

2023 Contra Costa County Greenhouse Gas Emissions Inventory Update



Prepared by:
Blake McPherson
Sustainability Fellow / Student Intern
Dept. of Conservation and Development

Photo credit: Adam Scarbrough

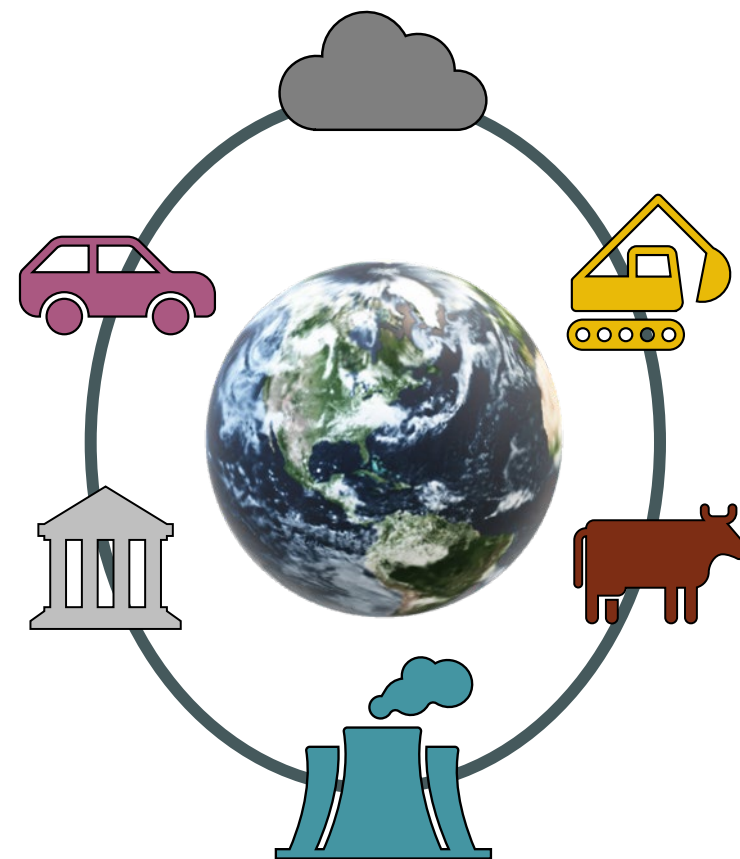
Agenda

- Greenhouse Gas Inventory Purpose
- Types of GHG Inventories
- Key Points from 2023 Inventories
- Community-Wide Inventory Results
- County Operations Inventory Results



Greenhouse Gas (GHG) Inventory Purpose

- GHGs, such as carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O), emitted from human activity trap more heat in the atmosphere and contribute to:
 - Rising surface temperatures; adverse health effects; more unstable weather events; and climate change.
- In 2024, Contra Costa County adopted the Climate Action and Adaptation Plan 2024 Update (CAAP), which aims to reduce GHG emissions in the County with equitable solutions.
- CAAP directs staff to conduct GHG emissions inventory at least every 5 years



Types of GHG Inventories Conducted

Community-Wide Inventory

- Identifies GHG emissions from the activities of **unincorporated** Contra Costa County residents, employees, visitors, and other community members.



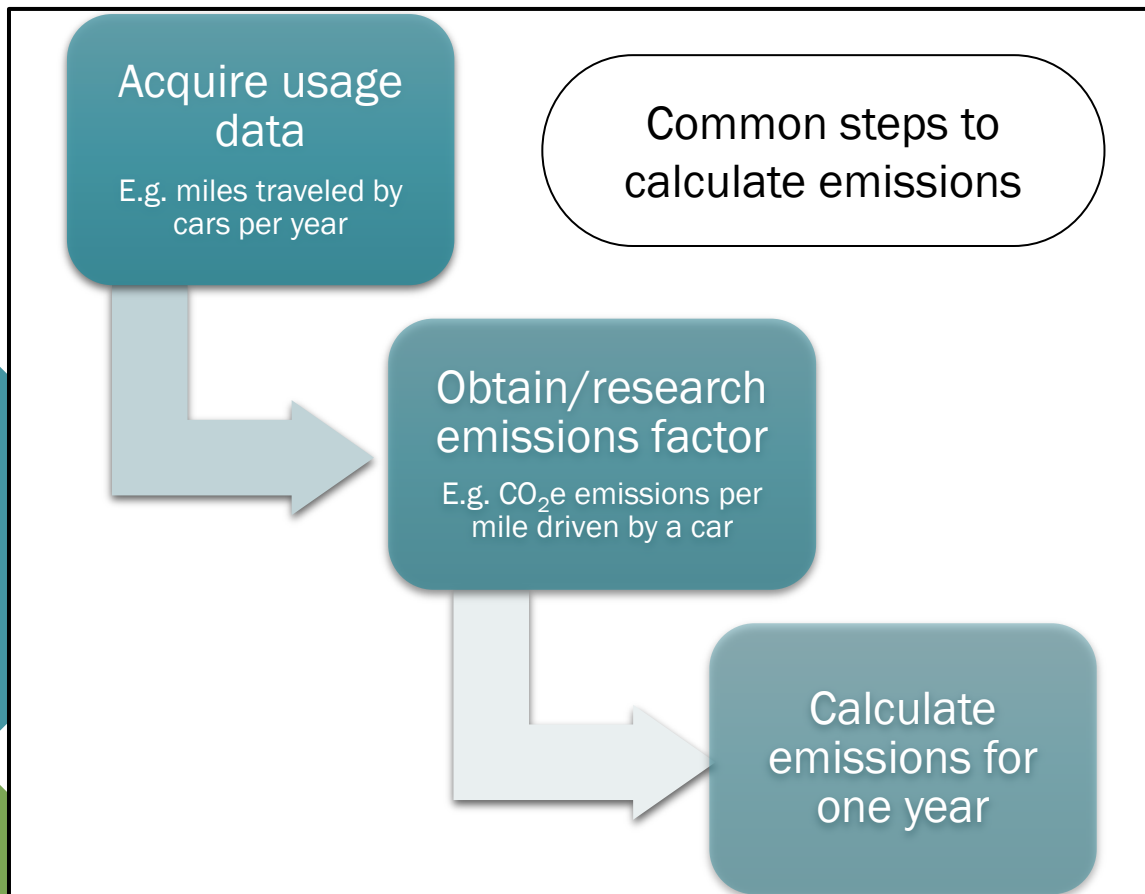
County Operations Inventory

- Identifies GHG emissions that are a direct result of Contra Costa County's **government operations**.



What goes into GHG emissions inventories?

- GHG inventories are conducted in accordance with *U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions*, published by ICLEI in 2019
- Data is compiled from many sources, like local and state organizations, and emissions are calculated by converting usage to emissions via an emissions factor



Sector	Data Source
Transportation	Vehicle miles traveled & emissions factors from California Air Resources Board (CARB)
Energy	PG&E-provided electricity and natural gas usage
Solid waste	Tons of waste reported by CalRecycle
Water and wastewater	Gallons of water usage from water utility companies
Off-road equipment	Direct emissions reported by CARB
Agriculture	Acres of crops & number of cattle from Contra Costa County Annual Ag Report

Key Points from Both Inventories

Community-Wide Inventory

-  Emissions from the largest sectors, **transportation** and **energy consumed in buildings**, continue to decrease 
-  Emissions from **off-road equipment** and **agriculture** are increasing but are small portions of overall total
-  **Solid waste** emissions come primarily from waste in place at landfills, and are projected to be largest emissions source in 2045 if all CAAP goals are met

County Operations Inventory

- **Energy use in buildings/facilities** sector continues to decline in emissions 
- **Employee commute** accounts for almost 70% of emissions and remains near-constant
 - Remote work and EVs help reduce emissions



For both inventories, electricity is rapidly approaching zero-emissions.



