Ada County

Inventory of Government Operations Greenhouse Gas Emissions: Calendar Years 2009, 2019 & 2020

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Produced by the Ada County Operations Department
With Assistance from ICLEI - Local Governments for Sustainability USA

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Executive Summary

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. These risks are especially and uniquely exacerbated by the tremendous growth that is occurring in Ada County over recent years, which is projected to continue for the foreseeable future.

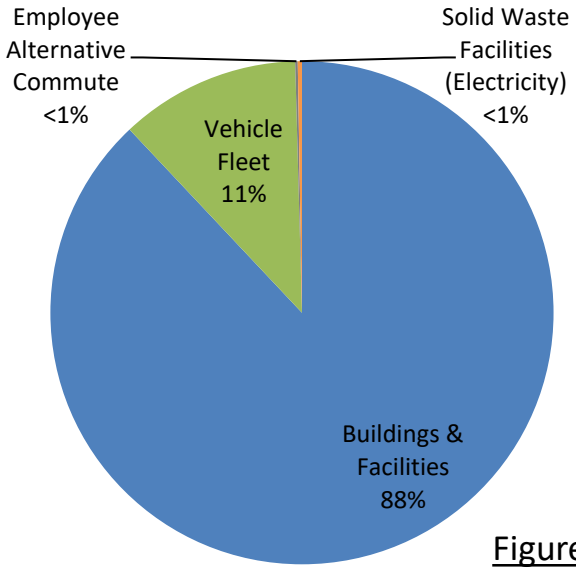
Ada County has long standing commitments to advance sustainability and address these consequences, going back to the 2003 Green Building Resolution, which has led to a present-day total of eight County facilities being LEED Certified. In 2019, the Clean Energy Resolution was passed, mandating that County facilities use 100% clean energy by 2045. Along with these resolutions, the annual Strategic Plan for Sustainable Operations and Resource Conservation (SORC) lays the foundation for sustainable transformation at Ada County. The information gathered in this report will play a key role in decision making processes as the County continues to progress sustainably.

This report provides estimates of greenhouse gas emissions resulting from Ada County's government operations in calendar years 2009, 2019 and 2020. Emissions from municipal solid waste at the Ada County Landfill (ACLF) are separated from each year's inventory but are included later in this report at the end of the Key Findings section.

Key Findings

2009: 11,549 $MTCO_2e$

Figure ES-1 shows the breakdown of county government operations emissions for calendar year 2009. The Buildings and Facilities sector accounts for a vast majority (88%) of these emissions. The next largest contributor is the County vehicle fleet (11%), followed by electricity use at the ACLF (<1%), and ending with County employee commute from alternative transportation methods (<1%). Actions to reduce emissions from these sectors will be a key part of any future climate action plan developed by Ada County.



FigureES-1

2019: 10,350 $MTCO_2e$

Figure ES-2 shows the breakdown of local government operations emissions for calendar year 2019. The Buildings and Facilities sector accounts for a vast majority (76%) of these emissions. The next largest contributor is the County vehicle fleet (21%), followed by electricity use at the ACLF (2%), and ending with County employee commute from alternative transportation methods (<1%). Actions to reduce emissions from these sectors will be a key part of any future climate action plan developed Ada County.

