

Larimer County 2022 Community Greenhouse Gas Emissions Inventory Results

Overview

As part of the Climate Smart and Future Ready Initiative (CSFR), Larimer County created a county-wide greenhouse gas (GHG) emissions inventory. Larimer County contracted Lotus Engineering & Sustainability, LLC to estimate emissions from the Larimer County community, including estimating emissions by jurisdiction in Larimer County. The emissions inventory provides valuable information regarding activities that generate carbon emissions in Larimer County, and where and how the County and its partners can focus efforts through the CSFR to reduce emissions. In addition to the county-wide GHG inventory, Lotus will develop a consumption based GHG emissions inventory (CBEI) which aims to quantify all lifecycle emissions associated with consumption of goods and services occurring within Larimer County. The following memo gives an overview of the results from the 2022 county-wide GHG inventory, describes the CBEI, and reviews how the CBEI will differ and relate to the county-wide inventory.

Results

In 2022, total emissions in Larimer County were 4,242,532 metric tons of carbon dioxide equivalent (mt CO₂e). The total emissions are attributed to the municipality in which emissions-generating activities occurred: Berthoud, Estes Park, Fort Collins, Loveland, Wellington, and Unincorporated Larimer County. The following table showcases these results in order of highest to lowest emissions. It should be noted that emissions in Estes Park are higher for a town of its size due to the large presence of the tourism economy.

Municipality	Emissions (mt CO ₂ e)	Percent of Total Emissions	Emissions per capita (mt CO ₂ e)	Municipality Population	Percent of Larimer County Population
Fort Collins	1,777,398	42%	10.55	168,538	46%
Unincorporated	1,441,406	34%	15.56	92,643	25%

Loveland	777,933	18%	10.08	77,194	21%
Estes Park	117,056	3%	19.91	5,880	2%
Berthoud	64,961	2%	6.01	10,801	3%
Wellington	63,778	2%	5.44	11,722	3%
Total	4,242,532	100%	11.57*	366,778	100%

**This is the emissions per capita estimate that incorporates all emissions in the county. It should be noted that BASIC emission sources are used as a comparison across communities in as these sources occur in all communities and are required to be reported by the GPC Protocol.*

Emissions are also divided by sector: building energy use, oil wells, transportation activities, industrial processes and product use, waste, and agriculture. Total emissions for these sectors, in order, were the following: building energy, 65% (2,770,138 mt CO₂e); transportation, 27% (1,137,524 mt CO₂e); oil wells, 2% (79,150 mt CO₂e); industrial processes and product use, 3% (115,780 mt CO₂e); waste (including wastewater treatment), 2% (68,696 mt CO₂e); and agriculture, 2% (71,244 mt CO₂e). See Figure 1.