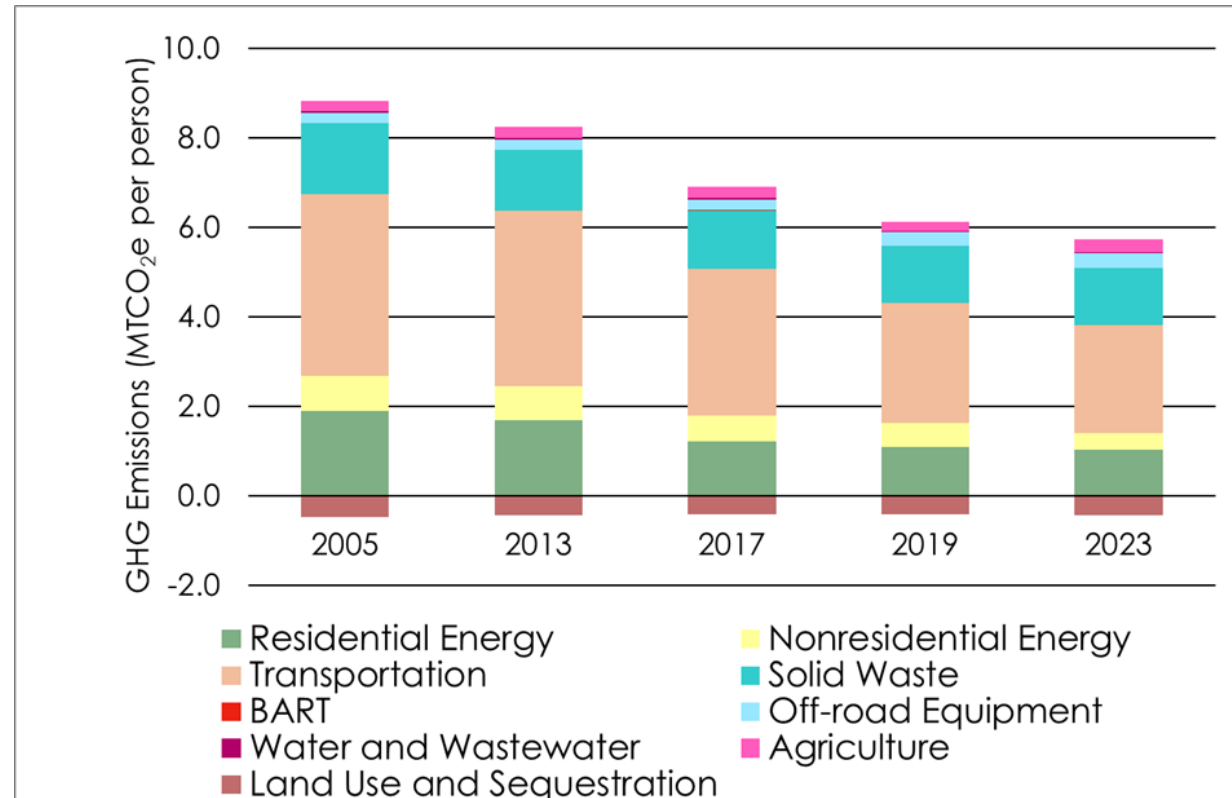
Community-Wide Inventory Results



Community-Wide Inventory Summary

Per-Person Emissions

Emissions per resident decreased **37%** from 2005 to 2023, despite a 13% increase in population

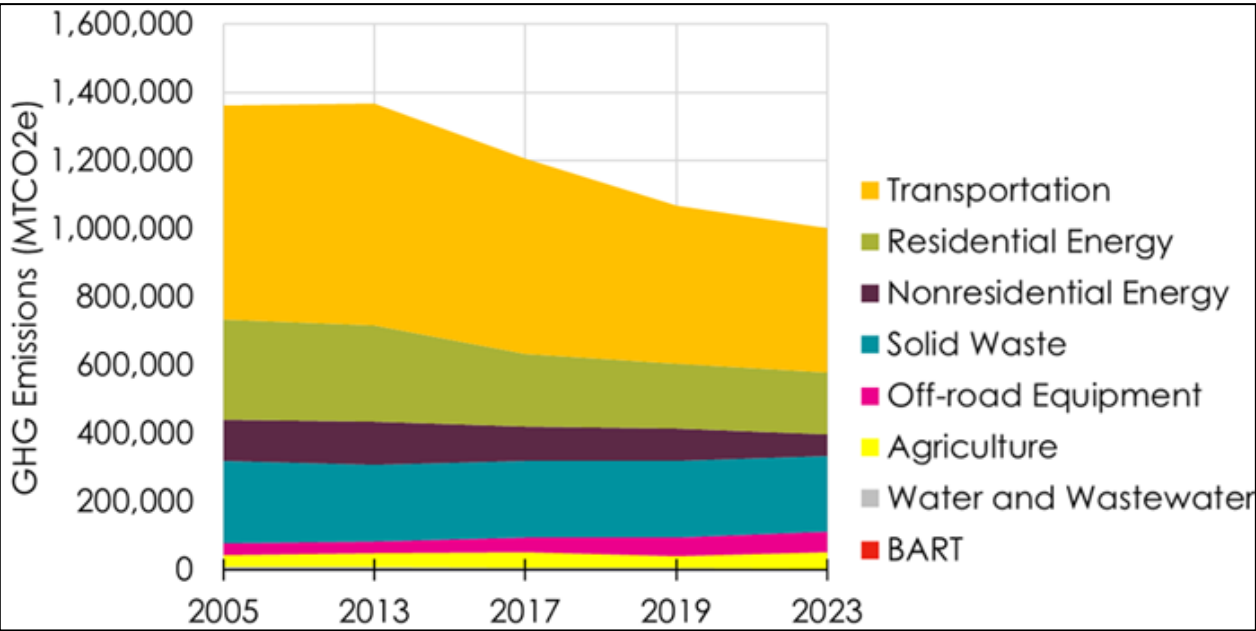


	2005	2013	2017	2019	2023	Percent Change, 2005 to 2023
Emissions per-person (MTCO ₂ e/person)	8.37	7.82	6.51	5.73	5.30	-37%
Unincorporated area population	154,270	165,700	174,110	174,150	174,980	+13%

Community-Wide Inventory Summary

- 28% decrease in unincorporated county emissions from 2005 to 2023

MTCO₂e = metric tons of CO₂ equivalence



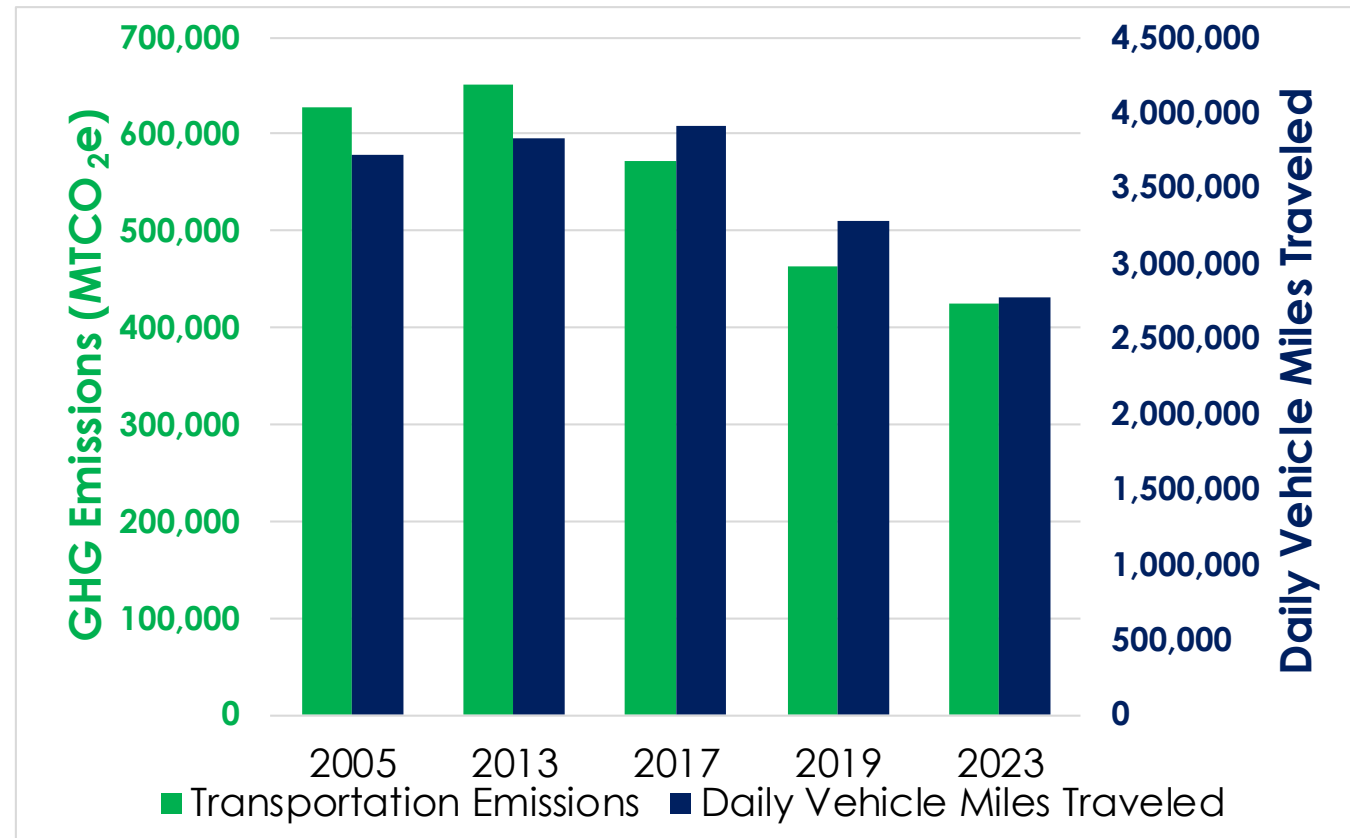
Sector	2023 Emissions (MTCO ₂ e)	Percent of Total
Transportation	425,060	46%
Residential energy	180,590	19%
Nonresidential energy	64,160	7%
Solid waste	220,920	24%
Off-road equipment	60,050	6%
Agriculture	49,210	5%
Water and wastewater	2,290	< 1%
BART	300	< 1%
Land use and sequestration	-74,520	-8%
Total	928,060	100%