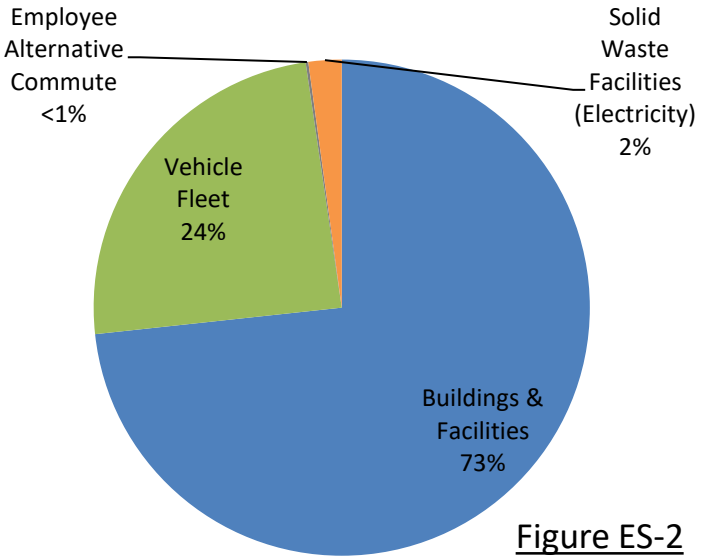


Figure ES-2

2020: 11,748 $MTCO_2e$

Figure ES-3 shows the breakdown of local government operations emissions for calendar year 2020. The Buildings and Facilities sector accounts for a vast majority (76%) of these emissions. The next largest contributor is the County vehicle fleet (21%), followed by electricity use at the ACLF (2%), and ending with County employee commute from alternative transportation methods (<1%). Actions to reduce emissions from these sectors will be a key part of any future climate action plan developed Ada County.

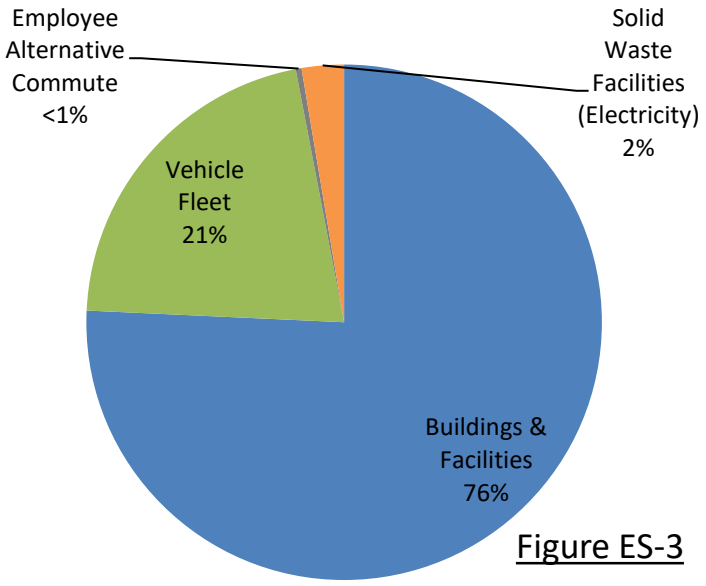


Figure ES-3

Key Findings - Ada County Landfill (Waste)

Figure ES-4 shows local government operations emissions, specifically those coming from the waste at the landfill, which is being presented separately due to its relatively large quantities in comparison with the data previously mentioned. Landfill emission records for 2010 have been included in the 2009 inventory, as there were no available ACLF emissions records for 2009 due to a change in recording system that year.

