCCALL INVENTORY OF COMMUNITY GREENHOUSE GAS EMISSIONS (2023), PROVIDING FOR RELATED MATTERS, AND PROVIDING AN EFFECTIVE DATE.

WHEREAS, in 2019, the City received a Grant from Blue Cross of Idaho Foundation for Health in response to the Mayor having participated in their leadership program to partner with MOSS students to create an internship studying Climate Action in McCall.

WHEREAS, in 2019, intern Anna Lindquist conducted surveys, collected data, performed interviews and produced *McCall's Framework for Climate Action Planning* and *Draft 2018 Greenhouse Gas Emission Inventories*; and

WHEREAS, the results of the *Draft 2018 Greenhouse Gas Emissions Inventories* and *McCall's Framework for Climate Action Planning* reports assist the City and the community in developing a baseline to measure follow-up Greenhouse Gas Emissions and set a framework for developing a Climate Action Plan; and

WHEREAS, in 2023, staff conducted follow-up Greenhouse Gas Emissions Inventories at the Community-wide and Local Government Operations levels covering the 2021 Calendar Year, to assess changes and complete missing components of the *Draft 2018 Greenhouse Gas Emissions Inventories*; and

WHEREAS, throughout 2023, staff partnered with International Council for Local Environmental Initiatives (ICLEI) – Local Governments for Sustainability, a non-profit assisting local governments to quantify environmental impacts, to develop the custom Greenhouse Gas Inventories Report and learn best-practices for analysis; and

WHEREAS, the Adoption of the *McCall Inventory of Community Greenhouse Gas Emissions (2023)* will provide data to inform a future Climate Action Plan.

NOW, THEREFORE, BE IT RESOLVED, by the Mayor and City Council of the City of McCall, Valley County, Idaho that:

Section 1: the *McCall Inventory of Community Greenhouse Gas Emissions (2023)* is adopted, and a copy of the Plan is attached hereto as Exhibit 1, and by this reference incorporated herein.

Section 2: This resolution shall be in full force and effect upon its passage and approval.

PASSED AND APPROVED BY THE MAYOR AND THE CITY COUNCIL of the City of McCall, Valley County, Idaho, this 28 day of December 2023.



CITY OF MCCALL, a municipal corporation of the State of Idaho

Robert S. Giles
Robert S. Giles, Mayor

ATTEST:
BessieJo Wagner
BessieJo Wagner, City Clerk



CITY OF MCCALL, IDAHO

2021 Inventory of Community Greenhouse Gas Emissions



Prepared For:

City of McCall,
Idaho

Produced By:

ICLEI – Local Governments
for Sustainability USA
December 2023

Table of Contents

03	Tables and Figures
04	Executive Summary
05	Key Findings: Community-Wide Inventory
06	Key Findings: Government Operations Inventory
07	Introduction to Climate Change
10	Greenhouse Gas Inventory as a Step Toward Carbon Neutrality
11	ICLEI Climate Mitigation Milestones
12	Inventory Methodology
12	Understanding a Greenhouse Gas Emissions Inventory
13	Community Emissions Protocol
13	Local Government Operations Protocol
14	Quantifying Greenhouse Gas Emission
14	<i>Sources and Activities</i>
14	<i>Base Year</i>
15	<i>Quantification Methods</i>
16	Community Emissions Inventory Results
19	Comparison Discussion 2018 and 2021
20	Tree Canopy Analysis
21	Next Steps
22	Greenhouse Gas Emissions Forecasts
22	Business-As-Usual (BAU) Forecast
23	Government Operations Emissions Inventory Results
26	Comparison Discussion 2018 and 2021
27	Next Steps
28	Conclusion
29	Appendix A: Methodology Details
29	Energy
30	Transportation
31	Wastewater
31	Potable Water (if reported separately, omit if not)
31	Solid Waste
32	Agriculture, Forestry and Land Use (AFOLU)
32	Inventory Calculations

Tables and Figures

List of Tables

14	Table 1: Source vs. Activity for Greenhouse Gas Emissions
16	Table 2: Community-Wide Emissions Inventory
18	Table 3: 2018 and 2021 Primary Community-Wide Emissions Comparison
23	Table 4: Local Government Operations Emissions Inventory 2021
25	Table 5: 2018 and 2021 Primary Government Emissions Comparison
29	Table 6: Energy Data Sources
29	Table 7: Emissions Factors for Electricity Consumption
30	Table 8: Transportation Data Sources
30	Table 9: MPG and Emissions Factors by Vehicle Type
31	Table 10: Wastewater Data Sources
31	Table 11: Potable Water Data Sources
31	Table 12: Solid Waste Data Sources
32	Table 13: Forests and Urban Trees Sequestration and Emissions Data Sources

List of Figures

05	Figure 1: Community-Wide Emissions by Sector
06	Figure 2: Government Operations Emissions by Sector
10	Figure 3: Accelerated Climate Action through McCall Comprehensive Plan Goals, Co-Benefits, and ICLEI Pathways
11	Figure 4: ICLEI Climate Mitigation Milestones
12	Figure 5: Relationship of Community and Government Operations Inventories
12	Figure 6: Global Warming Potential Values (IPCC, 2014)
17	Figure 7: Community-Wide Emissions by Sector
18	Figure 8: Comparison of Community-Wide Emissions by Sector and Year (2018 & 2021)
22	Figure 9: BAU Forecast for Community-Wide Emissions from 2021-2050
24	Figure 10: Local Government Operations Emissions by Sector 2021
25	Figure 11: Comparison of LGO Emissions by Sector and Year (2018 & 2021)



This work is licensed under a [Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License](https://creativecommons.org/licenses/by-nc-nd/4.0/). It may not be used for any commercial purpose. Any non-commercial use of this material must provide attribution to ICLEI Local Governments for Sustainability USA.

Executive Summary

The City of McCall recognizes that greenhouse gas (GHG) emissions from human activity are catalyzing profound climate change, the consequences of which pose substantial risks to the future health, wellbeing, and prosperity of our community. As a community with a deep relationship and reliance on the natural environment and recreation amenities, McCall plays a key role in addressing this challenge with the urgency and creativity required for current and future generations.

Since 2018 when McCall first measured emissions from the community, McCall City Council has adopted McCall's Framework for Climate Action Planning (2020) and 2018 Base year Inventory, converted all community streetlights to LED bulbs, decarbonized the municipal golf-course greens mowers, upgraded municipal building envelopes and HVAC systems to increase public energy-efficiency, trained staff on GHG accounting and analysis, completed this second, follow-up GHG Inventory, and has committed to pursuing the first McCall Community-wide Climate Action Plan, kicking off in 2024. This report provides estimates of GHG emissions resulting from activities in the McCall Community as a whole in 2021, and reflects on changes in community GHG emissions since the first inventory conducted in 2018.

While these actions are small in comparison to the changes, adaptations, and new ways of being that will be crucial to reducing emissions and McCall's impact on the changing climate, they were steps necessary to learn what must be done to act locally towards resilience at the global level.



Key Findings: Community-Wide Inventory

Figure 1 shows community-wide emissions by sector. The largest contributor is Transportation with 52% of emissions. The next largest contributors are Residential Energy (26%) and Commercial Energy (17%). Actions to reduce emissions in all of these sectors will be a key part of a climate action plan. Solid Waste, Water & Wastewater, and AFOLU were responsible for the remaining with 7% of emissions.

The Inventory Results section of this report provides a detailed profile of emissions sources within the City of McCall; information that is key to guiding local reduction efforts. These data will also provide a baseline against which the city will be able to compare future performance and demonstrate progress in reducing emissions.