Energy = 26%

Community-Wide Inventory Summary

Transportation – 46% of emissions

- Largest sector of emissions in 2023
- Emissions decreased because:
 - Decrease in daily vehicle miles traveled (VMT)
 - Increased adoption of electric vehicles

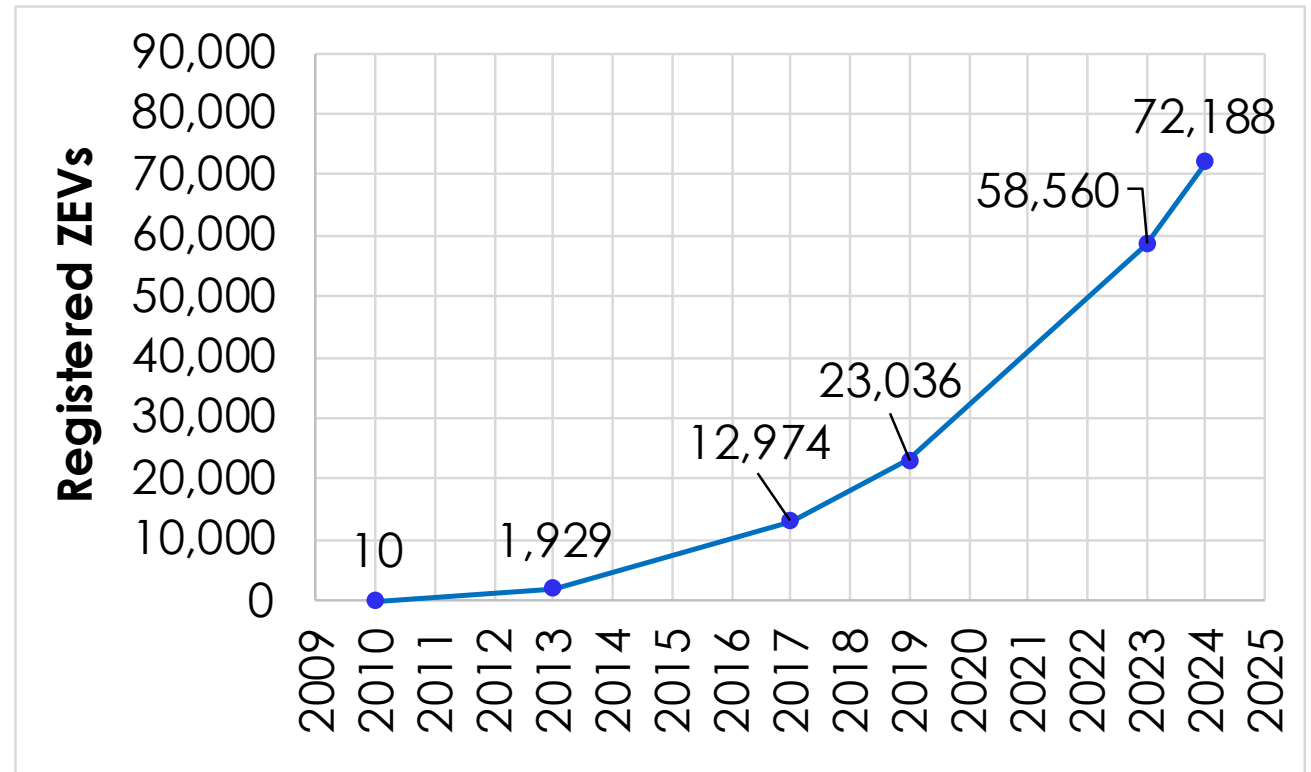


VMT Source: California Air Resources Board. "On-Road (EMFAC) – Mobile Source Emissions Inventory." 2025.
Retrieved from: <<https://ww2.arb.ca.gov/our-work/programs/msei/on-road-emfac>>

Community-Wide Inventory Summary

Transportation – 46% of emissions

- Largest sector of emissions in 2023
- Emissions decreased because:
 - Decrease in daily vehicle miles traveled (VMT)
 - Increased adoption of electric vehicles

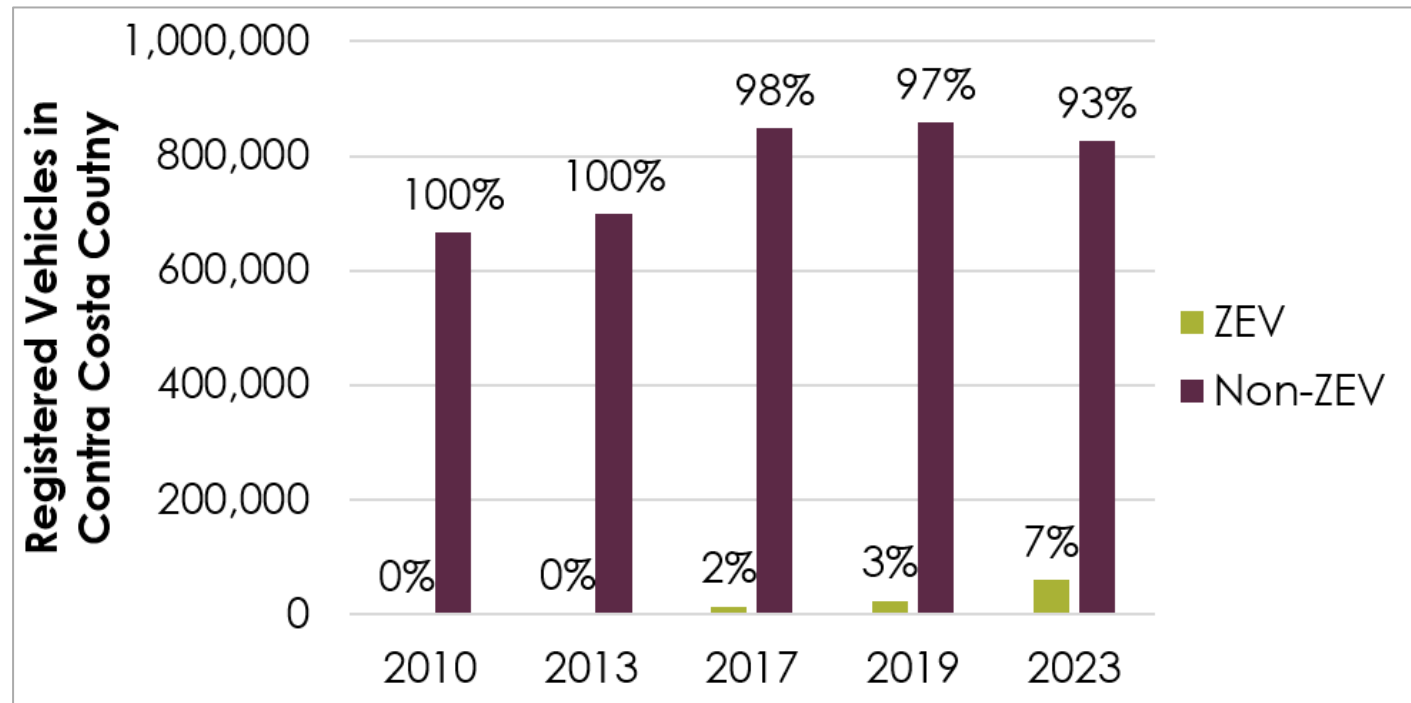


Source: California Energy Commission (2025). Light-Duty Vehicle Population in California. Data last updated May 16, 2025. Retrieved from <<https://www.energy.ca.gov/zevstats>>

Community-Wide Inventory Summary

Transportation – 46% of emissions

- Largest sector of emissions in 2023
- Emissions decreased because:
 - Decrease in daily vehicle miles traveled (VMT)
 - Increased adoption of electric vehicles

