

CITY OF MISSOULA FY24 GREENHOUSE GAS EMISSIONS INVENTORY

City Climate and Sustainability Team

June 25, 2025

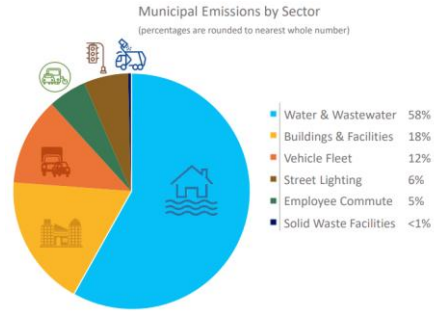
CITY GOALS & COMMITMENTS

- ❑ Carbon Neutrality by 2025 (*Municipal Operations*)
- ❑ Carbon Neutrality by 2050 (*Community-wide Goal*)
- ❑ 100% Clean Electricity by 2030 (*Joint City-County Goal*)
- ❑ Climate Ready Missoula Resiliency Plan (*Joint City-County Goal*)
- ❑ Zero Waste by 2050



MUNICIPAL INVENTORIES OVER THE YEARS

UM Team completes first municipal inventories, for FY03 and FY08



Lotus Team completes FY24 municipal inventory



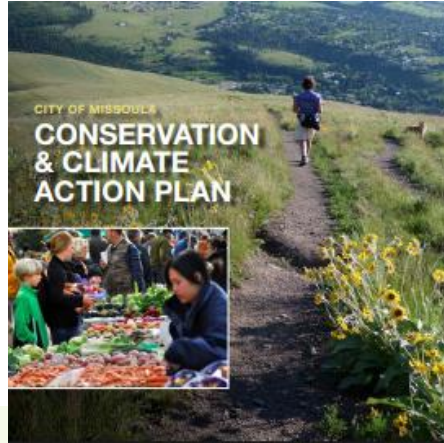
MISSOULA GREENHOUSE GAS EMISSIONS
INVENTORY AND ANALYSIS, 2003-2008:
Toward A Blueprint For Municipal Sustainability

City Climate Team
completes FY20
municipal inventory

CLIENTS



CURRENT MUNICIPAL ACTION PLAN



2012 ACTION PLAN
CURRENTLY GUIDES
THE CITY'S CLIMATE
WORK. THE PLAN
INCLUDES...

Table 4-1: Suite 1 Strategies and Intended Implementation Years
Suite 1 Goal: Achieve 10% reduction from 2008 baseline by 2015

Working Group	Strategy	Intended Implementation year
Internal Policies and Practices	Communication and Sustainability in Work Plans and Annual Review	2013
Fleet and Facilities	Auto-Wash Program	2013
Fleet and Facilities	Climate-Proof Vehicle Purchasing (Fuel economy)	2013
Internal Policies and Practices	Employee Greening Incentive Program	2013
Fleet and Facilities	Expand Fleet Optimization Software (SAP)	2013
Internal Policies and Practices	Creating Sustainable Workplace	2013
Fleet and Facilities	Hybrid/Electric Vehicle Purchasing	2013
Internal Policies and Practices	Include Sustainability in Employee Orientation	2013
Internal Policies and Practices	Water and Energy Program	2013
Internal Policies and Practices	Reduce Electronic Energy Use	2013
Renewable Energy and E-Recycle	Solar PV Installation on Municipal Buildings	2013
Renewable Energy and E-Recycle	Green New Building and Maintenance	2013
Fleet and Facilities	Continuation Building Green and Re-commissioning for Existing Buildings	2013
Renewable Energy and E-Recycle	Renewable Resource Allocation on WWT	2014
Internal Policies and Practices	Vendor Green Procurement	2014
Internal Policies and Practices	Green Purchasing Policy	2014
Renewable Energy and E-Recycle	Solar Thermal Heating System and Thermal Fuel Burner at Spunk Hotch and Cooks Energy Efficiency Improvements at Courtside	2014
Fleet and Facilities	LED Lighting Building, Landmarks & Maintenance Policy	2014