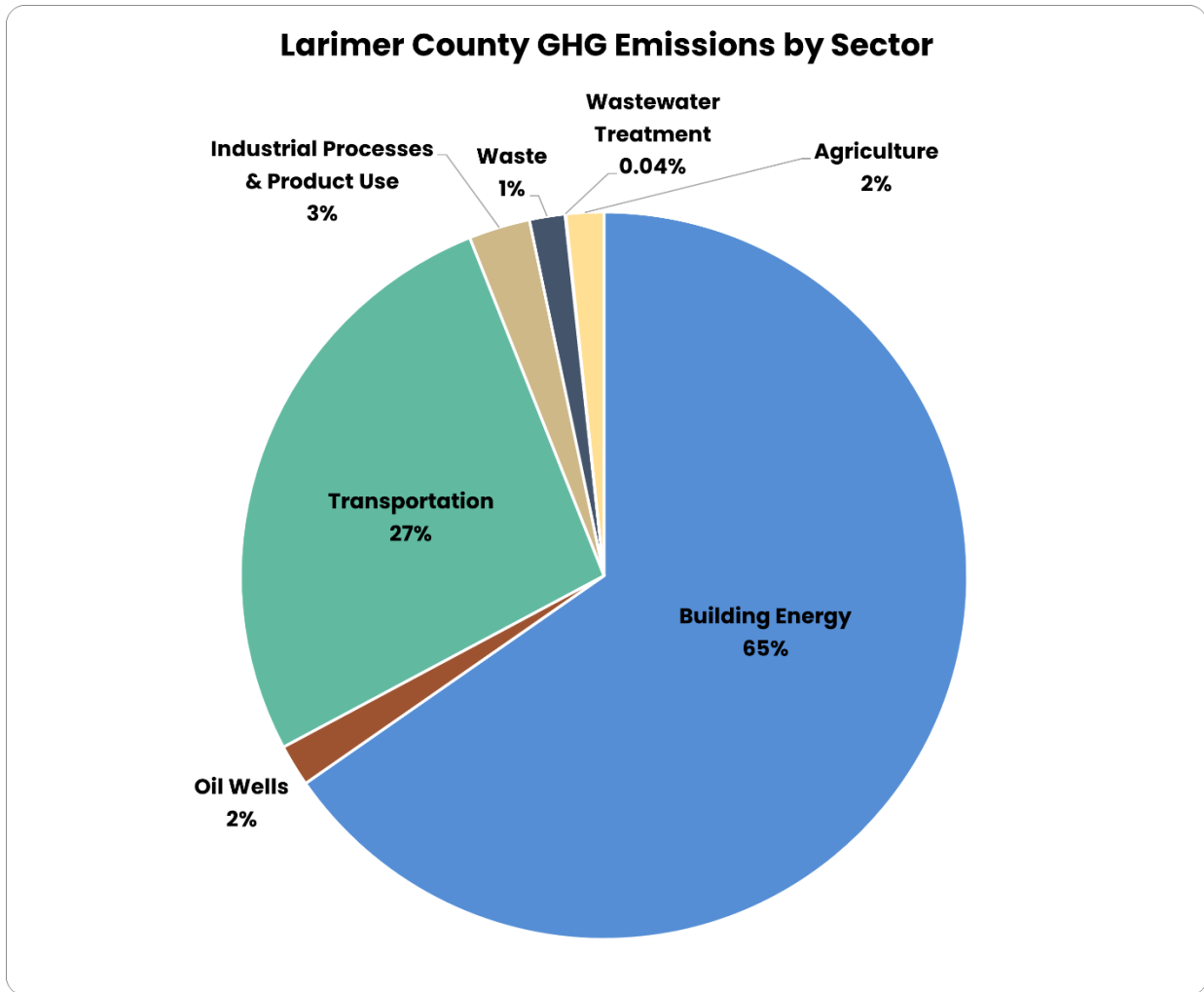


Figure 1. Larimer County greenhouse gas emissions by sector for 2022.

GHG Emissions by Source

In 2022, the top three sources of emissions in Larimer County were: building electricity use at 42.3% (1,795,987 mt CO₂e); building natural gas use at 21.0% (889,259 mt CO₂e); and on-road gasoline at 20.4% (865,396 mt CO₂e). See Figure 2.