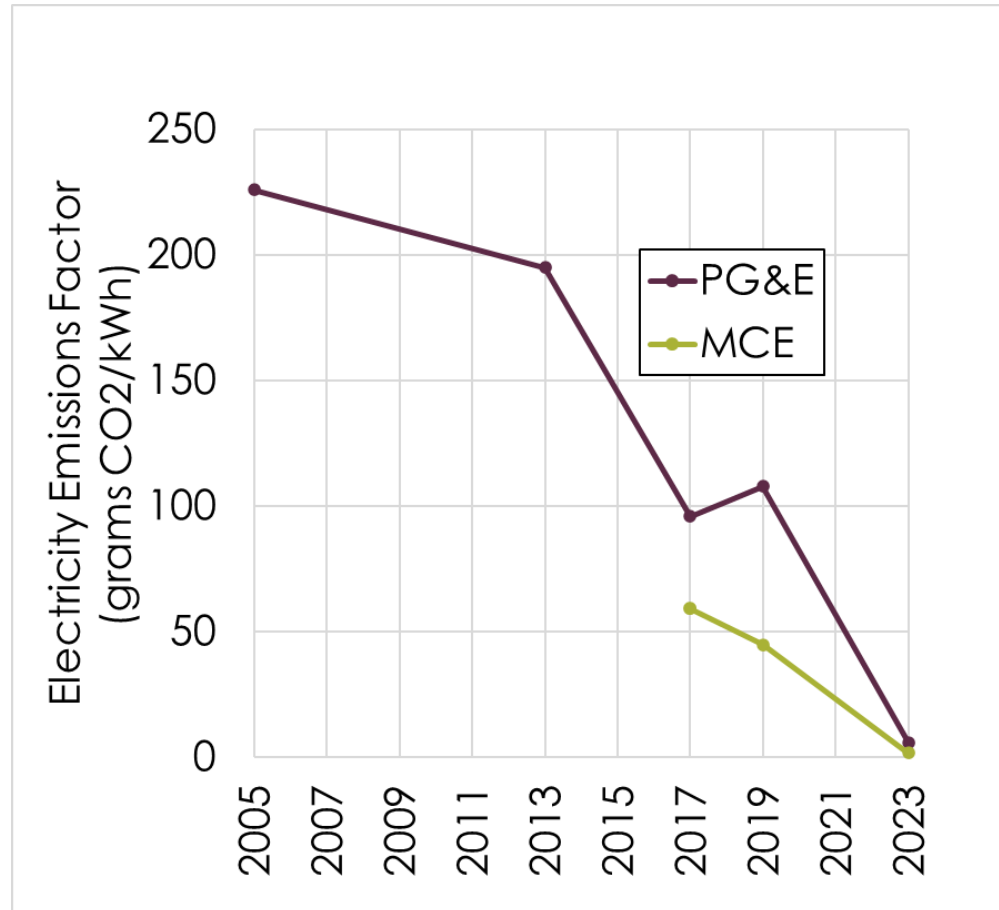


Source: California Energy Commission (2025). Light-Duty Vehicle Population in California. Data last updated May 16, 2025. Retrieved from <<https://www.energy.ca.gov/zevstats>>

Community-Wide Inventory Summary

Energy – 26% of emissions

- Emissions related to electricity consumption **decreased by 97%** from 2005 to 2023



High emissions



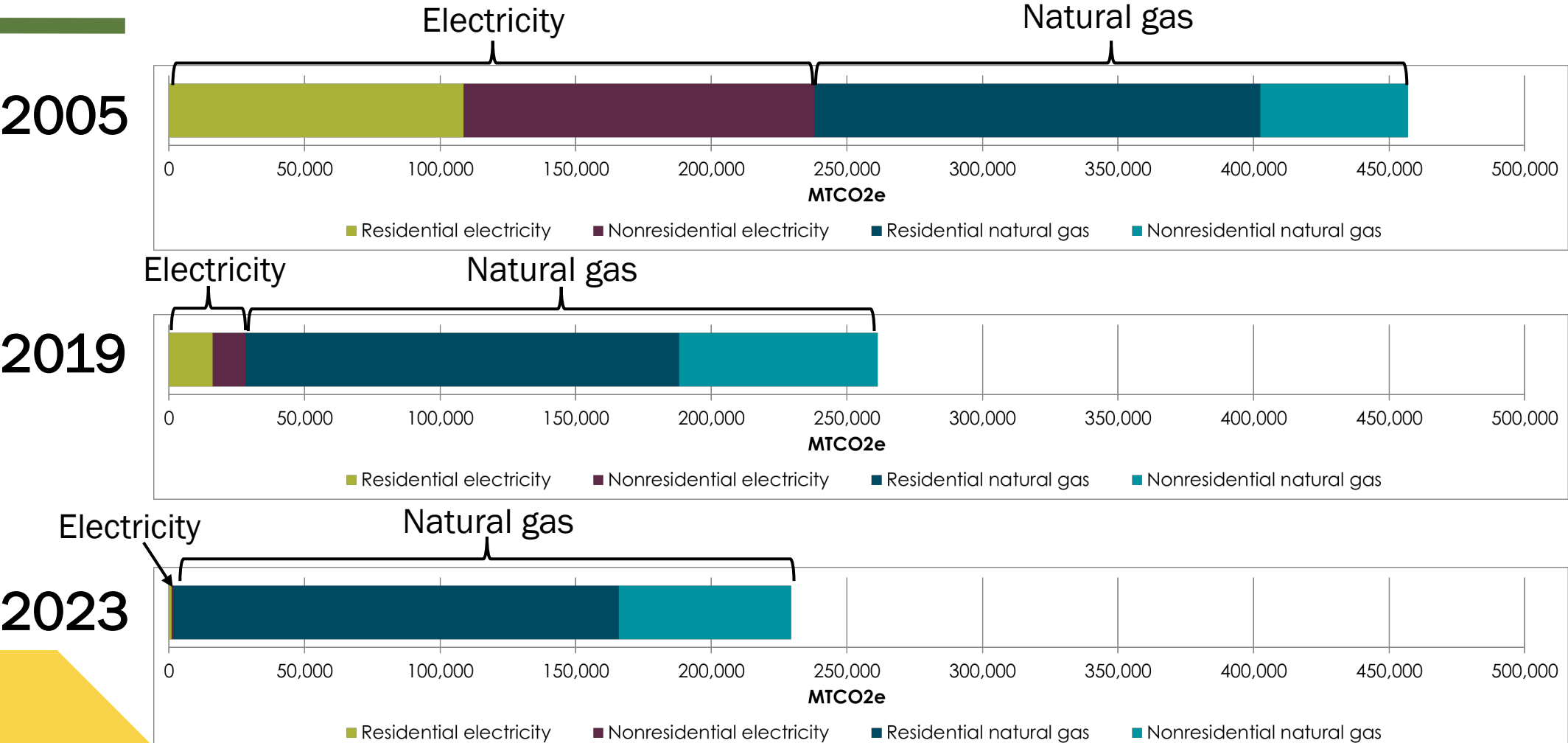
Low emissions

Source: California Energy Commission (2024). "Annual Power Content Labels for 2023."
Retrieved from <<https://www.energy.ca.gov/programs-and-topics/programs/power-source-disclosure-program/power-content-label>>

Community-Wide Inventory Summary

Energy – 26% of emissions

Energy-related emissions shifted from ~50% electricity and ~50% natural gas in 2005 to almost entirely (~99%) natural gas in 2023