Table 4-2: Suite 2 Strategies and Intended Implementation Years
Suite 2 Goal: Achieve 30% reduction from 2008 baseline by 2017

Working Group	Strategy	Intended Implementation year
Fleet and Facilities	Green-ize Energy Monitoring Systems	2016
Fleet and Facilities	Water Heat Infrastructure	2016
Internal Policies and Practices	Include Communication and Sustainability in all Decision-Making	2016
Renewable Energy and E-Recycle	100% to Non-Combustible and Green Sustainable Building	2016

34 STRATEGIES, AND...

Table 4-3: Suite 3 Strategies and Intended Implementation years
Suite 3 Goal: Achieve 50% reduction from 2008 baseline by 2020

Working Group	Strategy	Intended Implementation year
Fleet and Facilities	Comprehensive Cooking Systems	2018
Fleet and Facilities	Water-Wise Park Amenities	2018
Renewable Energy and E-Recycle	Micro-hydroelectric Electricity Generation at WWT	2018
Renewable Energy and E-Recycle	Energy Production from WWT	2018

Table 4-4: Suite 4 Strategies and Intended Implementation Years
Suite 4 Goal: Achieve carbon neutrality by 2025

Working Group	Strategy	Intended Implementation year
Renewable Energy and E-Recycle	Micro-hydroelectric Power Plants	2025
Renewable Energy and E-Recycle	Carbon Offset Purchasing	2025