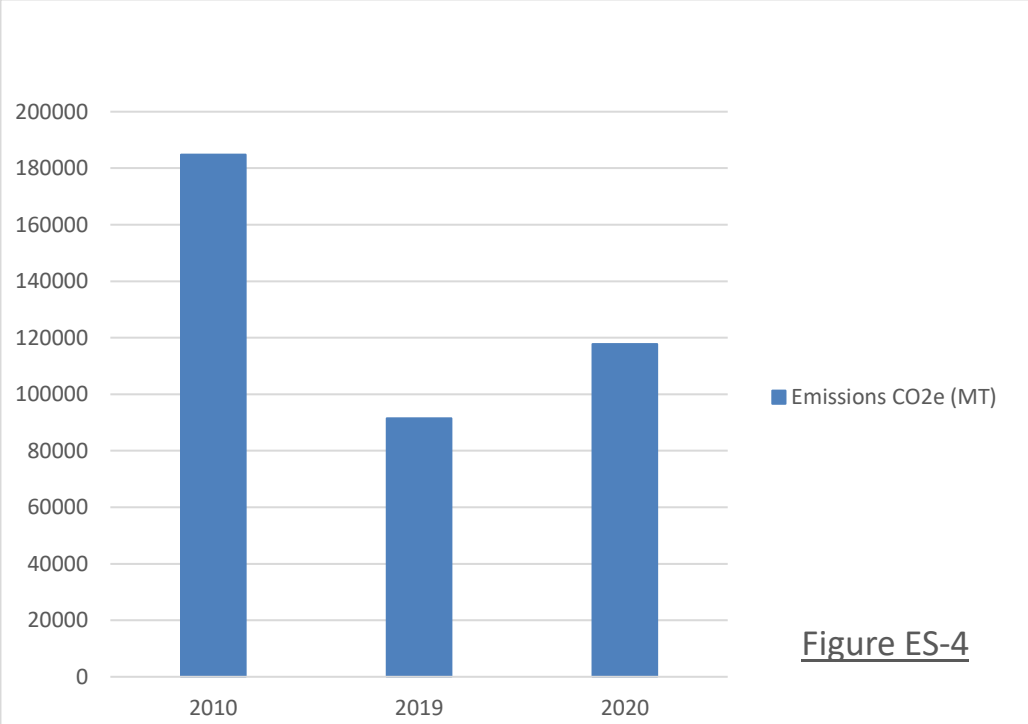


Figure ES-4

The Inventory Results section of this report provides a detailed profile of emissions sources within Ada County; 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.

Climate Change Background

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 the burning of fossil fuels for transportation, electricity generation and other purposes, which introduces large amounts of CO_2 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. Global climate change influences seasonal patterns and intensifies weather events, threatening the safety, quality of life, and economic prosperity of communities everywhere[1]. Frontline and disadvantaged communities often experience the first, and the worst impacts.

The Fourth National Climate Assessment, published in 2018, states the main aspects of life in the Northwest region that will be impacted by climate change:

- Natural resources economy
    - Irrigation shortages, heat and drought impacts to agriculture, fisheries losses
- Heritage and quality of life
    - Reduced recreation, wildfire impacts, declines in First Foods, increased harmful algal blooms
- Water, transportation and energy infrastructure
    - Decreased drinking water quality, wildfire infrastructure damage
- Health and social systems
    - Increased risk of heat illness and infectious diseases, increased need for emergency food assistance

Many communities in the United States have started to take responsibility for addressing climate change at the local level. Reducing fossil fuel use in government operations has many benefits in addition to reducing greenhouse gas emissions, such as saving taxpayer dollars through energy efficiency improvements and reducing air pollution.

[1] International Panel on Climate Change. 2014. Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp. Retrieved from https://www.ipcc.ch/report/ar5/syr/

ICLEI Climate Mitigation Milestones

In response to the problem of climate change, many communities in the United States are taking responsibility for addressing emissions at the local level.

ICLEI provides a framework and methodology for local governments to identify and reduce greenhouse gas emissions, organized along Five Milestones, also shown in Figure 1:

1. Conduct an inventory and forecast of local greenhouse gas emissions;
2. Establish a greenhouse gas emissions reduction target;
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 for government operations and provides a foundation for future work to reduce greenhouse gas emissions in Ada County.

Figure 1 ICLEI Climate Mitigation Milestones

Inventory Methodology

Understanding a Greenhouse Gas Emissions Inventory

The first step toward achieving tangible greenhouse gas emission reductions requires identifying baseline emissions levels and sources and activities generating emissions in the community.

As local governments have continued 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 Local Government Operations Protocol for Accounting and Reporting Greenhouse Gas Emissions (LGO Protocol), described further in the next section.

Three greenhouse gases are included in this inventory: carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). Many of the charts in this report represent emissions in "carbon dioxide equivalent" (CO_2e) values, calculated using the Global Warming Potentials (GWP) for methane and nitrous oxide from the IPCC 5th Assessment Report:

Table 1 Global Warming Potential Values (IPCC, 2014)

Greenhouse Gas	Global Warming Potential
Carbon Dioxide (CO_2)	1
Methane (CH_4)	28
Nitrous Oxide (N_2O)	265

The emissions-generating activities represented in these inventories are the following:

- Energy (electricity and natural gas) consumption from Ada County buildings and facilities
- Ada County vehicle fleet
- Employee commute (alternative transportation only)
- Solid waste management processes at Ada County landfill

Local Government Operations Protocol

In 2010, ICLEI, the California Air Resources Board (CARB), and the California Climate Action Registry (CCAR) released Version 1.1 of the LGO Protocol.[2] The LGO Protocol serves as the national standard for quantifying

[2] ICLEI. 2010. Local Government Operations Protocol for Accounting and Reporting Greenhouse Gas Emissions. Retrieved from https://icleiusa.org/ghg-protocols/

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.