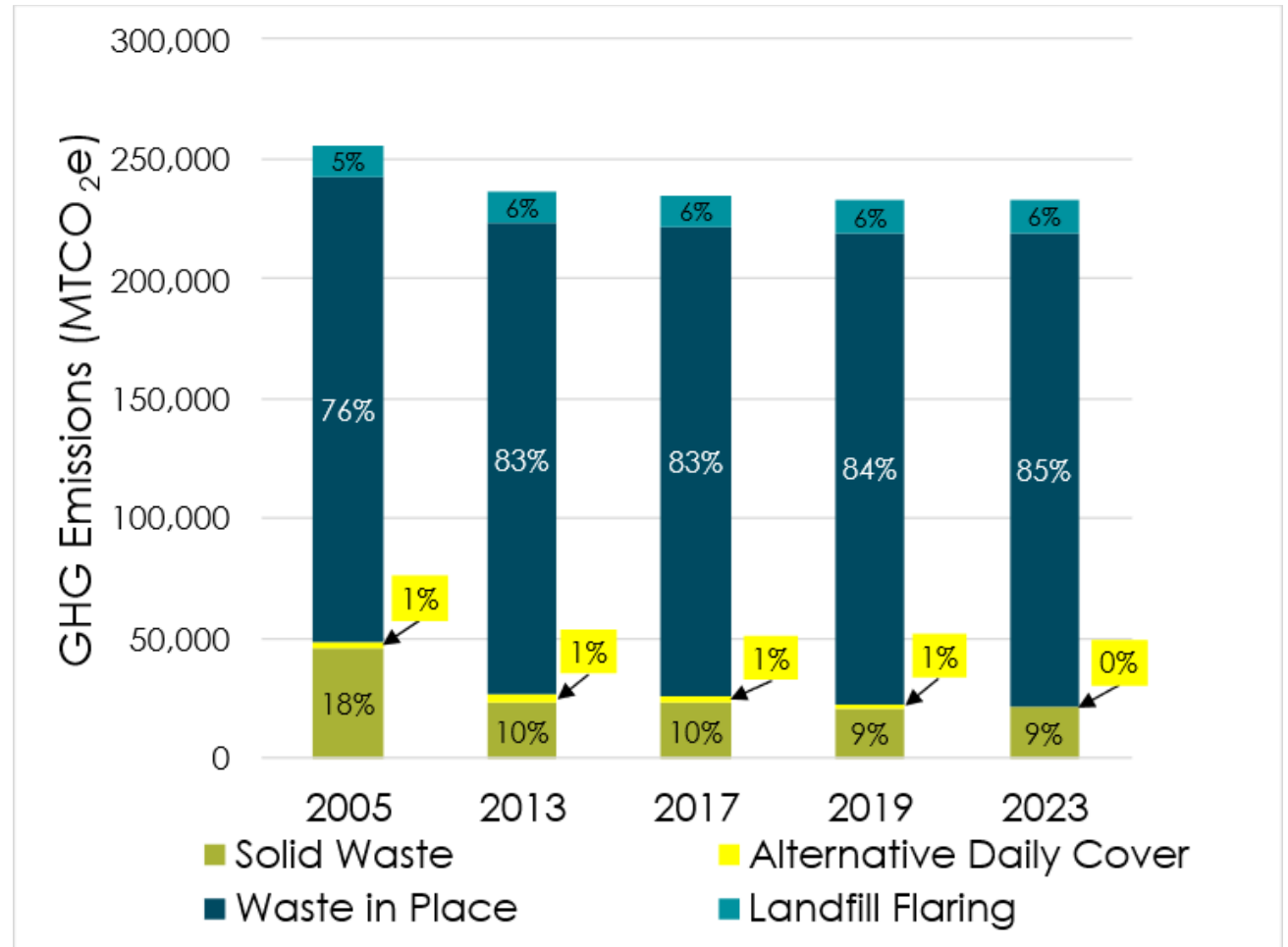


Community-Wide Inventory Summary

Solid Waste – 24% of emissions

- Between 2005 and 2023, solid waste emissions decreased by 9%, primarily due to decreases in solid waste generated
- In 2023, waste already in-place at landfills accounted for 85% of solid waste emissions

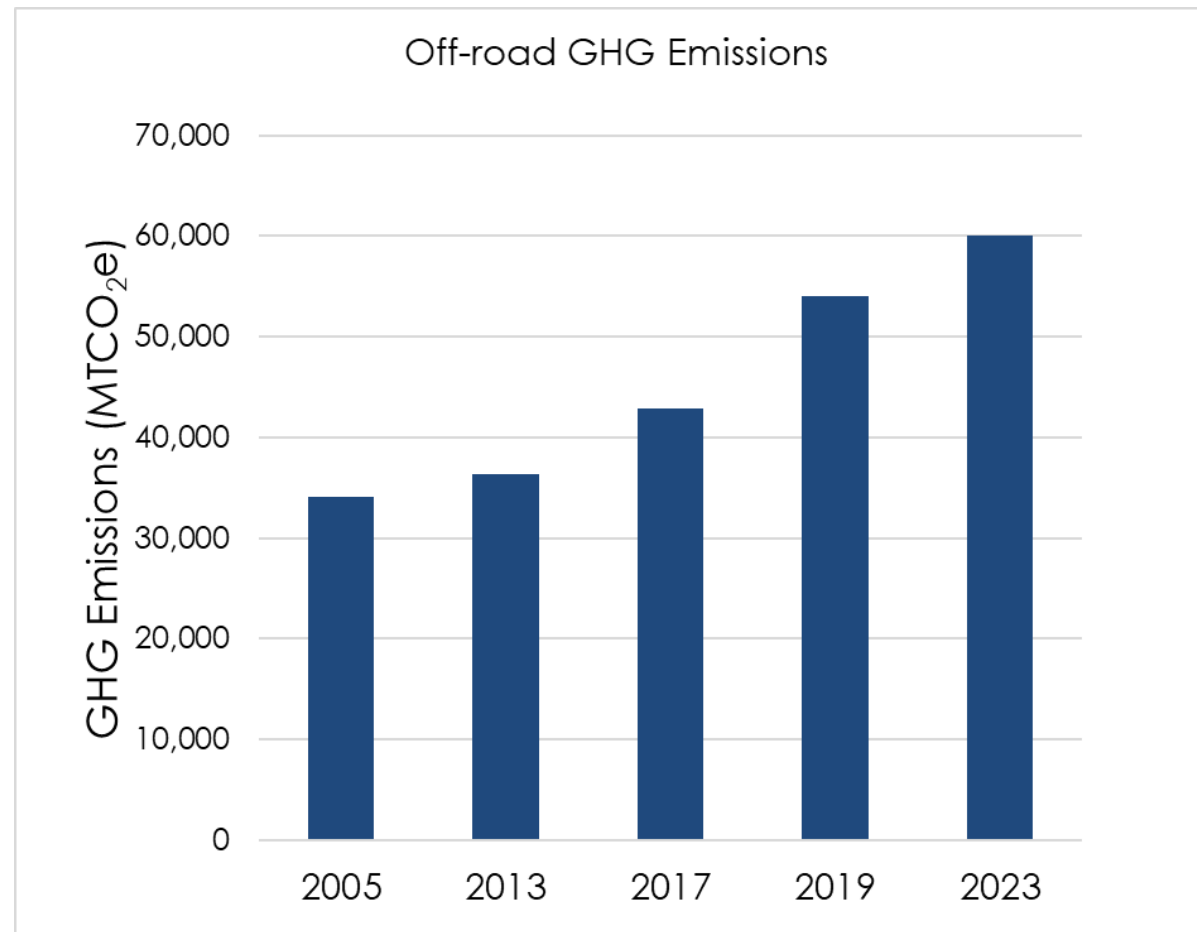
The 2024 CAAP forecasts that if all the County's GHG reduction targets are met in 2045, waste in place at landfills will be the largest GHG emissions source.



Community-Wide Inventory Summary

Off-Road Equipment – 6% of emissions

- Off-road emissions **increased by 76%** from 2005 to 2023
- The addition of more categories of vehicles being tracked and different modeling approaches could explain some increased emissions

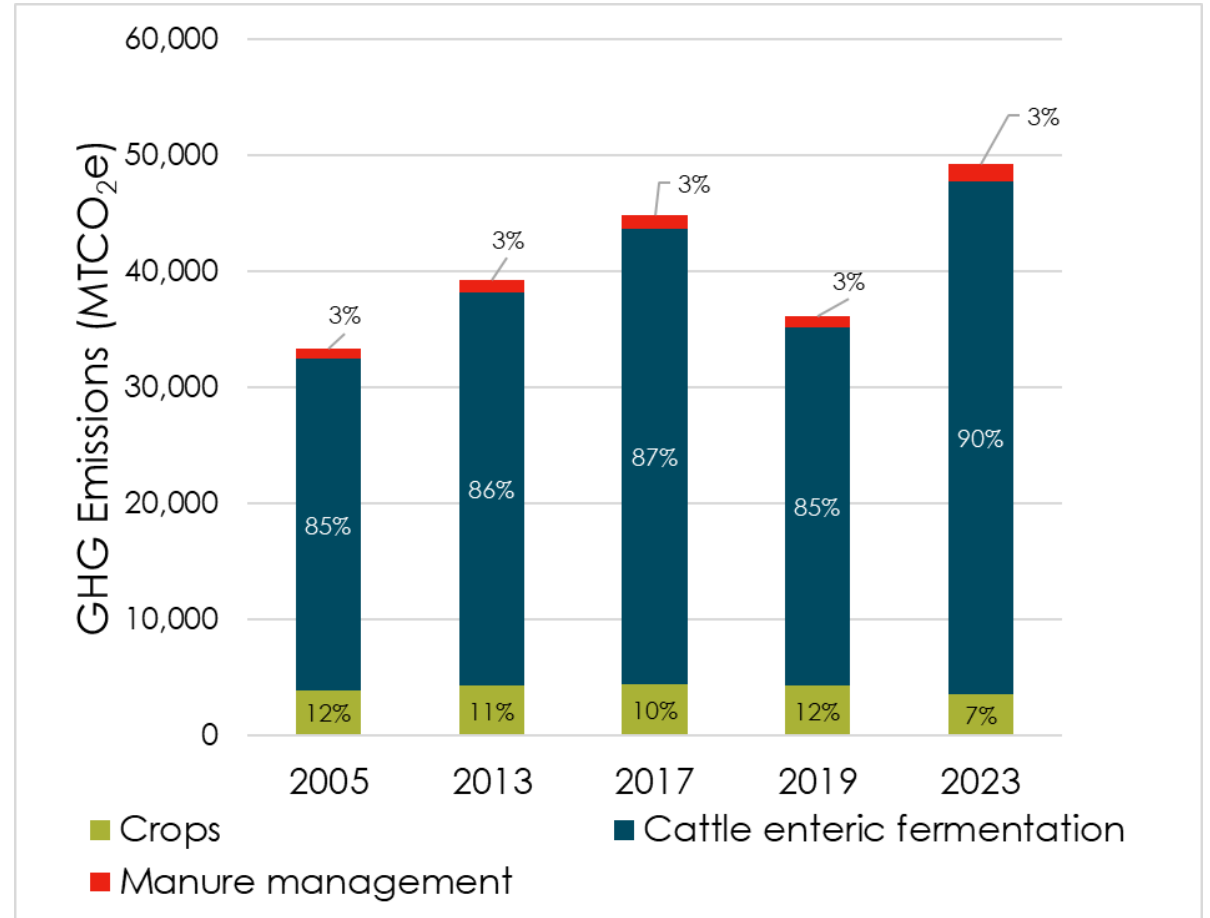
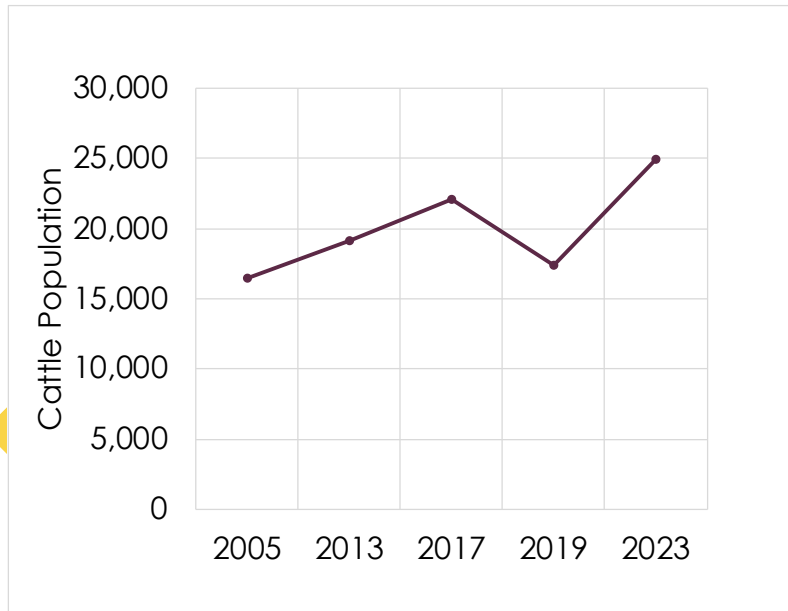