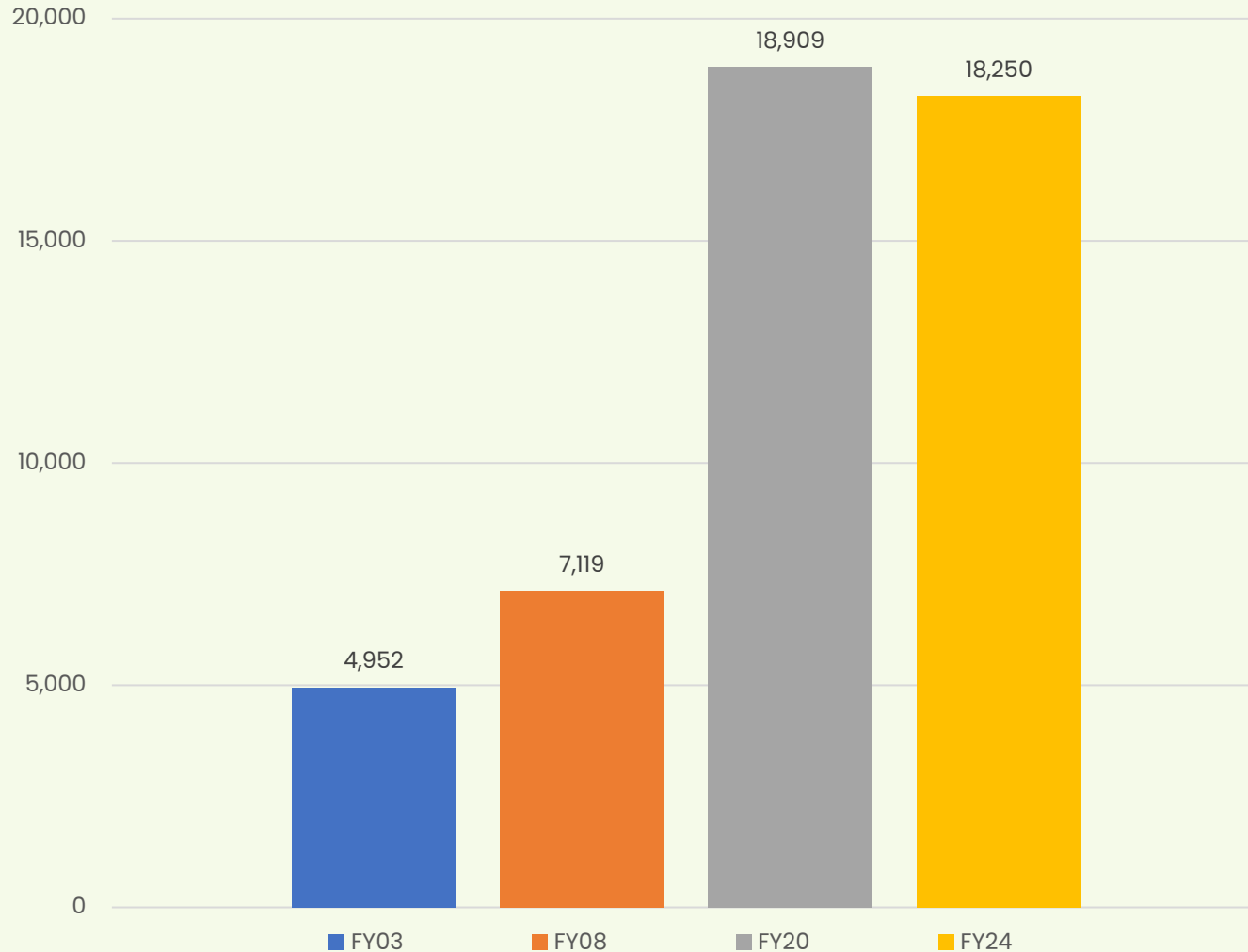


IMPLEMENTATION
TIMEFRAMES
THROUGH 2025.

TBD

MUNICIPAL
SUSTAINABILITY
ROADMAP:
TO BE WRITTEN IN
FY26.

HISTORICAL TRENDS: TOTAL EMISSIONS BY FY (MT CO₂e*)



WHAT'S HAPPENING?

- In 2017 the City acquired Missoula's water utility, accounting for approx. 87% of the emissions increase from 2017 to 2020
- Climate Team recommends using the **FY20 inventory as the baseline** for measuring our progress
- Total emissions **decreased 3% in FY24** from the new FY20 baseline
- As context, 2023 emissions for Missoula community totaled 980,914 MT CO₂e
- City's FY24 municipal emissions are **1.86% of community emissions**

Source: FY24 City of Missoula Municipal GHG Inventory

* Metric tons of carbon dioxide equivalent

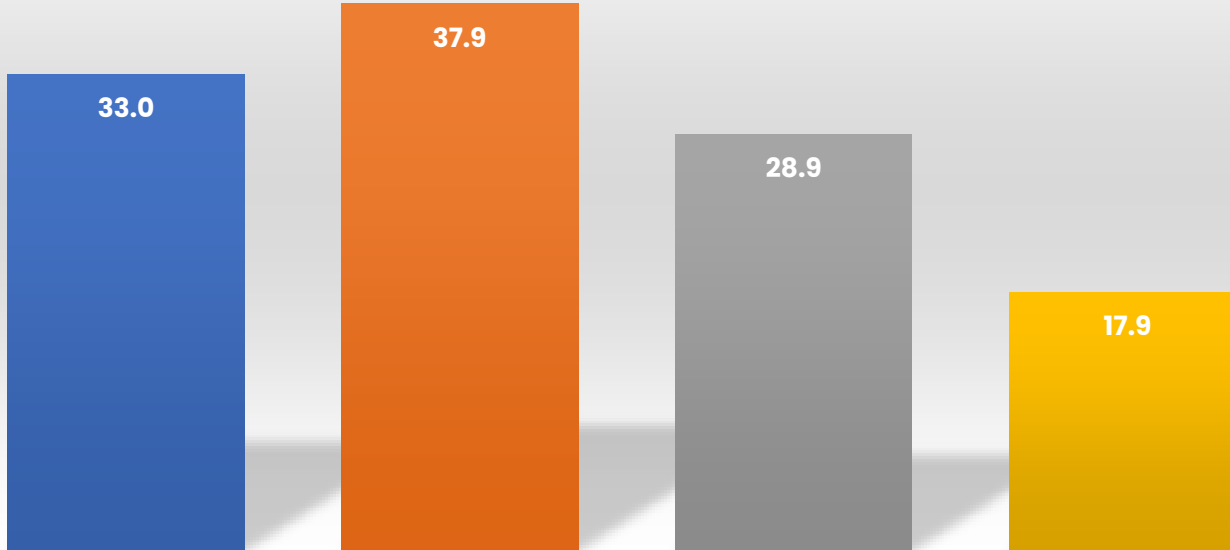
HISTORICAL TRENDS: PER EMPLOYEE EMISSIONS