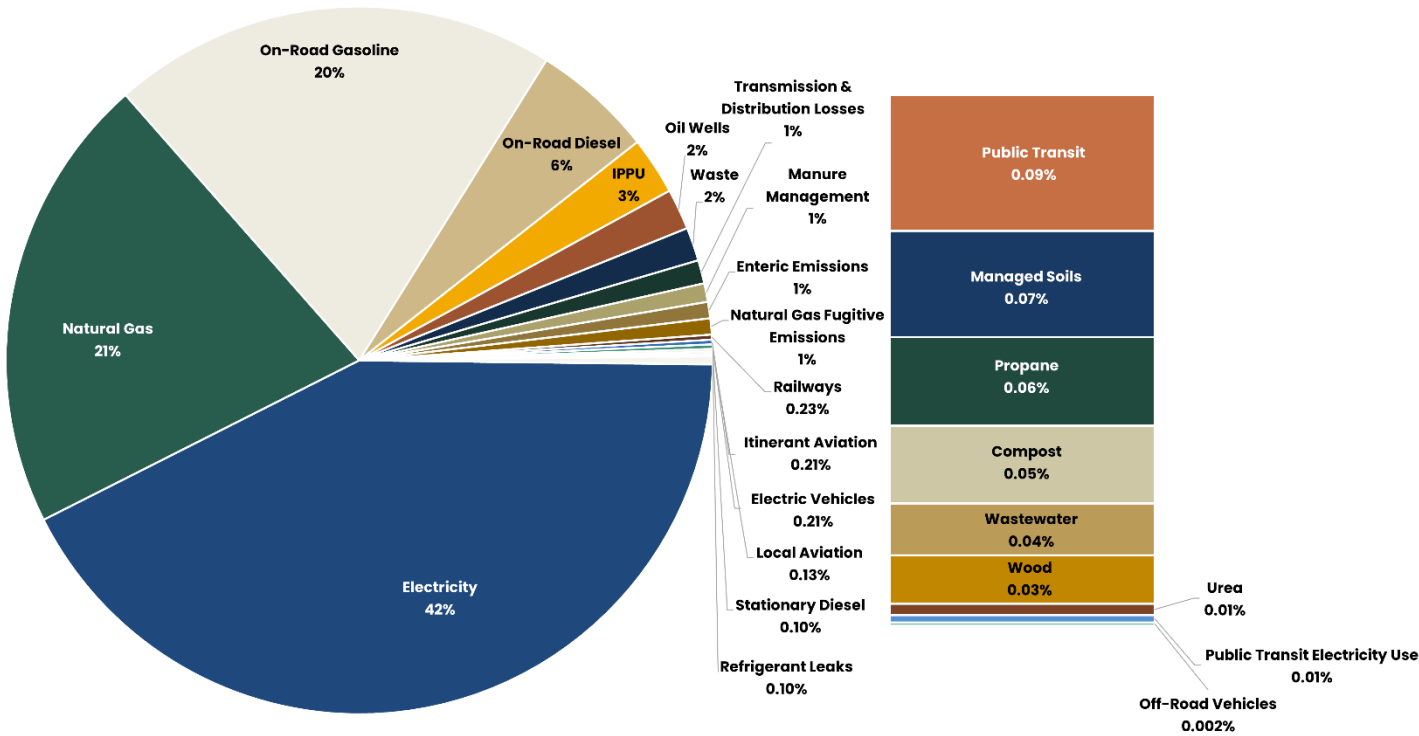


Figure 2. Larimer County greenhouse gas emissions by source in 2022.

Changing Emissions

While electricity emissions are currently the largest source for Larimer County, they are expected to decrease in future years due to statewide and utility specific renewable energy goals. Platte River Power Authority (PRPA) supplied 67% of all electricity consumed in Larimer County during 2022. PRPA has the most aggressive renewable energy goal out of all Larimer County electric utilities, with plans to reach 100% renewable energy by 2030. Xcel Energy and Tri-State provided the remaining electricity in the community. All electric utilities have renewable energy goals that will decrease electricity emissions in the county significantly by 2030. Table 1 shows each utility that provides electricity to Larimer County and their stated renewable energy goals.

Table 1. Renewable energy goals for Colorado and electric utilities that serve Larimer County.

Electric Utility	Current Renewable %	Renewable Energy Goals
CO State Goal	N/A	100% renewable energy by 2040.
Xcel Energy	42.3%	80% reduction in carbon emissions from electricity by 2030 and 100% carbon-free by 2050.
Poudre Valley REA	33%	80% carbon-free energy by 2030.
Mountain Parks Electric	Between 40–50%	60% renewable energy by 2025. 80% renewable energy by 2030.
High West Energy	33%	70% renewable energy by 2030.
PRPA (Fort Collins, Loveland, Estes Park)	34.7% (FCU is at 48.7%)	100% carbon free by 2030.