Sources: California Air Resources Board (2025). "Off-Road Emissions Inventory." Retrieved from:
<<https://arb.ca.gov/emfac/offroad/emissions-inventory/47ab6a5c937b039319a63afd7df94ec503ccd733>>

Community-Wide Inventory Summary

Agriculture – 5% of emissions

- Agriculture emissions increased by 48% from 2005 to 2023
- Increases in emissions are primarily due to more cattle being present in the county

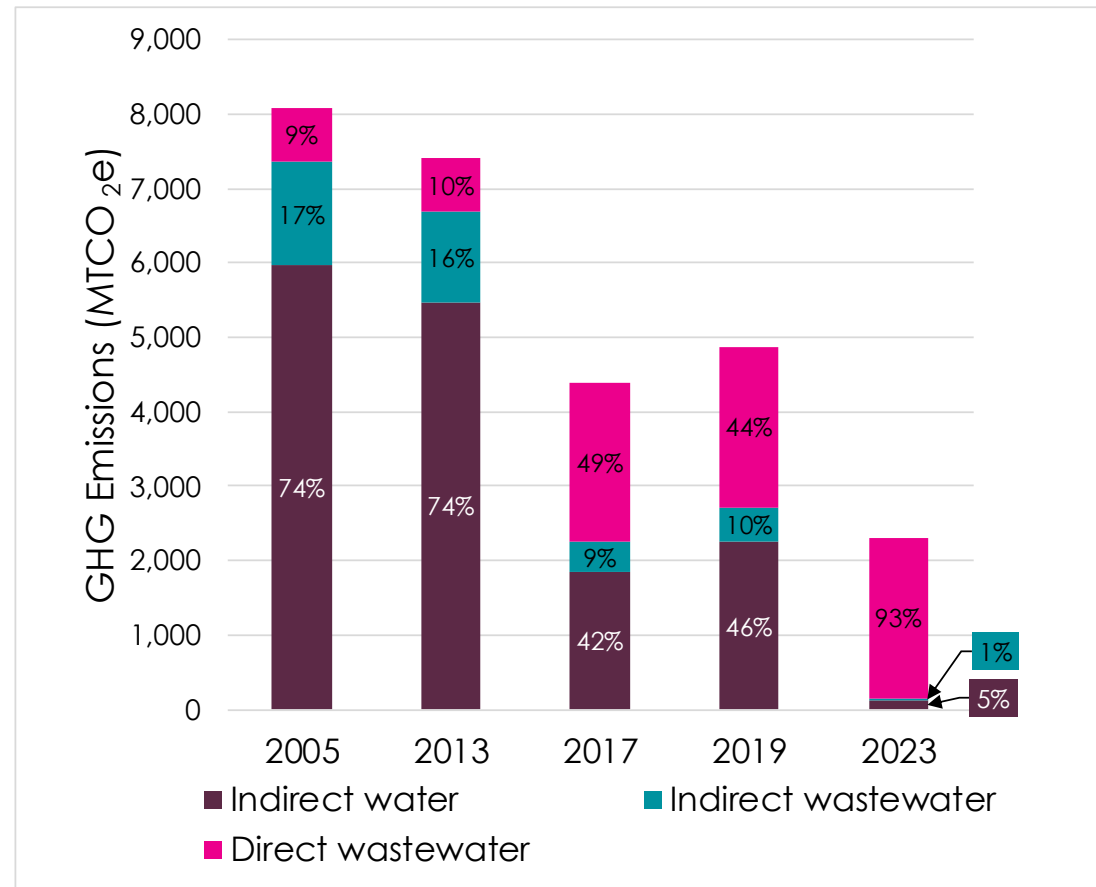


Source: Contra Costa County Dept. of Agriculture / Weights & Measures (2025). "2023 Contra Costa Agricultural Crop Report."
Retrieved from: <https://www.contracosta.ca.gov/2207/Crop-and-Economic-Reports>

Community-Wide Inventory Summary

Water and Wastewater - <1% of emissions

- Between 2005 and 2023, GHG emissions from water and wastewater **decreased 72%**
 - Mostly due to nearly zero-emissions related to electricity to move water
- **Indirect emissions** are from the electricity required to pump water or wastewater from one place to another
- **Direct emissions** come from the actual treatment of wastewater

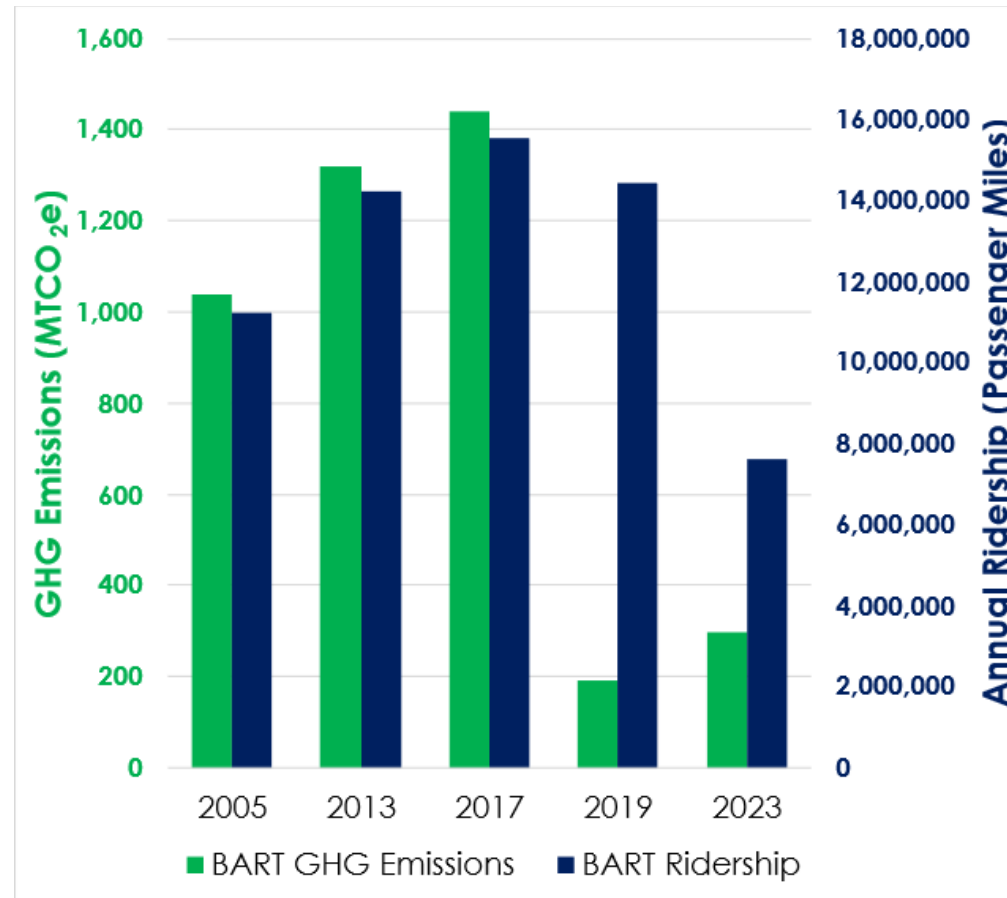


Sources: Contra Costa Water District and East Bay Municipal Utility District.
Unincorporated Contra Costa Annual Usage Reports - 2023.
Retrieved from CCWD and EBMUD Representatives.