COMMUNITY EMISSIONS AT A GLANCE

- 1** Transportation
52%
- 2** Residential Energy
26%
- 3** Commercial Energy
17%

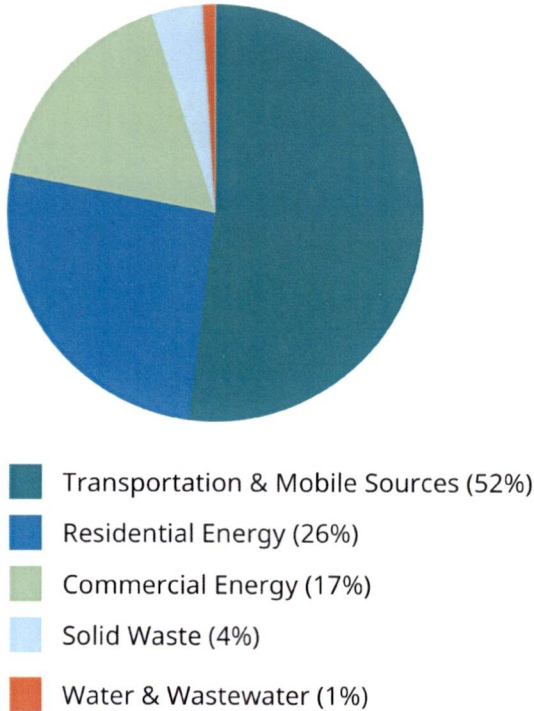


Figure 1: Community-Wide Emissions by Sector

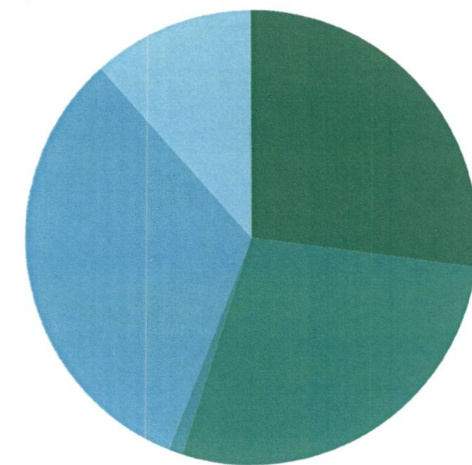
Key Findings: Government Operations Inventory

Figure 2 shows government operations emissions by sector. The largest contributor is the Municipal Fleet and Equipment Fuel (Snowplowing) with 32.4% of emissions. The next largest contributors are Water & Wastewater (27.9%) and Buildings & Facilities (27.1%). Actions to reduce emissions in all of these sectors will be a key part of a climate action plan.

Emissions from municipal government operations contribute to 1.6% of McCall's community-wide emissions.

GOVERNMENT OPERATIONS EMISSIONS AT A GLANCE

- 1** Vehicle Fleet & Equipment
32.4%
- 2** Water & Wastewater
27.9%
- 3** Buildings & Facilities
27.1%



- Vehicle Fleet & Equipment (32.4 %)
- Water & Wastewater (27.9%)
- Buildings & Facilities (27.1%)
- Employee Commute (11.5%)
- Streetlights & Traffic Signals (1%)
- Solid Waste <1%

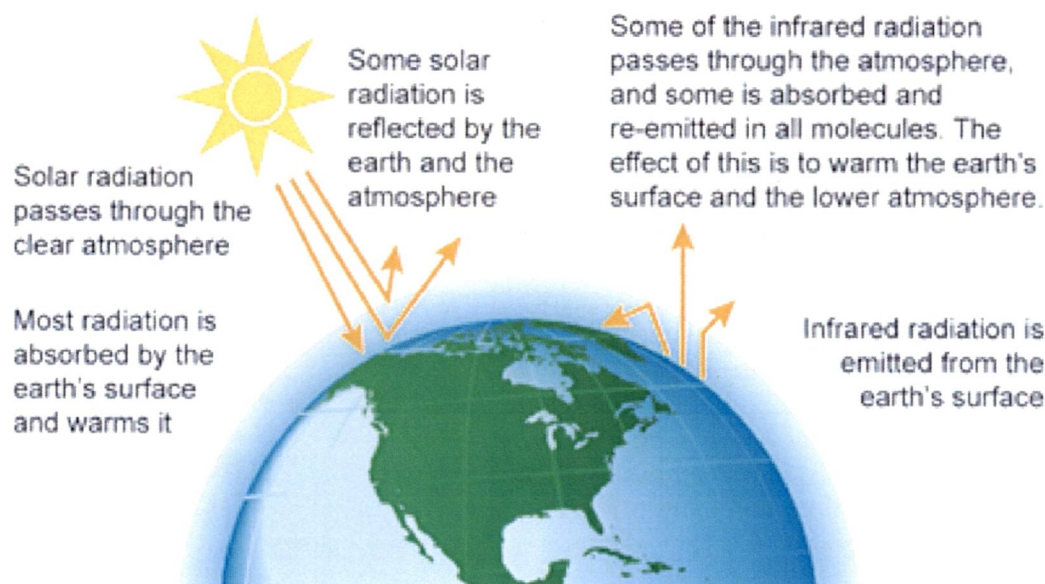
Figure 2: 2021 Government Operations Emissions by Sector

Introduction to Climate Change

Naturally occurring gases dispersed in the atmosphere determine the Earth's climate by trapping solar radiation. This phenomenon is known as the greenhouse effect. Overwhelming evidence shows that human activities are increasing the concentration of greenhouse gases and changing the global climate. The most significant contributor is burning fossil fuels for transportation, electricity generation, and other purposes, which introduces large amounts of carbon dioxide and other greenhouse gases into the atmosphere.

Collectively, these gases intensify the natural greenhouse effect, causing global average surface and lower atmospheric temperatures to rise, threatening the safety, quality of life, and economic prosperity of global communities. Although the natural greenhouse effect is needed to keep the Earth warm, a human-enhanced greenhouse effect with the rapid accumulation of GHGs in the atmosphere leads to too much heat and radiation being trapped. The Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report confirms that human activities have unequivocally caused an increase in carbon emissions [1]. Many regions are already experiencing the consequences of global climate change, and McCall is no exception.

The greenhouse effect



[1] IPCC, 2021: *Summary for Policymakers*. In: *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [MassonDelmotte, V., P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J. B. R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu and B. Zhou (eds.)]. Cambridge University Press. In Press.

Regional studies have shown that Idaho can expect increasing temperatures and changing precipitation patterns in the years to come. Specifically, we can anticipate an increasing growing-season length, increasing areas burned by wildfires, and more precipitation falling as rain instead of snow. Natural resource managers in the state are increasingly concerned about water resource availability, extreme drought, more wildland fires, and changes in plant productivity [2].

In McCall, however, our relationship to wildfire on the landscape is not a story that began with the changing climate. Wildland firefighters have been a part of our community since the early 1900's and the McCall Smokejumpers have been in operation since 1943. The US Forest Service, state fire managers, and local fire districts respond quickly and strategically to wildfires as they occur, as well as plan for and implement prescribed burning to maintain optimal forest and community health [3].

In 2022, the US Forest Service launched a robust strategy to address the wildfire crisis in places where it poses the most immediate threats to communities and Valley County was identified as one of the highest-risk landscapes. As part of that effort, the Southwest Idaho Wildfire Crisis Landscape Project was created, which is a broadscale effort to reduce the risk of catastrophic and undesirable wildfire while increasing the resiliency of the landscape to climate change and other stressors. The project encompasses 1.7 million acres, including about 424,000 and 505,000 acres of the Boise and Payette National Forests, respectively. There are another 800,000 acres of other ownership including private, state and other federal lands. Land managers will utilize treatments based on sound science, including prescribed fire, non-commercial thinning, commercial thinning, and reforestation [3].



[2] Lindquist, A. (2019, January). Draft 2018 greenhouse gas emissions inventories - mccall.id.us. https://www.mccall.id.us/media/CED/Plans/Draft%20Greenhouse%20Gas%20Emissions%20Inventories_2018.pdf

[3] Southwest Idaho Landscape Project. (2023, September 26). ArcGIS StoryMaps. <https://storymaps.arcgis.com/stories/326b883b9d1b46498435a2a904a937d1>

As a place where people value a high quality of life, and as a destination for outdoor recreation, McCall is in danger of being deeply affected because of climate change. McCall depends on snowpack not only for its water, but also for winter recreation, which brings an economic boost to the region. Yet, overall snowpack in Idaho has been decreasing in the past few decades. Thus, in the future the region may experience a shorter skiing and winter tourism season. This decrease in snowpack is also detrimental to another key feature of McCall, Payette Lake, which is a natural lake fed by spring flow from the mountains. With rising temperatures, however, spring runoff will peak sooner, leading to reduced flow in the summer, potentially affecting agriculture downstream, as well as the flora and fauna that depend on the lake. This change in water variability, coupled with rising temperatures, has the potential to exacerbate the already visible effects of drought heat in area forests. This is because a decrease in snowpack reduces the water supply to forest ecosystems. An increase in unhealthy forests means more fuel for wildfires, which are also correlated with decreased soil moisture and rising temperatures.