As electricity emissions decrease, the share of emissions by source will change. Natural gas and on-road gasoline will become the largest emission sources for Larimer County. Electric vehicle (EV) adoption is expected to increase over the next decade regardless of additional action from Larimer County. Colorado has a goal for 940,000 EVs on the road by 2030 and is on track to meet that goal. This growth in EVs, along with increasingly renewable electricity, will cause on-road emissions to decrease. Further action beyond business-as-usual EV adoption will be needed to fully address on-road emissions. Building electrification, multimodal transportation, and expanding EV infrastructure and incentives will be vital tools for Larimer County if it is to continue reducing emissions after electric utilities meet their goals.

Benchmarking

The counties referenced for benchmarking against Larimer County's results were: the City and County of Denver (CO), Boulder County (CO), Jefferson County (CO), Santa Fe County (NM), and Dane County (WI). Larimer County's total population is a little over half of the City and County of Denver's population; however, when looking at emissions per capita, there is little difference between the two. Larimer County also has less than half of the total households than the City and County of Denver and has higher emissions per household than Denver. Boulder County, which neighbors Larimer County, sees lower emissions per capita and emissions per household than Larimer County. See Table 2.

The following tables lay out information on emissions (Table 2) and breaks down emissions benchmarking information between these counties.

Table 2. Benchmarking emissions for Larimer County with other counties by emissions per capita. *It should be noted that BASIC emission sources are used as a comparison across communities as these sources occur in all communities and are required to be reported by the GPC Protocol.

Emissions per Capita and Household						
County	Inventory Year	BASIC Emissions (mt CO ₂ e)*	Total Population	Emissions per Capita	Total Households	Emissions per household
Larimer, CO	2022	4,113,150	366,778	11.21	145,175	28.33
City and County of Denver (CO)	2021	8,004,008	713,252	11.22	313,926	25.50
Boulder County (CO)	2021	3,480,483	329,793	10.55	127,365	27.33
Jefferson County, (CO)	2018	6,600,000	576,143	11.46	236,499	27.91
Santa Fe County (NM)	2019	1,858,627	150,358	12.36	62,182	29.89
Dane County (WI)	2017	7,451,000	568,203	13.11	236,036	31.57

Table 3. Comparing emissions profiles between Larimer County and other comparable counties.

Emissions Breakdown						
Sector	County					
	Larimer County	City and County of Denver	Boulder County (CO)	Jefferson County (CO)	Santa Fe County (NM)	Dane County (WI)
Building Energy	65%	67%	64%	59%	43%	56%
Transportation	27%	30%	26%	40%	46%	29%
Waste	2%	2%	2%	1%	4%	1%
Other	6%	N/A	8%	N/A	7%	14%

Consumption Based Emissions Inventory

In addition to the county-wide GHG inventory, Lotus will develop a consumption-based inventory for Larimer County. The consumption-based inventory estimates all emissions produced around the world due to Larimer County's consumption of goods and services. The consumption-based inventory is supplemental to the county-wide inventory, which measures all emissions produced within Larimer County boundaries. With both types of inventories, Larimer County will be able to make policy decisions based on a more complete picture of the County's total emissions footprint, even those produced beyond the county boundaries.

Consumption-based inventories capture both direct and lifecycle emissions from goods and services purchased by residents of a community. Lotus will capture consumption-based emissions produced by seven core provisioning sectors. These sectors include:

- Buildings and materials.
- Energy supply.
- Mobility-connectivity.
- Water supply.
- Waste and sanitation.
- Food supply.
- Green and Public Space.

This sector-based approach connects easily to the county-wide inventory and aligns with overarching local and global sustainability goals (e.g., energy and transportation transitions, smart cities, and nature-based solutions). The consumption-based inventory will allow Larimer County to better understand resource flows and highlight actions that can reduce direct and upstream emissions.

Consumption-based inventories move beyond the territorial county-wide inventory but will overlap for some sources. As such, the inventories should not be added together to avoid double counting. Electricity emissions illustrate this overlap and difference in scope between the two inventories. The county-wide inventory accounts for emissions from the generation of electricity consumed within Larimer County. The consumption-based inventory will account for these emissions *and* will also calculate life-cycle emissions associated with the extraction, production, delivery, and disposal of each fuel type used to generate the consumed electricity. Figure 3 provides an overview of the differences and similarities between the two inventory types.