Community-Wide Inventory Summary

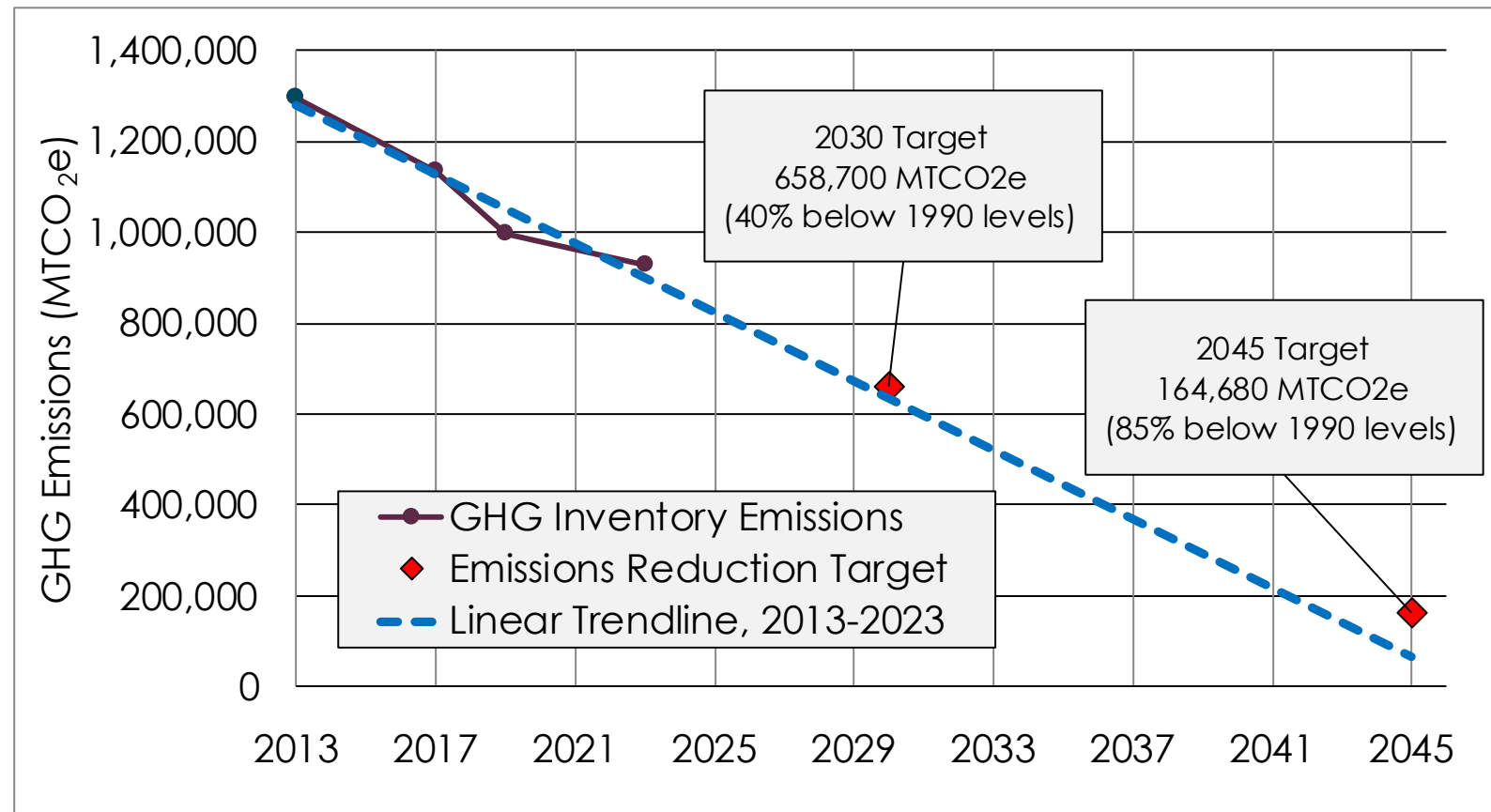
BART – <1% of emissions

- From 2005 to 2023, BART emissions decreased by 72%, while ridership decreased by 32%



Source: Bay Area Rapid Transit (2025). "Ridership Reports – April 2023" Retrieved from:
<<https://www.bart.gov/about/reports/ridership>>

Community-wide Historical Emissions Trendline vs. Targets



Community-Wide Inventory

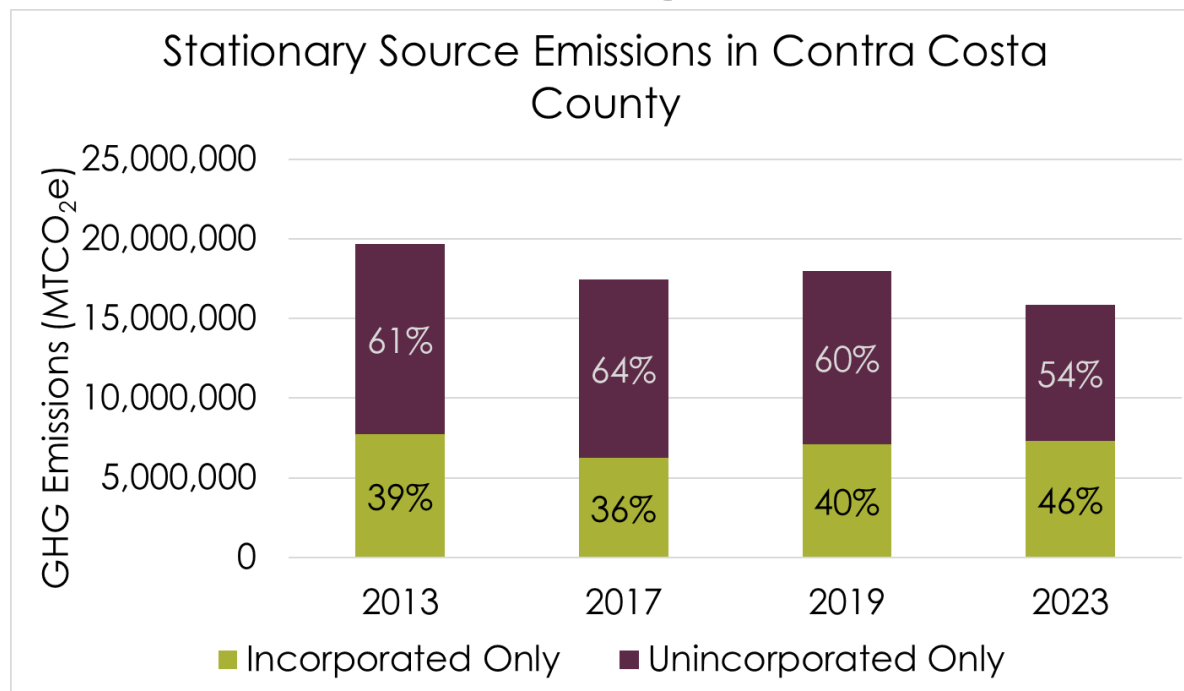
Informational Items



2023 Community-Wide Inventory

Stationary Sources

- Stationary sources are not under County authority for GHG emissions
- Since 2013, emissions decreased 28% in unincorporated areas and 19% across the entire county



SECTOR	2013	2017	2019	2023	PERCENT CHANGE, 2013-2023
Stationary Source Emissions (MTCO₂e)					
Incorporated areas	7,732,049	6,241,605	7,110,440	7,300,296	-6%
Unincorporated areas	11,956,002	11,232,294	10,867,670	8,569,854	-28%
Total	19,688,051	17,473,899	17,978,110	15,870,150	-19%

Source: California Air Resources Board (2025). "CARB Pollution Mapping Tool." Version 2.6. Retrieved from: <https://ww2.arb.ca.gov/resources/carb-pollution-mapping-tool>