Quantifying Greenhouse Gas Emissions

Emissions Scopes

For the government operations inventory, emissions are categorized by scope. Using the scopes framework helps prevent double counting. There are three emissions scopes for government operations emissions:

- **Scope 1:** All direct emissions from a facility or piece of equipment operated by the local government. Examples include tailpipe emissions from local government, and emissions from a furnace in a local government building.
- **Scope 2:** Indirect emissions associated with the consumption of purchased or acquired electricity, steam, heating, and cooling.
- **Scope 3:** All other indirect or embodied emissions not covered in Scope 2. Examples include contracted services, embodied emissions in good purchased by the local government, and emissions associated with disposal of government generated waste.

Scope 1 and Scope 2 emissions are the most essential components of a government operations greenhouse gas analysis as they are the most easily affected by local policy making. The following table shows the activities included in this municipal inventory and the scopes they fall under.

Table 2 Activities Included in this GHG Inventory Organized by Scope

Scope	Activities
1	• Natural gas used in government buildings and facilities • Vehicle fleet travel • Solid waste management processes
2	• Purchased electricity, heating and cooling used in government buildings and facilities
3	• Employee alternate commute travel

Base Year

The inventory process requires the selection of a base year with which to compare current emissions. Ada County's municipal greenhouse gas emissions inventory utilizes 2009 as its baseline year because it is the earliest year for which sufficient data necessary to complete an accurate inventory are available.

Quantification Methods

Greenhouse gas emissions can be quantified in two ways:

- Measurement-based methodologies refer to the direct measurement of greenhouse gas 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:

Activity Data x Emission Factor = 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 greenhouse gas-generating processes such as fuel consumption by fuel type, metered annual electricity consumption, and annual vehicle miles traveled. Please see 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 CO_2/kWh of electricity). For this inventory, calculations were made using ICLEI's ClearPath tool.

Government Operations Emissions Inventory Results

Government operations emissions are shown in Tables 3.1 (2009), 3.2 (2019), and 3.3 (2020).

Table 3.1 Local Government Emissions Inventory - 2009

Sector	Source	Scope	Total Accounted Emissions ($MTCO_2e$)
Buildings & Facilities	Electricity	2	7,752
	Natural gas	1	2,409
		Buildings & Facilities total	**10,161**
Vehicle Fleet	Gasoline (on-road)	1	1,072
	Diesel (on-road)	1	267
		Vehicle Fleet & Off-Road Equipment total	**1,338**
Employee Commute	Bus, carpool and vanpool	3	19
		Employee Commute Total	**19**
Solid Waste Facilities (ACLF)	Electricity	2	31
	Waste (2010 data)	1	184,814
		Solid waste total	**184,845**
		2009 Total Emissions ($MTCO_2e$)	**196,363**