Finally, the health effects of climate change may also shift in the McCall area. Increasing temperatures and more particulate matter in the air due to wildfires, may result in the most vulnerable citizens, such as seniors, wildland firefighters, and young children, being disproportionately affected.

Many communities in the United States have started to take responsibility for addressing climate change at the local level. Reducing fossil fuel use in the community can have many benefits in addition to reducing greenhouse gas emissions. More efficient use of energy decreases utility and transportation costs for residents and businesses. Retrofitting homes and businesses to be more efficient creates local jobs. In addition, when residents save on energy costs, they are more likely to spend at local businesses and add to the local economy. Reducing fossil fuel use improves air quality, and increasing opportunities for walking and bicycling improves residents' health.



Greenhouse Gas Inventory as a Step Toward Carbon Neutrality

Facing the climate crisis requires the concerted efforts of local governments and their partners, those that are close to the communities directly dealing with the impacts of climate change.

Cities, towns and counties are well placed to create detailed plans that address integrated climate action — climate change adaptation, resilience, and mitigation. Existing targets and plans need to be reviewed to bring in the necessary level of ambition and outline how to achieve net-zero emissions by 2050 at the latest. Creating a roadmap for climate neutrality requires McCall to identify priority sectors for action, while considering climate justice, inclusiveness, local job creation, and other benefits of sustainable development.

To complete this inventory, McCall utilized tools and guidelines from ICLEI - Local Governments for Sustainability (ICLEI), which provides authoritative direction for greenhouse gas emissions accounting and defines climate neutrality as follows:

The targeted reduction of greenhouse gas (GHG) emissions and GHG avoidance in government operations and across the community in all sectors to an absolute net-zero emission level at the latest by 2050. In parallel to this, it is critical to adapt to climate change and enhance climate resilience across all sectors, in all systems and processes.

To achieve ambitious emissions reduction and move toward climate neutrality, McCall will need to set clear goals and act rapidly, following a holistic and integrated approach. Climate action is an opportunity for our community to experience a wide range of co-benefits, such as creating socio-economic opportunities, reducing poverty and inequality, and improving the health of people and nature (Figure 3).

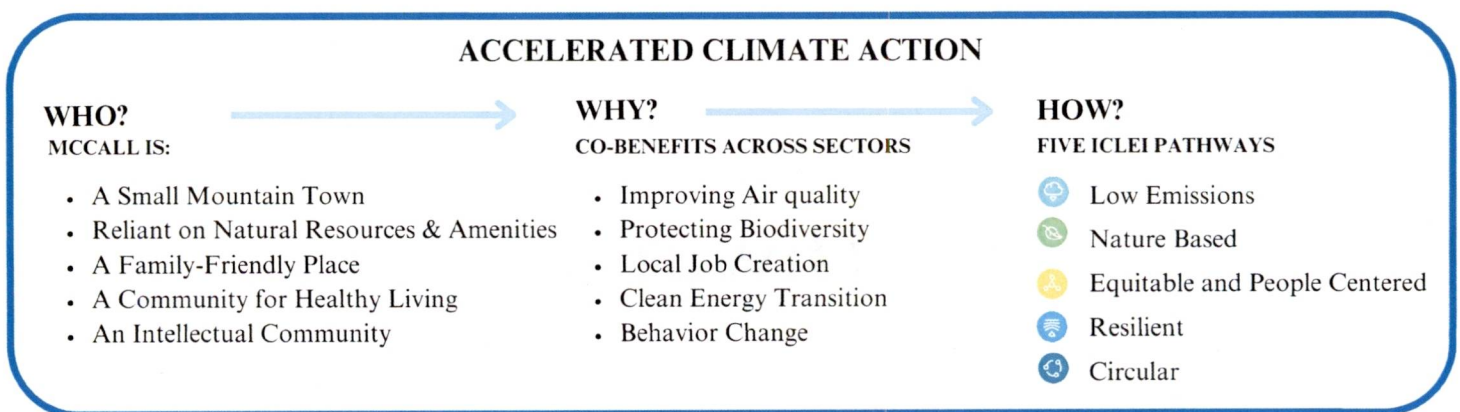


Figure 3: Accelerated Climate Action through McCall Comprehensive Plan Goals, Co-Benefits, and ICLEI Pathways

ICLEI Climate Mitigation Milestones

In response to the climate emergency, many communities in the United States are taking responsibility for addressing emissions at the local level. Since many of the major sources of greenhouse gas emissions are directly or indirectly controlled through local policies, local governments have a strong role to play in reducing greenhouse gas emissions within their boundaries, as well as influencing regional emissions through partnerships and advocacy. Through proactive measures around land use patterns, transportation demand management, energy efficiency, green building, waste diversion, and more, local governments can dramatically reduce emissions in their communities. In addition, local governments are primarily responsible for the provision of emergency services and the mitigation of natural disaster impacts.

ICLEI provides a framework and methodology for local governments to identify and reduce greenhouse gas emissions, organized along with Five Milestones, also shown in Figure 4:

1. Conduct an inventory and forecast of local greenhouse gas emissions;
2. Establish a greenhouse gas emissions Science-Based Target [4];
3. Develop a climate action plan for achieving the emissions reduction target;
4. Implement the climate action plan; and,
5. Monitor and report on progress.

This report represents the completion of ICLEI's Climate Mitigation Milestone One, and provides a foundation for future work to reduce greenhouse gas emissions in McCall.



Figure 4: ICLEI Climate Mitigation Milestones

[4] Science-Based Targets are calculated climate goals, in line with the latest climate science, that represent your community's fair share of the ambition necessary to meet the Paris Agreement commitment of keeping warming below 1.5°C. To achieve this goal, the Intergovernmental Panel on Climate Change (IPCC) states that we must reduce global emissions by 50% by 2030 and achieve climate neutrality by 2050. Equitably reducing global emissions by 50% requires that high-emitting, wealthy nations reduce their emissions by more than 50%.

Inventory Methodology

Understanding a Greenhouse Gas Emissions Inventory

The first step toward achieving tangible greenhouse gas (GHG) emission reductions requires identifying baseline emissions levels and sources and activities generating emissions in the community. This report presents emissions from the community as a whole. The government operations inventory is mostly a subset of the community inventory, as shown in Figure 5. For example, data on commercial energy use by the community include energy consumed by municipal buildings and community vehicle-miles-traveled estimates include miles driven by municipal fleet vehicles.

As local governments continue to join the climate protection movement, the need for a standardized approach to quantify GHG emissions has proven essential. This inventory uses the approach and methods provided by the U.S. Community Protocol for Accounting and Reporting Greenhouse Gas Emissions (Community Protocol) and the Local Government Operations Protocol for Accounting and Reporting Greenhouse Gas Emissions (LGO Protocol), both of which are described below.

Three greenhouse gases are included in this inventory: carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O). Many of the charts in this report represent emissions in “carbon dioxide equivalent” (CO₂e) values, calculated using the Global Warming Potentials (GWP) for methane and nitrous oxide from the IPCC 6th Assessment Report (Figure 6).