Employee Changes

Population	FY03	FY08	FY20	FY24
City of Missoula Employees	150	188	655	1,017
% Increase in Employees, year over year		25%	248%	55%

Per Employee Emissions by FY (MT CO2E)

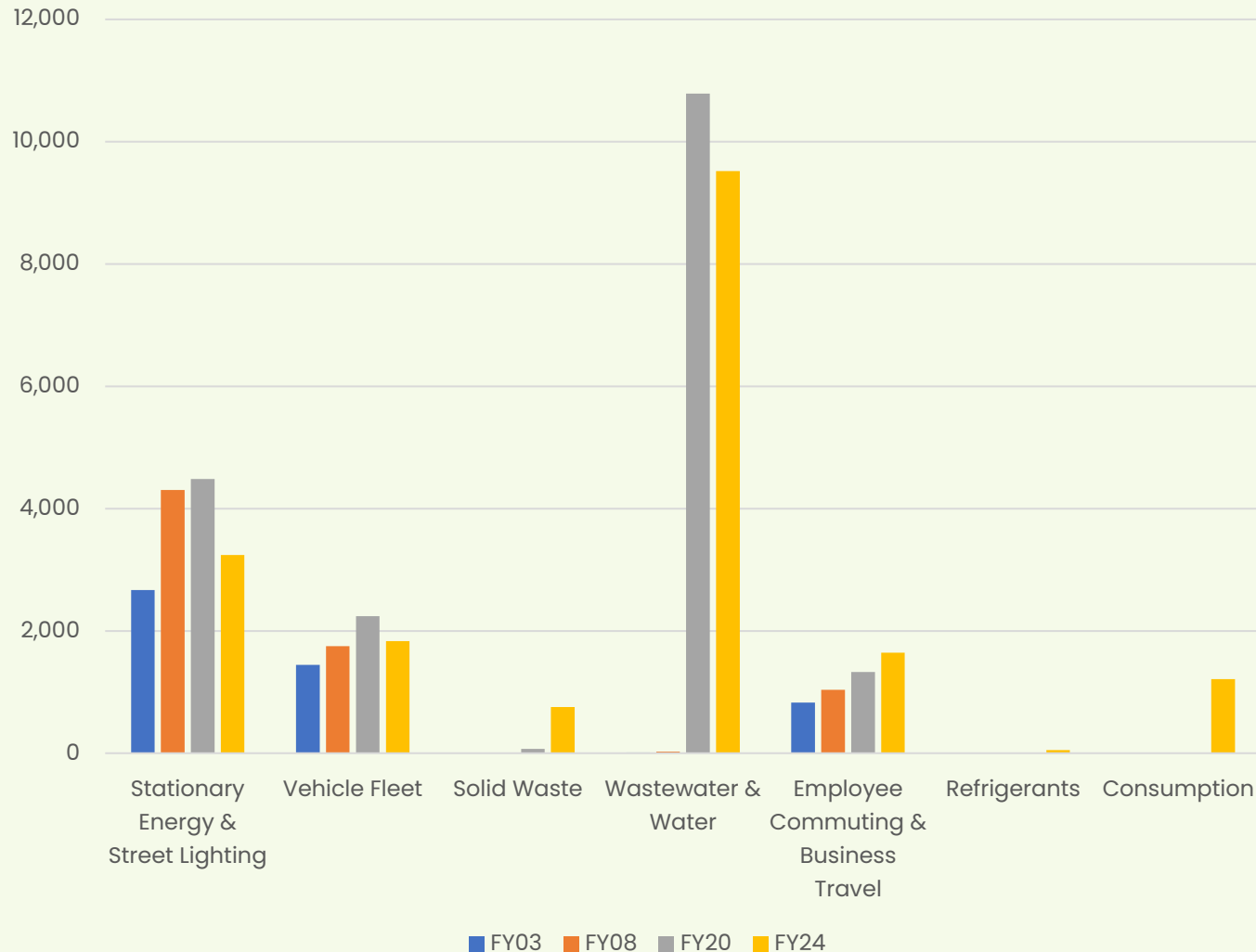
■ FY03 ■ FY08 ■ FY20 ■ FY24



WHAT'S HAPPENING?