Table 4.2 Local Government Emissions Inventory - 2019

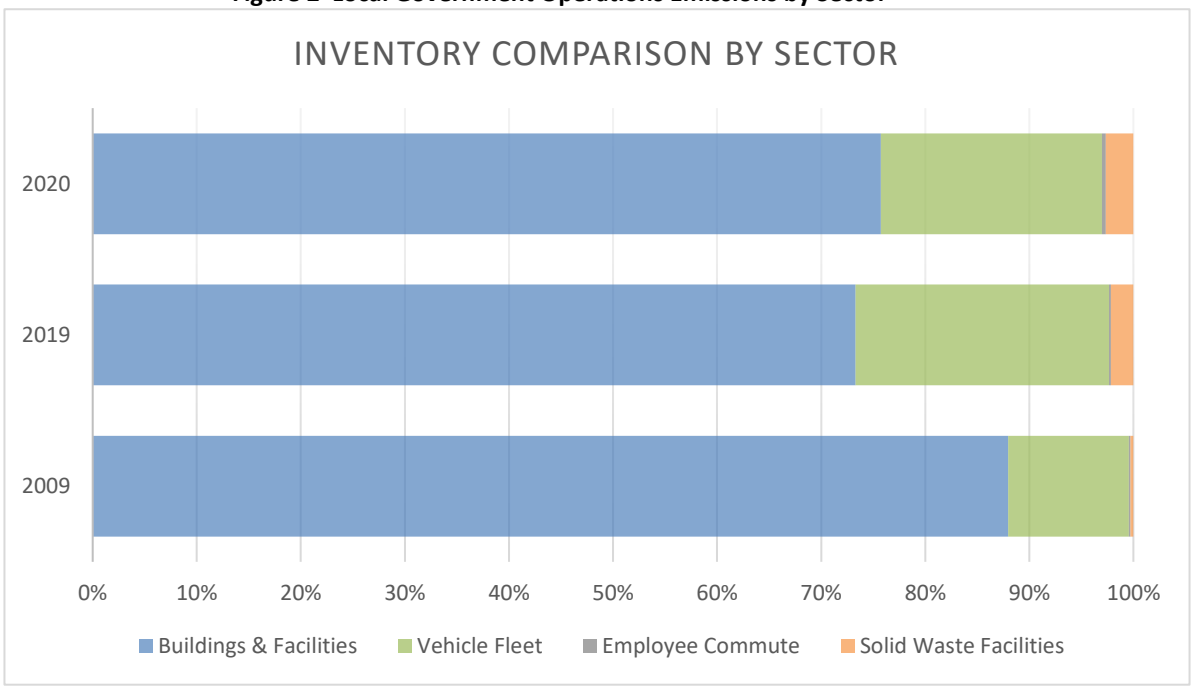
Sector	Source	Scope	Total Accounted Emissions ($MTCO_2e$)
Buildings & Facilities	Electricity	2	5,323
	Natural gas	1	2,263
		Buildings & Facilities total	**7,586**
Vehicle Fleet	Gasoline (on-road)	1	2,329
	Diesel (on-road)	1	194
		Vehicle Fleet & Off-Road Equipment total	**2,523**
Employee Commute	Bus, carpool and vanpool	3	18
		Employee Commute Total	**18**
Solid Waste Facilities (ACLF)	Electricity only	2	223
	Waste	1	91,503
		Solid waste total	**91,726**
		2019 Total Emissions ($MTCO_2e$)	**101,853**

Table 5.3. Local Government Emissions Inventory - 2020

Sector	Source	Scope	Total Accounted Emissions ($MTCO_2e$)
Buildings & Facilities	Electricity	2	6,723
	Natural gas	1	2,173
		Buildings & Facilities total	**8,896**
Vehicle Fleet	Gasoline (on-road)	1	2,412
	Diesel (on-road)	1	86
		Vehicle Fleet & Off-Road Equipment total	**2,498**
Employee Commute	Bus, carpool and vanpool	3	43
		Employee Commute Total	**43**
Solid Waste Facilities (ACLF)	Electricity only	2	311
	Waste	1	117,704
		Solid waste total	**118,015**
		2020 Total Emissions ($MTCO_2e$)	**129,452**

Figure 3 shows the distribution of emissions among the four sectors included in the inventory, excluding waste emissions at the ACLF. Buildings and facilities represent a vast majority of emissions, followed by vehicle fleet, electricity use at the ACLF, and employee commute.

Figure 2 Local Government Operations Emissions by Sector



Conclusion and Next Steps

This inventory marks 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 Sustainability Action Plan with a more robust climate action plan that identifies specific quantified strategies that can cumulatively meet that target. In addition, Ada County should continue to track key energy use and emissions indicators on an on-going basis. ICLEI recommends updating the inventory at least every five years to measure emissions reduction progress. Furthermore, ICLEI offers the Contribution Analysis tool, which will allow Ada County to more accurately determine what influences changes in emissions over time.