Figure 5: Relationship of Community and Government Operations Inventories

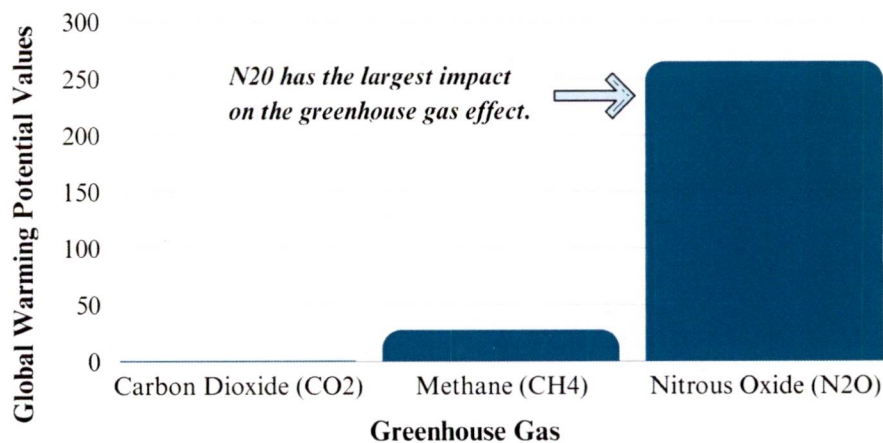













Figure 6: Global Warming Potential Values (IPCC, 2023)

Community Emissions Protocol

Version 1.2 of the U.S. Community Protocol for Accounting and Reporting GHG Emissions [5] was released by ICLEI in 2019, and represents a national standard in guidance to help U.S. local governments develop effective community GHG emissions inventories. It establishes reporting requirements for all community GHG emissions inventories, provides detailed accounting guidance for quantifying GHG emissions associated with a range of emission sources and community activities, and provides a number of optional reporting frameworks to help local governments customize their community GHG emissions inventory reports based on their local goals and capacities.

The community inventory in this report includes emissions from the various activities:

- | | |
|---|--|
|  Use of electricity by the community |  Wastewater treatment processes |
|  Use of fuel in residential and commercial stationary combustion equipment |  Off-road transportation |
|  On-road passenger and freight motor vehicle travel |  Industrial processes |
|  Use of energy in potable water and wastewater treatment and distribution |  Carbon sequestration emissions and removals |
|  Generation of solid waste by the community |  Upstream activities |
| |  Municipal operations fleet |

Local Government Operations (LGO) Protocol

In 2010, ICLEI and its research partners released Version 1.1 of the LGO Protocol [6]. The LGO Protocol serves as the national standard for quantifying and reporting greenhouse emissions from local government operations. The purpose of the LGO Protocol is to provide the principles, approach, methodology, and procedures needed to develop a local government operations greenhouse gas emissions inventory.

The following activities are included in the LGO inventory:

- Energy and natural gas consumption from buildings & facilities
- Water treatment processes
- On-road transportation from employee commute and vehicle fleet

[5] ICLEI. 2012. US Community Protocol for Accounting and Reporting Greenhouse Gas Emissions. Retrieved from <http://www.icleiusa.org/tools/ghg-protocol/community-protocol>

[6] ICLEI. 2008. Local Government Operations Protocol for Accounting and Reporting Greenhouse Gas Emissions. Retrieved from <http://www.icleiusa.org/programs/climate/ghg-protocol/ghg-protocol>

Quantifying Greenhouse Gas Emissions

Sources and Activities

Communities contribute to greenhouse gas emissions in many ways. Two central categorizations of emissions are used in the community inventory: 1) GHG emissions that are produced by “sources” located within the community boundary, and 2) GHG emissions produced as a consequence of community “activities.”

Table 1: Source vs. Activity for Greenhouse Gas Emissions (GHG)

Source	Activity
Any physical process inside the jurisdictional boundary that releases GHG emissions into the atmosphere.	The use of energy, materials (solid waste), and/or services by members of the community that result in the creation of GHG emissions.

Activities within a community include, but are not limited to: heating of homes, driving cars, and throwing away trash. Sources are where the emissions from those activities occur, which may or may not be the same place the activity occurs. When you drive your car, the source is the car's tailpipe. Similarly, when a gas furnace in your home runs, the source is the exhaust vent of the furnace. On the other hand, when you throw away trash, the source is the landfill the trash is sent to. When you flip a switch and use electricity, the source is the power plant where the electricity is generated. Because landfills and power plants are usually located outside the community, careful inclusion of both sources and activities provides a fuller picture of community emissions.

Base Year

The inventory process requires the selection of a base year with which to compare current emissions. McCall's LGO greenhouse gas emissions inventory utilizes 2018 as its baseline year because it is the most recent year for which the necessary data are available.



Quantification Methods

GHG emissions can be quantified in two ways:

- Measurement-based methodologies refer to the direct measurement of GHG emissions (from a monitoring system) emitted from a flue of a power plant, wastewater treatment plant, landfill, or industrial facility.
- Calculation-based methodologies calculate emissions using activity data and emission factors. To calculate emissions accordingly, the basic equation below is used:

$$\text{Activity Data} \times \text{Emission Factor} = \text{Emissions}$$

Most emissions sources in this inventory are quantified using calculation-based methodologies. Activity data refer to the relevant measurement of energy use or other GHG-generating processes such as fuel consumption by fuel type, metered annual electricity consumption, and annual vehicle miles traveled. Please see the appendices for a detailed listing of the activity data used in composing this inventory.

Known emission factors are used to convert energy usage or other activity data into associated quantities of emissions. Emissions factors are usually expressed in terms of emissions per unit of activity data (e.g. lbs CO₂/kWh of electricity). For this inventory, calculations were made using ICLEI's [ClearPath Climate Planner](#) tool.



Community Emissions Inventory Results

The total community-wide emissions for the 2021 inventory are shown in Table 2 and Figure 7.

Table 2: Community-Wide Emissions Inventory

Sector	Fuel or Source	2021 Usage	Usage Unit	2021 Emissions (Mt CO2e)
Residential Energy	Electricity	55,576,862	kWh	21,195
	Distillate Fuel Oil No. 2	2,158	MMBtu	161
	Propane	31,503	MMBtu	1,955
	Wood	63,479	MMBtu	618
Residential Energy Total				23,930
Commercial Energy	Electricity	38,152,110	kWh	14,550
	Distillate Fuel Oil No. 2	13,115	MMBtu	976
	Propane	1,926	MMBtu	120
	Wood	18,343	MMBtu	179
	Coal	2,843	MMBtu	273
Commercial Energy Total				16,097
Transportation & Mobile Sources	Gasoline	68,290,357	VMT	27,536
	Diesel	8,159,189	VMT	11,752
	Public Transit - Gasoline	128,073	VMT	138
	Public Transit - Diesel	82,500	VMT	84
	Aviation - Jet Kerosene	173,439	Gallons	1,108
	Aviation - AvGas	92,834	Gallons	774
	Off-Road - Gasoline	219015.268	MMBtu	5,467
	Off-Road - Diesel	60918.674	MMBtu	1,561
	Offroad - CNG	248.106	MMBtu	6
	Offroad - LPG	1277.100	MMBtu	27
Transportation & Mobile Sources Total				48,452

*Blank cells are a result of variability in the format of available data by sector and fuel or source type.

Table 2: Community-Wide Emissions Inventory (continued)

Sector	Fuel or Source	2021 Usage	Usage Unit	2021 Emissions (Mt CO2e)
Solid Waste	Landfilled Waste - Lakeshore Disposal	4,256	Tons	3,774
Solid Waste Total				3,774
Water & Wastewater	Supply of Potable Water - Electricity	1,240,361	kWh	473
	Wastewater Treatment Energy Use	1,316,299	kWh	502
	Wastewater Treatment Process N2O	4,188	Population Served	8
	Process N2O from Effluent Discharge	351	Population Served	21
Water & Wastewater Total				1,004
Total Gross Emissions				93,257
Forests and Trees	Forest Disturbances	20	Hectares	1,987
	Forest to Grassland	3	Hectares	110
Forests and Trees Total				2,097
Emissions with Forest Disturbances				95,354

*Blank cells are a result of variability in the format of available data by sector and fuel or source type.

Figure 7 shows the distribution of community-wide emissions by sector. Transportation is the largest contributor, followed by Residential & Commercial Energy.