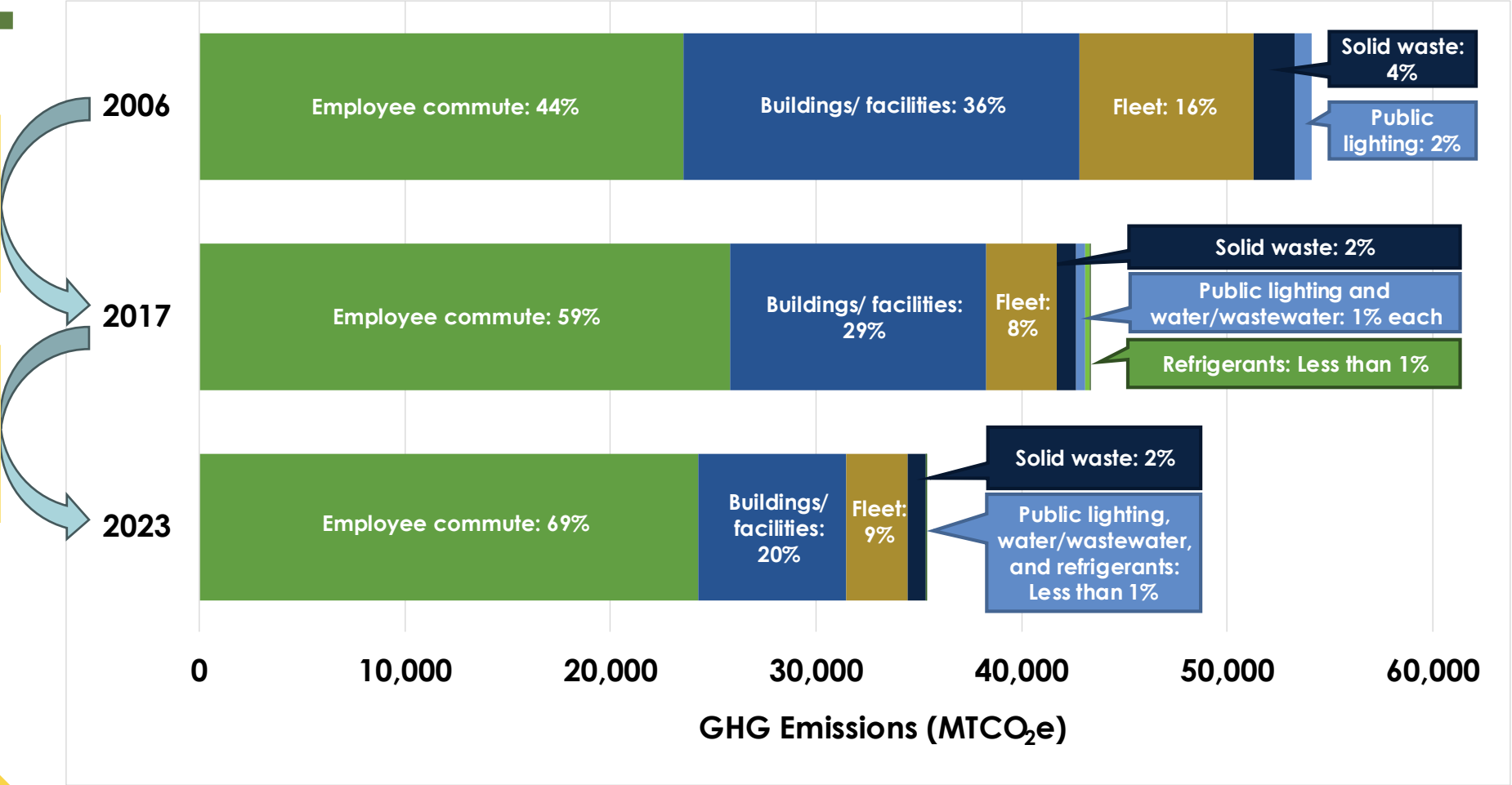


County Operations Inventory Results

County Operations Inventory Summary

GHG emissions	↓ 20%
# of County employees	↑ 19%

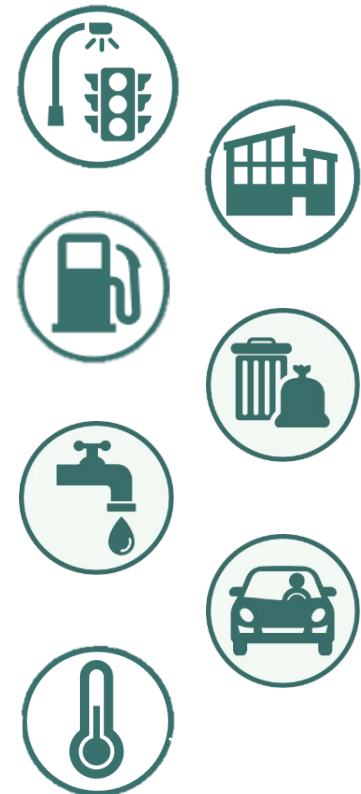
GHG emissions	↓ 18%
# of County employees	↑ 12%



2017 vs. 2023 County Operations Inventory

Consumption trends:

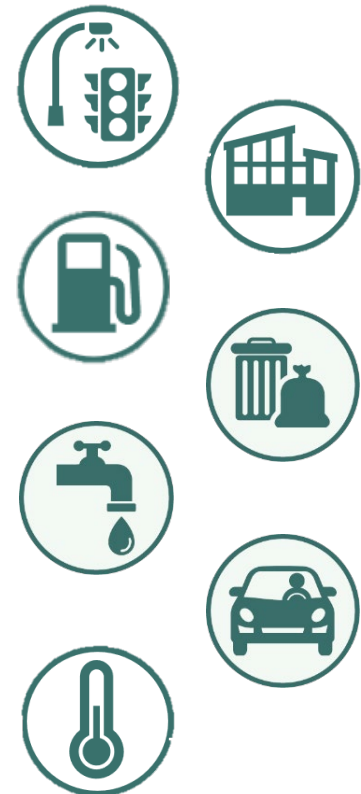
Between 2017 and 2023:	% Change
Building/lighting electricity usage	↓ 16%
Building natural gas usage	↑ 14%
Fleet fuel consumption	↓ 8%
Solid waste generation	↓ 6%
Water and wastewater usage (possibly large margin of error)	↓ 29%
Employee commute miles	0%
Refrigerant replacement (possibly large margin of error)	↑ 33%



2017 vs. 2023 County Operations Inventory

Emissions trends:

Between 2017 and 2023:	% Change
Building/lighting electricity emissions	↓ 99%
Building natural gas emissions	↑ 14%
Fleet fuel emissions	↓ 12%
Solid waste generation	↓ 7%
Water and wastewater emissions	↓ 89%
Employee commute miles	↑ 6%
Escaped refrigerant emissions	↑ 33%



2023 Employee Commute Statistics

- Survey responses of 2,339 employees (over 20% response rate) was scaled up to represent all employees in 2023
- **Over 95% of respondents primarily drive alone to work**
- Electric vehicle use doubled from 2019 to 2025 comprised 10.7% of miles traveled in 2025, up from 5.3% in 2019

PRIMARY EMPLOYEE COMMUTE MODE	PERCENT OF RESPONSES
Driving alone (gas, diesel, and gas hybrid)	85.1%
Driving alone (electric)	10.0%
Carpool (gas, diesel, and gas hybrid)	3.7%
Carpool (electric)	0.3%
Public transit (BART, bus, ferry, and Amtrak)	1.9%
Motorcycle	0.2%
Active transportation (walk, bike, scooter, etc.)	1.9%

7,480 MTCO₂e (24% of commute emissions) were avoided in 2023 due to remote work, carpooling, and electric vehicles

Equivalent to taking 1,630 gas-powered cars off the road for one year

Source: 511 Contra Costa (2025). "Contra Costa County Employee Commute Survey." Retrieved response data from 511 Contra Costa representative.
Results may vary from published numbers by 511 Contra Costa due to different calculation methods.

Thank you for your time!

Questions?

Contact:

Blake McPherson, Fellow/Intern
Dept. of Conservation and Development
blake.mcpherson@dcd.cccounty.us

Special thanks to:

Contra Costa County

Jody London, Sustainability Coordinator
Samantha Harris, Transportation Planner
Brendan Havenar-Daughton, Public Works Energy Manager
Joe Yee, Public Works Deputy Director
Jamar Stamps, Principal Transportation Planner
Robert Sarmiento, Transportation Planner
David Brockbank, Conservation Programs Manager
Kristine Solseng, Principal Geographic Information Systems Planner
AiLi Pigott, Geographic Information Systems Intern
Chris Howard, Principal Geographic Information Systems Planner
Greg Spurlock, Deputy Agricultural Commissioner
Ricky Williams, Fleet Maintenance Manager
John Kopchik, Conservation and Development Director
Jason Crapo, Conservation and Development Deputy Director
Emily Groth, Sustainability Planner
Nicole Shimizu, Sustainability Planner
Demian Hardman-Saldana, Principal Sustainability Planner
Adam Scarbrough, Sustainability Planner

Other Agencies and Organizations

Eli Krispi, PlaceWorks
Kirsten Riker, Advanced Mobility Group / 511 Contra Costa
Kristin Bowman, East Bay Municipal Utility District
Stephanie Stewart, Pacific Gas & Electric
Martin Bond, MCE
Laura Wehrly, MCE
Sebastian Conn, MCE