- From FY03 to FY24, the number of City employees increased 578%
- Going back to new baseline year of FY20, the number of employees **increased 55%** from FY20 to FY24...
- ...and the City's per capita emissions **dropped 38%** from FY20 to FY24

HISTORICAL TRENDS: TOTAL EMISSIONS BY SECTOR (MT CO₂e)



WHAT'S HAPPENING?

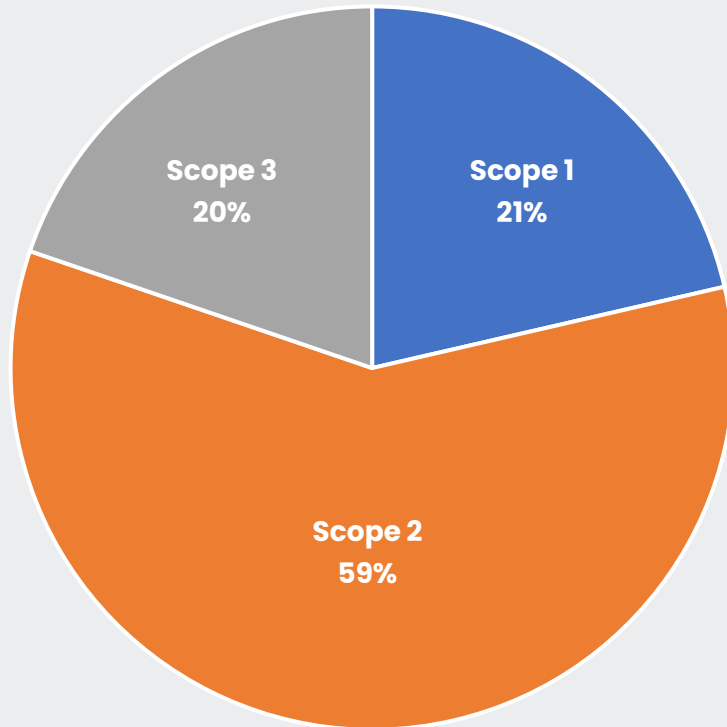
- In FY24 City saw **emissions reductions** in sectors with the highest emissions, as compared to new FY20 baseline:
 - Stationary energy/street lighting: ↓ 28%
 - Vehicle fleet: ↓ 18%
 - Wastewater/water: ↓ 12%
- Employee commuting/business travel: emissions increased 24%
- FYI, measuring refrigerants and consumption* emissions was new in FY24

Source: FY24 City of Missoula Municipal GHG Inventory

* Consumption-based emissions include emissions produced throughout the life cycle of a product purchased by an entity, e.g., asphalt and fertilizer.