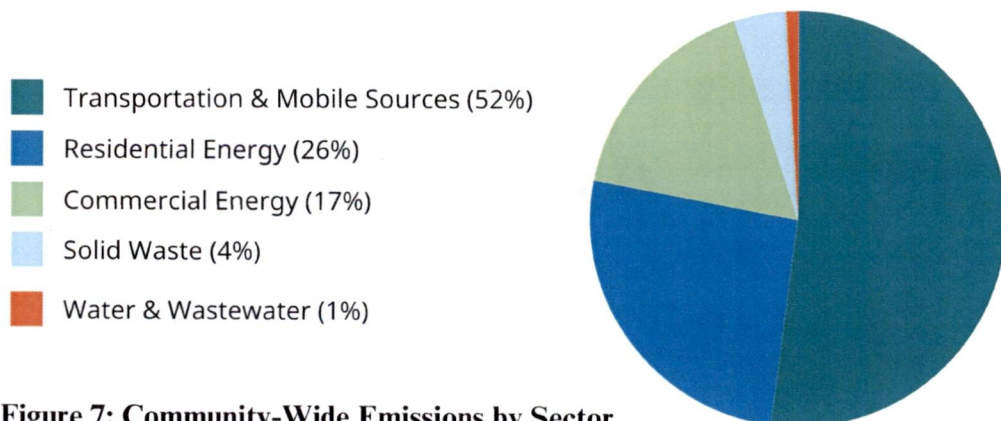


Figure 7: Community-Wide Emissions by Sector

Table 3: 2018 and 2021 Primary Community-Wide Emissions Comparison

Sector	Fuel or Source	2018 Usage	2021 Usage	2018 Emissions (MT CO2e)	2021 Emissions (MT CO2e)	Percent Change in Emissions
Residential	Electricity	34,945,246	55,373,908	10,544	21,195	101.02%
	Fuel Oil	2,031	2,158	151	161	6.30%
	Propane	29,641	31,503	1,840	1,955	6.28%
	Wood	59,727	63,479	582	618	6.28%
Commercial	Electricity	53,229,990	37,877,990	16,061	14,550	-9.41%
On-Road Transportation	On Road - Gasoline	64,254,396	68,290,357	26,832	27,536	2.5%
	On Road - Diesel	7,676,356	8,159,189	11,046	11,752	6%
	Treasure Valley Public Transit - Gasoline	310	128,073	3	138	49.78%
	Treasure Valley Public Transit Diesel	19,804	82,500	202	84	-0.59%
	Aviation - AvGas	92,834	92,834	774	774	0%
	Aviation - Jet Kerosene	173,439	173,439	1,108	1,108	0%
Waste	Landfilled Waste - Lakeshore Disposal	3955.82	4,256	3,939	3,774	-4.19%
Water & Wastewater	Supply of Potable Water - Electricity	1,410,098	1,240,361	425	473	11.30%
	Payette Lakes Wastewater Treatment - Electricity	983,280	1,316,299	297	502	69.20%
Total				73,657	84,620	+ 12.7%

*Blank cells are a result of variability in the format of available data by sector and fuel or source type.

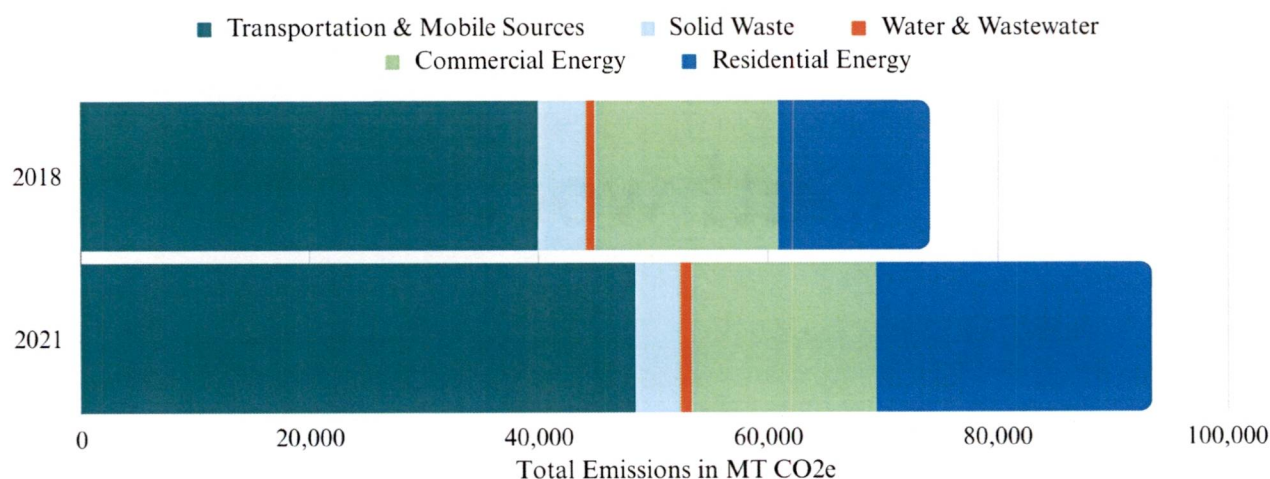


Figure 8: Comparison of Community-Wide Emissions by Sector and Year (2018 & 2021)

Comparison Discussion Community-Wide (2018 & 2021)

The above table compares 2018 and 2021 activity data and emissions (MT CO₂e). When comparing inventories 3 years apart, it must be recognized that the data collection and the inventory process could have been conducted differently. Most notably, data collection methodologies since 2018 have become more accurate. The various patterns and outliers displayed in the above table might be partly based on the aforementioned inventory changes.

In conducting this 2021 Inventory follow-up, the goal was to measure what the changes to McCall's emissions would look like from before and after the Covid-19 pandemic and related boom in local tourism, local land use development, and local energy consumption that came with an influx of visitors and constant stream of temporary residents seeking to enjoy McCall's natural amenities.

Since 2018 the community has seen the new construction of more than 200 household units, predominantly large, single-family homes. The influx of development of this style has also driven and exacerbated challenges to workforce housing, potentially displacing many long-term residents and workforce members into housing further outside of the community with longer commuting required which leads to increases in on-road transportation emissions. We can see the nuanced impacts of this growth in key indicators within the 2021 Inventory such as: Residential Energy Use, Transportation, and demand for Water and Wastewater Infrastructure.



Tree Canopy Analysis

A Message from Our City Arborist

The manner in which GHG inventories are estimated for different types of land use is more complicated than for other sectors. In addition to both emitting and removing GHGs, there are multiple carbon pools that respond differently to management activities and natural disturbances, inter-annual variability is high, and measurements may not be as precise as it is in other sectors (see the USCP, Appendix J). Beginning in 2019, a number of updates to protocols and guidance on estimating carbon from the *Agriculture, Forestry, and Other Land Use (AFOLU)* sector required that communities include the "net flux" of carbon emissions and removals - carbon emitted to the atmosphere from the land and carbon removed from the atmosphere to the land.

In coordination with ICLEI USA, McCall was able to use the US Community Protocol's Land Emissions And Removals Navigator (LEARN) tool to calculate the net flux of AFOLU emissions from 2013-2019 [7]. This analysis reported six "land use" categories which were defined by data on land cover—forest land, grassland, cropland, wetland, settlement and other land (barren). In 2019, McCall's total land base was approximately 6,333 acres (9.9 square miles), with nearly 37.0% Settlement (i.e. developed areas of varying intensity), around 31.5% forest, 22.1% Grassland (which includes hay/pasture, shrub/scrub and other herbaceous cover), 7.7% cropland, 3.4% wetland and 0.5% other land. 2019 is the most recent year available of the National Land Cover Dataset. These measurements are only for trees, so carbon sequestration from other vegetation, such as grassland, likely mean that what is measured by the LEARN tool is actually an underestimate of total sequestration for the community sectors.