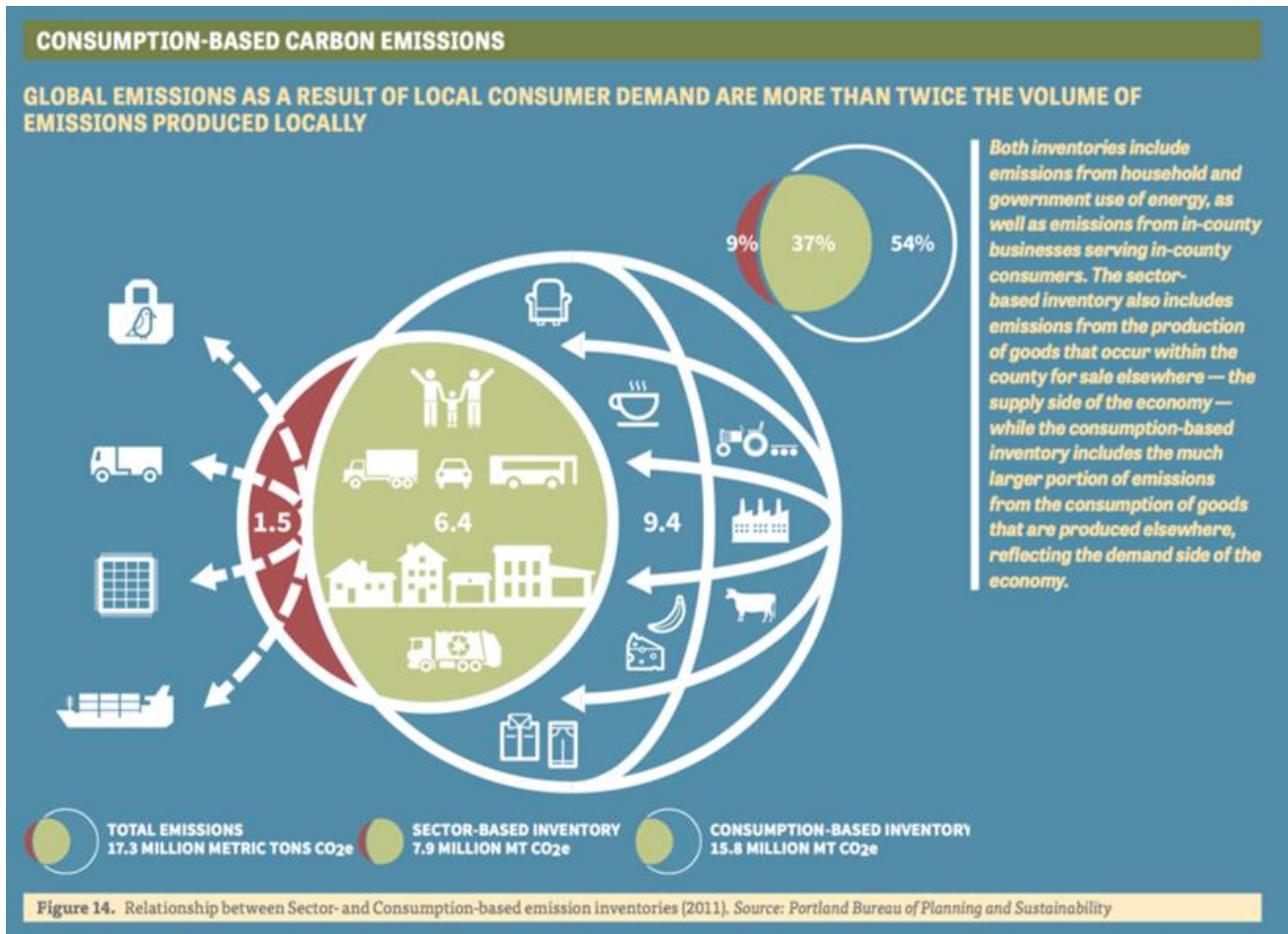


Figure 3. Comparison of sector-based (county-wide) and consumption-based inventories.