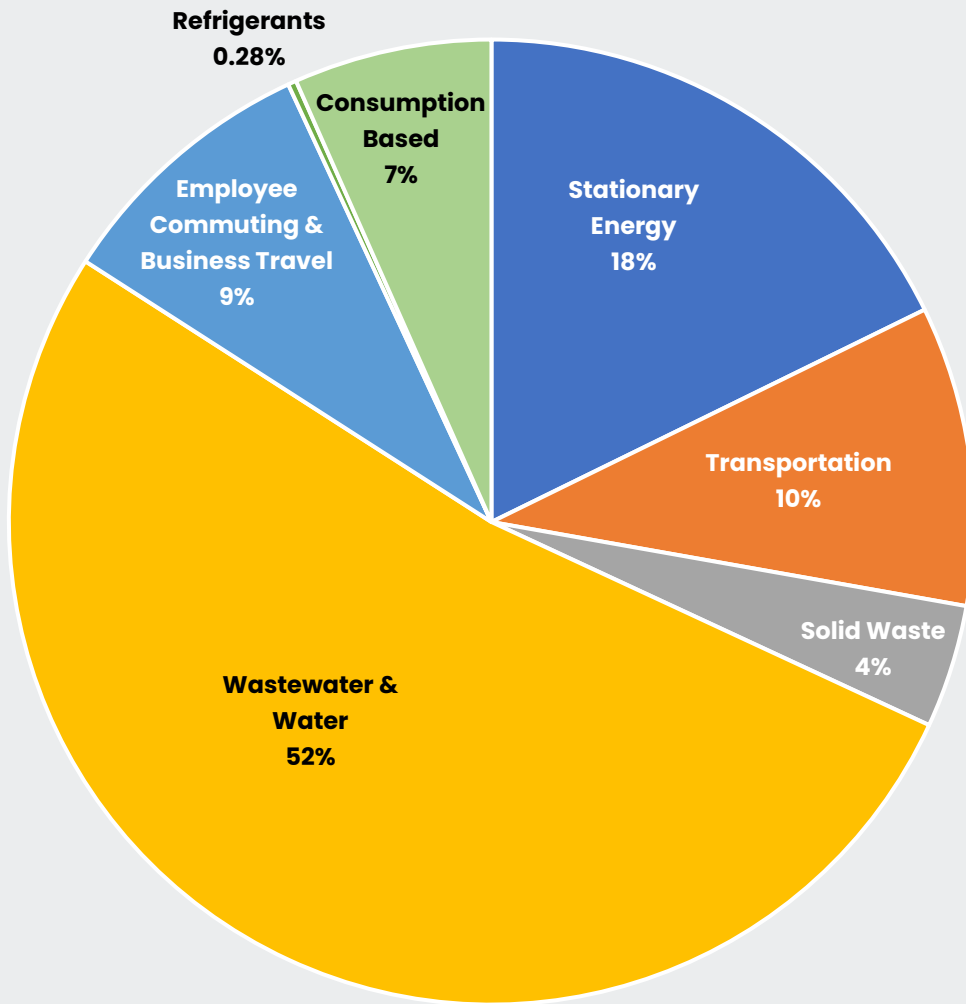
FY24 INVENTORY: METHODOLOGY, EMISSIONS BY SCOPE

Total Emissions (MT CO₂E)



- Inventory completed by Lotus follows guidance from ICLEI's *Local Government Operations Protocol* (LGOP)
 - GHGs included: carbon dioxide, methane, nitrous oxide, HFCs (refrigerants)
- All activities where the City can make operational decisions are included in the inventory
- Scope 1: Direct emissions from operations, including:
 - Stationary and mobile fuel combustion, refrigerant use in buildings and fleet, wastewater treatment
- Scope 2: Indirect emissions from purchased energy, i.e.,
 - Use of grid-supplied electricity, heat, steam, and/or cooling within City-owned buildings and infrastructure (e.g., streetlights)
- Scope 3: All other emissions with a company's activities, including:
 - Solid waste generation, employee commuting, business travel, consumption-based emissions from asphalt, concrete, computer/hardware purchases, fertilizer use, etc.

FY24 INVENTORY: TOTAL EMISSIONS BY SECTOR (MT CO₂e)



- **Wastewater & Water** (9,521 MT CO₂e):
 - Wastewater and water electricity use (9,054), wastewater process treatment process (398), wastewater and water fuel combustion (69)
- **Stationary Energy** (3,239):
 - Grid-supplied electricity (1,686), fuel combustion (natural gas, stationary diesel & propane, totaling 1,552)
- **Transportation** (1,833):
 - Municipal vehicles fuel combustion (1,369), municipal equipment fuel combustion (464), grid-supplied electricity (0.03)
- **Employee Commuting & Business Travel** (1,642):
 - Commuting: Driving alone (1,557), carpooling (23), public transit (21)
 - Business travel: Air travel (38), vehicle travel (3)
- **Consumption Based** (1,211):
 - Asphalt (1,027), fertilizer (130), computers (29), cement (25)
- **Solid Waste** (753):
 - Landfilled waste (752), compost (1)