This inventory shows that the ACLF, Buildings & Facilities, and the County vehicle fleet will be particularly important to focus on. Through these efforts and others, Ada County can achieve additional environmental, economic, and social benefits beyond reducing emissions.

The local government operations emissions inventory first points to a need for the continuation of data gathering and analysis, in order to fill all information gaps; the most significant of which are Scope 3 emissions from employee commuting, and supply chain related emissions.

Ada County will continue to place an emphasis on resource efficiency in its facilities, especially regarding energy use. We share our 100% Clean Energy by 2045 goal with Idaho Power, the area electric utility. As the energy profiles of both Ada County and Idaho Power continue to progress toward this goal, the eventual electrification of facilities and transportation will be an important step toward lowering emissions. Increasing and expanding upon existing recycling and landfill diversion programs, along with sending less material to the landfill in general, will also lead to progress in lowering emissions.

The information that has been gathered and presented in this report will serve to identify areas of opportunity within Ada County facilities and systems (transportation, supply chain, etc.), and guide Ada County toward specific actions that will lower total emissions. Continuing to gather and report on GHG emissions data will continuously feed into an effective and informed decision-making process that will support these actions going forward.

Appendix: Methodology Details

Stationary Energy

The following table shows each activity related to energy consumption, data source, and notes on data gaps.

Table 6 Energy Data Sources

Activity	Data Source	Data Gaps/Assumptions
Electricity consumption	Energy Manager software	N/A
Natural gas consumption	Energy Manager software	N/A

Table 7 Emissions Factors for Electricity Consumption

Year	CO_2 (lbs./MWh)	CH_4 (lbs./GWh)	N_2O (lbs./GWh)	Source
2009	1003	10.71	2.06	CO_2: Idaho Power, CH_4: eGRID, N_2O: eGRID
2019	646	0.83	0.12	All: Idaho Power
2020	836	0.83	0.12	All: Idaho Power

- 2020 eGRID data has not been released; 2019 Idaho Power values for CH_4 and N_2O are assumed for 2020

Transportation

Table 8 Transportation Data Sources

Activity	Data Source	Data Gaps/Assumptions
Vehicle fleet	Fuel purchasing records	Assuming all fuel purchased in a given year was consumed in that year.
Employee commute	Internal alternative transportation participation records	Significant gap in true commute emissions, currently no data on emissions from those who drive their personal vehicle to work.

For vehicle transportation, it is necessary to apply average miles per gallon and emissions factors for CH_4 and N_2O to each vehicle type. The factors used are shown in Table 7.

Table 9 MPG and Emissions Factors by Vehicle Type (2019 National Default Values)

Fuel	Vehicle type	MPG	CH_4 g/mile	N_2O g/mile
Gasoline	Passenger car/ Motorcycle	24.37713	0.0183	0.0083
Gasoline	Light truck	17.86788	0.0193	0.0148
Diesel	Passenger car/ Motorcycle	24.37713	0.0005	0.001
Diesel	Light truck	17.86788	0.001	0.0015

Solid Waste

Table 8 Solid Waste Data Sources

Activity	Data Source	Data Gaps/Assumptions
Electricity	Energy Manager software	N/A
Waste and methane gas capture	EPA FLIGHT (Facility Level Information on Greenhouse gases Tool)	N/A

Additionally, Ada County used the "methane commitment" approach outlined in the LGO Protocol, the calculation of which requires a breakdown of waste types in the landfill, shown in Table 11.

Table 9 Waste Characterization

Category	%
Mixed Municipal Solid Waste (MSW)	100

Due to insufficient data collection on waste characterization, 100% "Mixed MSW" was assumed for these emissions inventories. The emissions factor for 100% Mixed MSW embedded in Clearpath Is 0.054 MT CH4 per short ton of solid waste.

Inventory Calculations

These inventories were calculated following the US Community Protocol and ICLEI's ClearPath software. As discussed in Inventory Methodology, the IPCC 5th Assessment was used for global warming potential (GWP) values to convert methane and nitrous oxide to CO_2 equivalent units. ClearPath's inventory calculators allow for input of the sector activity (i.e. kWh or VMT) and emission factor to calculate the final CO_2e emissions.