Over the period 2016 to 2019, the Net GHG balance of forests and trees was -3,349 Mt CO₂e per year, however this sequestration should be considered informational in nature, only. Total GHG emissions for McCall across all sectors could be reduced if additional forests/trees were added to its land base, and/or if losses of trees were reduced further by:

- Replacement of all lost or removed trees through city code
- Ongoing protection and maintenance of shoreline, public and street trees
- Outreach and management of arborist services through adequate business licensing



[7] US Community Protocol's Land Emissions And Removals Navigator (LEARN) tool. Available at <https://icleiusa.org/LEARN/>

Next Steps - Community-Wide

The inventory should be used to focus and prioritize actions to reduce emissions and inform the future Community-wide Climate Action Plan for McCall. Based on the inventory results, the following areas have the greatest potential for emissions reduction at the community level:

- Residential Energy
- Commercial Energy
- On-Road Transportation
 - High level VMT reduction - Reduce parking minimums, improve bike infrastructure, increase public transit and active transportation access, and implement other measures to reduce dependency on on-road vehicle transportation

Completing another GHG inventory every two to five years is recommended to assess progress resulting from any actions implemented. The detailed methodology section of this report, as well as notes and attached data files in the ClearPath Climate Planner tool and a master data Excel file provided to McCall, will be helpful in completing a future inventory consistent with this one.



Greenhouse Gas Emissions Forecasts

McCall’s most recent community-wide greenhouse gas (GHG) inventory includes emissions from activities and sources that took place within the city during the 2021 calendar year. Using the 2021 GHG inventory as a baseline, ICLEI prepared a basic “business-as-usual” forecast for 2030.

Business-As-Usual (BAU) Forecast

The BAU forecast (Figure 9) is a projection of emissions through the year 2050. The projected emissions estimated population growth, changes in automotive fuel efficiency standards [8], and changes to the carbon intensity of grid electricity [9].

McCall’s 2021 emissions were 93,715 Metric Tons Carbon Dioxide equivalent (MT CO₂e). Based on expected population growth, increasing on-road vehicle fuel efficiency, and utility decarbonization plans, McCall’s 2030 emissions will be 94,383 CO₂e. This is a 1% increase in emissions.

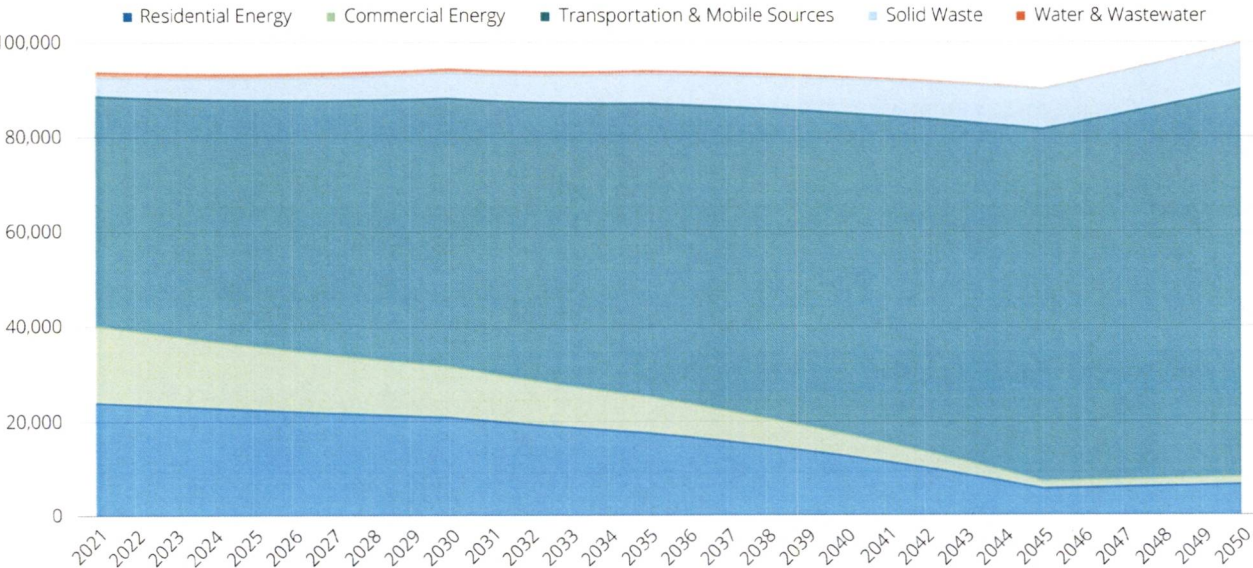


Figure 9: Business-As-Usual Forecast for Community-Wide Emissions from 2021-2050

[8] ICLEI’s Carbon Intensity Reference Sheet
 [9] “Our Path Away from Coal”. Idaho Power, 2023. <https://www.idahopower.com/energy-environment/energy/energy-sources/our-path-away-from-coal/#:~:text=Our%20Clean%20Today%2C%20Cleaner%20Tomorrow,by%20the%20end%20of%202028>.

Government Operations Emissions Inventory 2021 Results

The total government operations emissions for the 2021 inventory are shown in Table 4 and Figure 10.

Table 4: Government Operations Emissions Inventory 2021

Sector	Fuel or Source	2021 Usage	Usage Unit	2021 Emissions (Mt CO ₂ e)
Buildings & Facilities	Electricity (NWPP)	706,609	kWh	266
	Propane (LPG)	2,209.28	MMBtu	131
Buildings & Facilities Total				397
Street Lights & Traffic Signals	Electricity (NWPP)	12,177	kWh	11
Street Lights & Traffic Signals Total				11
Vehicle Fleet & Equipment Fuel Consumption	Gasoline (on-road)	29,856	Gallons	283
	Diesel (on-road)	18,635	Gallons	193
Vehicle Fleet Total				476
Transit Fleet	Diesel	82,500	VMT	84**
	Gasoline	128,073	VMT	138**
Transit Fleet Total				INFO ONLY**
Employee Commute	Gasoline	343,722.11	VMT	167
	Biodiesel/Ethanol	NCNP	VMT	--
	Electric	NCNP	VMT	--
	Hybrid Gasoline	7,800	VMT	2.42
	PHEVs	NCNP	VMT	--
Employee Commute Travel Total				478.42

*Blank cells are a result of variability in the format of available data by sector and fuel or source type.

** The Transit Fleet is Owned and Operated by Mountain Community/Treasure Valley Transit not the McCall Municipal Government. City of McCall does partially fund transit operations.

Table 4: Government Operations Emissions Inventory 2021 (continued)

Sector	Fuel or Source	2021 Usage	Usage Unit	2021 Emissions (Mt CO2e)
Solid Waste	Waste Generation	5.8	Tons (wet)	6
	Compost	N/A	N/A	
Solid Waste Total				6
Water Treatment & Distribution	Treatment Energy	1,078,475	kWh	409
Water & Wastewater Total				409
Process & Fugitive Emissions	Fugitive Emissions from Natural Gas Distribution	--	--	
Process & Fugitive Emissions Total				0
Total Government Operations Emissions				1,469 Mt CO2e

Figure 10 shows the distribution of Government Operations emissions by sector. Vehicle Fleet & Equipment Fueling is the largest contributor, followed by Water Treatment/Distribution and Buildings and facilities.



Figure 10: Local Government Operations Emissions by Sector 2021

Table 5: 2018 and 2021 Primary Government Operations Emissions Comparison

Sector	Fuel or Source	2021 Usage	2018 Usage	2021 Emissions (MT CO2e)	2018 Emissions (MT CO2e)	Percent Change in Emissions
Buildings & Facilities	Electricity	700,669 kWh	884,080 kWh	266	256	+ 3.9%
	Propane	2,078.94 MMBtu	811.46 MMBtu	132	66	+ 100%
Streetlight & Traffic	Electricity	29,445 kWh	119,935 kWh	11.2	34.8	(67.8%)
Vehicle Fleet	Gasoline	29,856 Gal	20,864 Gal	283	182.3	+ 55.2%
	Diesel	18,635 Gal	13,029 Gal	193	133	+ 45.1%
Employee Commute	Gasoline	343,722 VMT	194,125 VMT	169.7	100.2	+ 69.5%
	Diesel	NCNP	NCNP	NCNP	NCNP	
Solid Waste	Solid Waste Generation	5.8 Tons	5.07 Tons	6.58	5.21	+ 26.3%
Water (Treatment) **	Electricity	1,078,475 kWh	813,158 kWh	409.4	299.9	+ 36.5%
Total				1469.68	1,077.4	+ 35.8 %

*Blank cells are a result of variability in the format of available data by sector and fuel or source type.