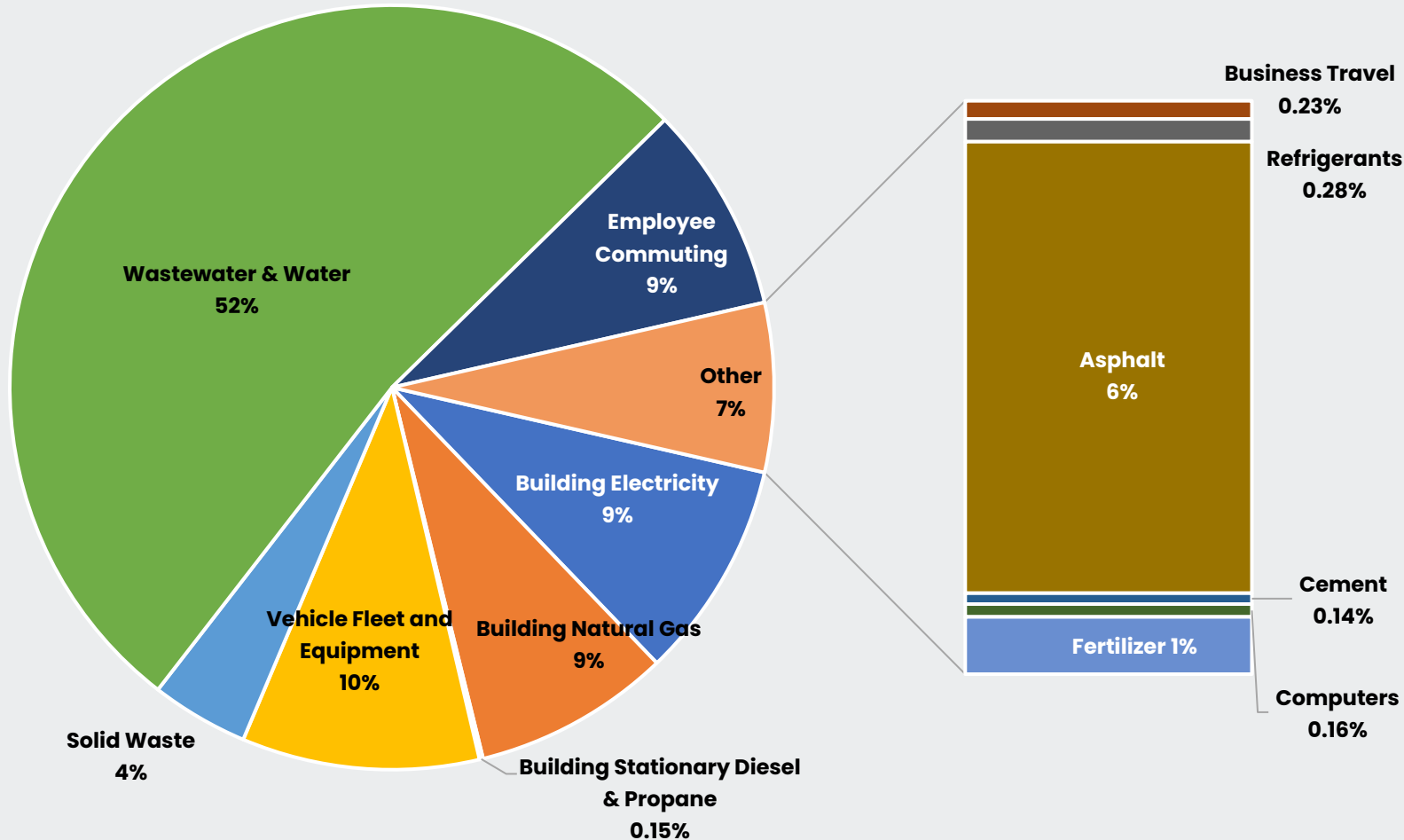
FY24 INVENTORY: PERCENT CHANGES BY SECTOR