** Water & Wastewater Distribution & Intake is included in Buildings & Facilities; Water & Wastewater Treatment in Water & Wastewater

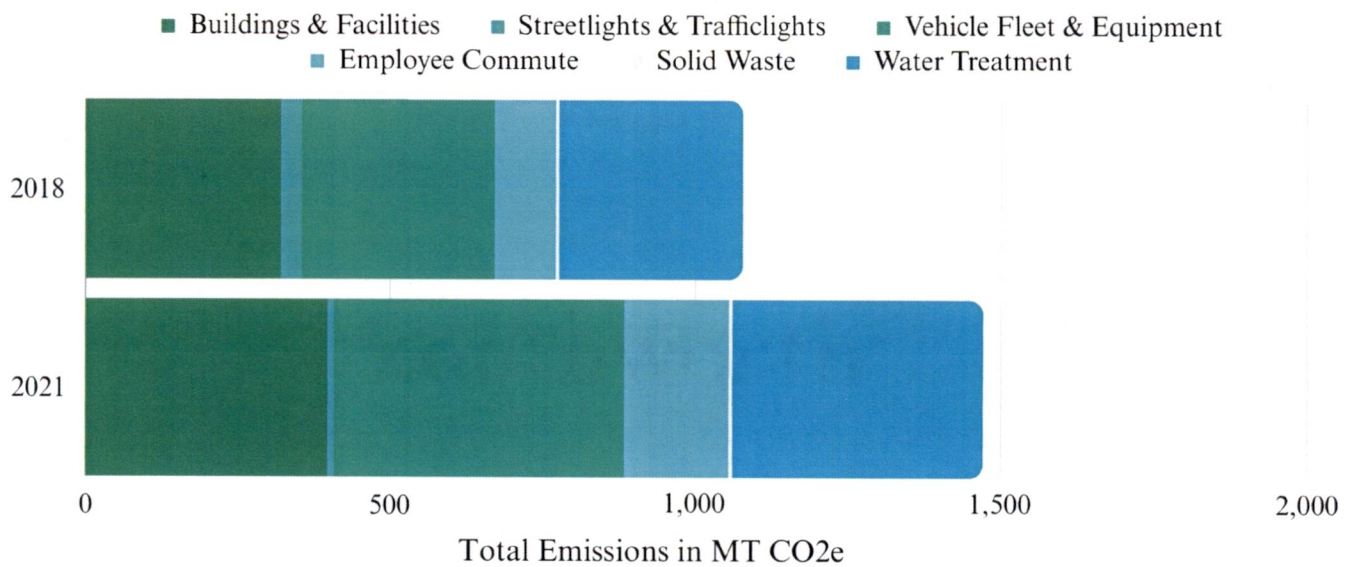


Figure 11: Comparison of City of McCall Government Operational Emissions by Sector and Year (2018 & 2021)

Comparison Discussion

Local Government Operations (2018 & 2021)

The above table compares 2018 and 2021 activity data and emissions (MT CO₂e). When comparing inventories three years apart, it must be recognized that the data collection and the inventory process could have been conducted differently. Most notably, data collection methodologies since 2018 have become more accurate. The various patterns and outliers displayed in the above table might be partly based on the aforementioned inventory changes.

In conducting this 2021 Inventory follow-up, the goal was to measure what the changes to McCall's Local Government Operations emissions would look like from before and after the Covid-19 pandemic and related boom in local tourism, return to in-office work, and increased demand for City staffing, services and infrastructure that came with an influx of visitors and constant stream of temporary residents seeking to enjoy McCall's natural amenities.

Since 2018 the community has seen the new construction of more than 200 household units and demand for water resources, the demolition and relocation of the City Parks Facility, the improvement of HVAC and energy-efficiency in municipal facilities, and a greater snow removal year than 2018. The increased demand for consistent and dependable services and facilities through the municipal government has also exacerbated challenges to workforce retention and recruitment, with the average commuting radius of City employees increasing over time which leads to increases in on-road transportation emissions. We can see the nuanced impacts of this growth in key indicators within the 2021 LGO Inventory such as: Vehicle Fleet, Employee Commute, and demand for Water Treatment.



Next Steps - Local Government Operations

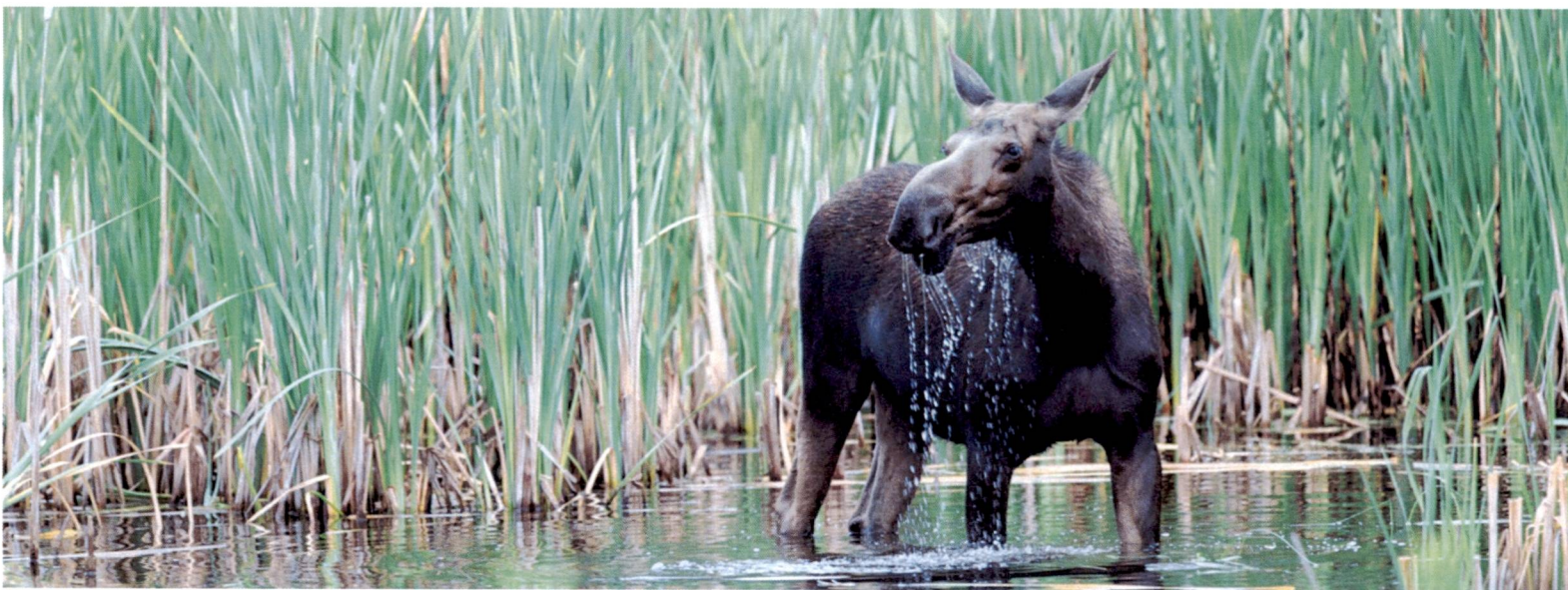
The inventory should be used to focus and prioritize actions to reduce emissions and inform the McCall Climate Action Plan strategies for emissions reduction. Based on the inventory results, the following areas have the greatest potential for emissions reduction:

- Buildings and Facilities
 - Convert existing buildings from natural gas to electricity, analyze on-site energy potential for public facilities and options for RECs.
- Vehicle Fleet
 - Pursue a feasibility analysis for purchasing and converting internal combustion engine vehicles to electric vehicles or hybrid vehicles.
- Employee Commute
 - Review telework/hybrid policy through the lens of greenhouse gas emissions reduction, consider active transportation commuter incentives.

Completing another GHG inventory in two to five years is recommended to assess progress resulting from any actions implemented. The detailed methodology section of this report, as well as notes and attached data files in the ClearPath Climate Planner tool and a master data Excel file provided to the City of McCall, will be helpful in completing a future inventory consistent with this one.

Below are recommended improvements to monitoring/data that may benefit the City in additional ways for Transportation and Land Use Planning:

- Create a Regional Gravity Model or similar study to measure the VMT of Tourist and Supply Chain vehicles using State Highway 55 entering and recreating in McCall
- Complete Local Government Inventory Annually as part of the City Annual Report to promote improvement and commitment to positive change as well as better comprehension of these analyses over time.
- Consider a more in-depth land-use change analysis in future planning efforts to better understand the impact of development on soil carbon storage or loss over time and encourage or require clustered development and encourage open space preservation.



Conclusion

This inventory marks the completion of Milestone One of the Five ICLEI Climate Mitigation Milestones. The next steps are to forecast emissions, set an emissions-reduction target, and build upon the existing climate action framework with a more robust climate action plan that identifies specific quantified strategies that can cumulatively meet that target.

The Intergovernmental Panel on Climate Change (IPCC) states that to meet the Paris Agreement commitment of keeping warming below 1.5°C we must:



Reduce global emissions by 50% by 2030



Reach global climate neutrality 2050

Equitably reducing global emissions by 50% requires that high-emitting, wealthy nations reduce their emissions by more than 50%. More than ever, it is imperative that countries, regions, and local governments set targets that are ambitious enough to slash carbon emissions between now and mid-century.

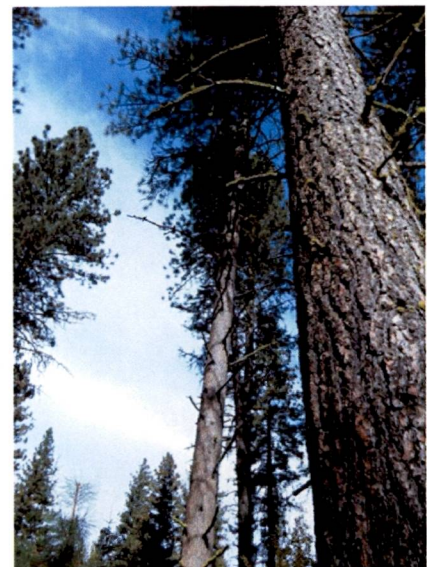
Science-Based Targets are calculated climate goals, in line with the latest climate science, that represent a community's fair share of the global ambition necessary to meet the Paris Agreement commitment. Community education, involvement, and partnerships will be instrumental to achieve a science-based target. ICLEI has calculated the city's Science-Based Targets [10]:

Absolute SBT: 51.4%

Science-Based Targets are climate goals in line with the latest climate science. They represent the city's fair share of the ambition necessary to meet the Paris Agreement commitment to keep warming below 1.5°C.

In addition, McCall will continue to track key energy use and emissions indicators on an on-going basis. It is recommended that communities update their inventories on a regular basis, especially as plans are implemented to ensure measurement and verification of impacts. Regular inventories also allow for "rolling averages" to provide insight into sustained changes and can help reduce the change of an anomalous year being incorrectly interpreted.

This inventory shows that residential and commercial energy, as well as transportation patterns, will be particularly important to focus on. Through these efforts and others, McCall can achieve environmental, economic, and social benefits beyond reducing emissions.



[10] "Science Based Climate Targets: A Guide for Cities." Science Based Targets Network, November 4, 2021. <https://sciencebasedtargetsnetwork.org/>

Appendix A: Methodology Details

Energy

Table 6: Energy Data Sources

Activity	Data Source	Data Gaps/Assumptions
Community-wide		
Residential Electricity	Idaho Power	N/A
Commercial Electricity	Idaho Power	This record subtracts kWh from City of McCall Supply of Potable Water energy usage and Wastewater Treatment Energy Use - Payette Lakes subtracted to avoid double counting
Industrial Electricity	Idaho Power	N/A
Residential Non-Utility	EIA State Profiles and Energy Estimates, US Census Bureau	US Census Bureau used to estimate households using each fuel type in Idaho and McCall, then state residential consumption data downscaled by ratio of McCall/Idaho households
Commercial Non-Utility	EIA State Profiles and Energy Estimates, Google EIE, Meredith Todd - City Government Records	State EIA consumption data downscaled by ratio of McCall nonresidential sq footage to Idaho nonresidential sq footage (EIE)
Industrial Non-Utility	EIA State Profiles and Energy Estimates, Google EIE, Meredith Todd - City Government Records	N/A

Table 7: Idaho Power and eGrid NWPP Emissions Factors for Electricity Consumption

Year	CO2 (lbs./MWh)	CH4 (lbs./GWh)	N2O (lbs./GWh)	
2021	837	58	8	Idaho Power did not separately report CH4 and N2O emissions factors for 2021 - eGrid emissions factors were used

Transportation

Table 8: Transportation Data Sources

Activity	Data Source	Data Gaps/Assumptions
Community-wide		
Transportation on-road	US DOT, EPA State Inventory and Projection Tool, US National Defaults	N/A
Transportation off-road	EPA NEI	Downscaled by pop from EPA's National Emissions Inventory, Emissions factors multiplied by emissions to estimate fuel use
Public Transportation	Treasure Valley Transit/Mountain Community Transit	N/A
Aviation	2018 CW Inventory	Assumed insignificant change from 2018 inventory

For vehicle transportation, it is necessary to apply average miles per gallon and emissions factors for CH₄ and N₂O to each vehicle type. The factors used are shown in Table 8.

Table 9: MPG and Emissions Factors by Vehicle Type

Fuel	Vehicle Type	MPG	CH ₄ (g/mile)	N ₂ O (g/mile)
Gasoline	Passenger car	25.3	0.0084	0.0069
Gasoline	Light truck	18.2	0.0117	0.0087
Gasoline	Heavy truck	5.383557	0.0719	0.0611
Gasoline	Motorcycle	44	0.0084	0.0069
Diesel	Passenger car	25.3	0.0005	0.001
Diesel	Light truck	18.2	0.001	0.0015
Diesel	Heavy truck	6.561615	0.0051	0.0048

Wastewater

Table 10: Wastewater Data Sources

Activity	Data Source	Data Gaps/Assumptions
Community-wide		
Process N2O	Payette Lakes - Jeff Bateman, Manager (jbateman@plrwsd.org)	<p>Population is based on the difference between In-boundary Population and service population (4188) provided by PLRWSD - calculators split between in-boundary (3844) and imported (344) population.</p> <p>Payette Lakes Recreational Water and Sewer District uses Nitrification/Denitrification.</p> <p>Subtracted from Commercial Grid Electricity to avoid double counting</p>

Potable Water

Table 11: Potable Water Data Sources

Activity	Data Source	Data Gaps/Assumptions
Community-wide		
Potable Water	City of McCall	Subtracted from Commercial Grid Electricity to avoid double counting

Solid Waste

Table 12: Solid Waste Data Sources

Activity	Data Source	Data Gaps/Assumptions
Community-wide		
Solid Waste	Lakeshore Disposal - Terry Stewart, Operations Manager (Terry.Stewart@WasteConnections.com)	Does not include C & D waste

Agriculture, Forestry and Land Use (AFOLU)

Table 13: Forests and Urban Trees Sequestration and Emissions Data Sources

Activity	Data Source	Data Gaps/Assumptions
Community-wide		
Tree Canopy	LEARN	Removals and emissions are marked as "Info Only"

Inventory Calculations

The 2021 inventory was calculated following the US Community Protocol and ICLEI’s ClearPath Climate Planner software. As discussed in Inventory Methodology, the IPCC 6th Assessment was used for global warming potential (GWP) values to convert methane and nitrous oxide to CO2 equivalent units. ClearPath Climate Planner Climate Planner’s inventory calculators allow for input of the sector activity (i.e. kWh or VMT) and emission factor to calculate the final carbon dioxide equivalent (CO2e) emissions.



This work is licensed under a [Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License](https://creativecommons.org/licenses/by-nc-nd/4.0/). It may not be used for any commercial purpose. Any non-commercial use of this material must provide attribution to ICLEI Local Governments for Sustainability USA.