All Emissions by Sector

Emission Sector	Emissions (MT CO ₂ e)				Percent Change FY08 to FY20	Percent Change FY20 to FY24
	FY03	FY08	FY20	FY24		
Stationary Energy & Street Lighting	2,668	4,305	4,483	3,239	4%	-28%
Vehicle Fleet	1,445	1,752	2,239	1,833	28%	-18%
Solid Waste	N/A	N/A	71	753	N/A	961%
Wastewater & Water	12	25	10,787	9,521	43,396%	-12%
Employee Commuting & Business Travel	827	1,037	1,329	1,642	28%	24%
Refrigerants	N/A	N/A	N/A	52	N/A	N/A
Consumption	N/A	N/A	N/A	1,211	N/A	N/A
Total	4,952	7,119	18,909	18,250	166%	-3%

Source: FY24 City of Missoula Municipal GHG Inventory

FY24 INVENTORY: TOTAL EMISSIONS BY SOURCE (MT CO₂e)



- Wastewater & Water: 9,521
- Vehicle Fleet and Equipment: 1,833
- Building Electricity: 1,686
- Employee Commuting: 1,600
- Building Natural Gas: 1,524
- Asphalt: 1,027
- Solid Waste: 753
- Fertilizer: 130
- Refrigerants: 52
- Business Travel: 41
- Computers: 29
- Building Stationary Diesel & Propane: 28
- Cement: 25

Source: FY24 City of Missoula Municipal GHG Inventory

HOW DOES MISSOULA COMPARE?*

	Municipal Carbon Neutrality Goal	City Population (2023)	Municipal Employees	Municipal Emissions
Boulder, CO	70% Reduction in GHG Emissions by 2030	106,274	1,540 FTE (2023)	19,348 MT CO ₂ e (2023, Scopes 1-2)
Bozeman, MT	Carbon Neutral by 2050	55,042	510.5 FTE (2024)	Community Inventories Completed Every Other Year
Helena, MT	Increased Sustainability for All Municipal Facilities	33,126	368 FTE (2022)	5,637 MT CO ₂ e (2022, Scopes 1-2)
Missoula, MT	Carbon Neutral in City Operations by 2025	75,600	1,017 Headcount (FY24)	18,250 MT CO ₂ e (FY24, Scopes 1-3)
Mountain View, CA	Carbon Neutral City by 2045	82,363	688 Headcount (2023-24)	9,623 MT CO ₂ e (2022, Scopes 1-3)
Spokane, WA	Net Zero Emissions by 2050	229,228	2,629 Headcount (2022)	148,058 MT CO ₂ e (2022, Scopes 1-3)

**Direct comparisons are difficult due to lack of standardized data points, different calculation methods, and a wide variety of municipally-owned and operated facilities and utilities.*

KEY TAKEAWAYS

Municipal emissions are 1.86% of community emissions, and the City will benefit from larger community projects (e.g., Green Power Program).

The City is reducing its GHG emissions overall, including in its three sectors with the highest emissions.

Given the 2017 acquisition of Missoula Water, the City is using the FY20 emissions inventory as the new baseline for measuring progress.

Even though the number of City employees increased 55% from FY20 to FY24, the City's per capita emissions dropped 38% in the same period.

The City has an ambitious carbon neutrality goal (set in 2012) that it is not on track to meet. (FYI, the 2012 plan recommended purchasing carbon offsets after fully exploring conservation and other reduction methods.)

The City is deeply committed to reducing its carbon footprint (e.g., Climate & Resiliency is one of the lenses City leaders and staff apply to making operational decisions).



WHAT'S NEXT?

- **Summer 2025:** City Climate and Sustainability Team evaluates progress on 34 strategies in 2012 action plan
 - Team to also present CY23 Community Inventory to Council
- **Fall 2025:** Task force of City leaders and staff from multiple departments develops 3- to 5-year municipal sustainability roadmap, prioritizing strategies to move the needle on emissions while considering budget realities
- **Winter 2025-26:** Task force brings new municipal sustainability roadmap to Council for discussion



MORE TO DO

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