Chatham County Greenhouse Gas Inventory 2023 - 2024

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Agenda

- Introduction & History
- Methodology
- 2023-2024 County Data
- Trends Over Time
- Carbon Sink
- Green Updates
- On the Horizon

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Introduction

BIG IDEA

Become a carbon negative county.

- What is a Greenhouse Gas (GHG) Inventory?
  - A detailed accounting of the greenhouse gases emitted by anthropogenic sources and also removed from natural carbon sequestration processes (trees & forests), within a specific area over a time period
  - Greenhouse gases include: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (NO_2), and fluorinated gases
- Why are GHG inventories important?
  - Help governments, organizations, and communities track progress toward climate goals and develop effective mitigation strategies; they are essential tools for climate planning and policy
- A "Big Idea" from Chatham County's Comprehensive Plan includes “become a Carbon Negative County” by reducing the County’s greenhouse gas emissions and the environmental risks that will result from global warming
  - GOAL 1: Become more resilient by mitigating, responding and adapting to emerging threats
  - Resiliency Policy 5: Reduce per capita emissions
  - Strategy 5.3: Partner with academic institutions, regional partners and other organizations to monitor emissions and carbon sequestration, as well as develop strategies to reduce emissions and encourage carbon sequestration

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Inventory History

- Chatham County has conducted 4 total GHG inventories:
  - 2010: A baseline GHG inventory was created by Betsy McCorkle and Amanda Campbell at Duke University's Nicholas School of the Environment
  - 2015: An updated report was produced by Lauren Joca and Carl Kolosna in the *PLAN 547: Energy, Transportation, and Land Use* course at the University of North Carolina at Chapel Hill
  - 2019-2020: A report was created by Emily Apadula, Chatham County intern, with updated methodology and resources to standardize GHG inventories for future years
  - 2023-2024: This current report by Courtney Bagans, Chatham County intern, uses standardized methodologies and resources from the 2019-2020 GHG inventory to identify patterns and trends over time

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Inventory Methodology

- International Council for Local Environmental Initiatives' (ICLEI) ClearPath tool
  - ClearPath is an emissions management tool used by more than 900 cities and counties in the U.S. to conduct GHG inventories and emissions forecasting.
  - It uses pre-loaded emissions factors and integrated formulas to convert raw data from energy processes, such as grid electricity usage and stationary fuel combustion, into the common unit of measure of CO_2 equivalents (CO_2E).
- IPCC Sixth Assessment Report 100-year Global Warming Potential (GWP) factors
  - GWPs measure how much heat a greenhouse gas traps in the atmosphere over a specific time period (100 years) compared to carbon dioxide (CO_2), which has a GWP of 1.
  - Converting all GHG emissions into this common unit of measure allows for the calculation of a comprehensive total of GHG emissions that allows for comparisons by sector.
- Data on direct (e.g. stationary combustion) and indirect (e.g. electricity) emissions from 13 sources that include a mix of national, state, and local governmental agencies, and private enterprises

Data Sources

Electric Companies (3)	Duke Energy, Randolph Electric, Central Electric
Oil & Gas Suppliers (5)	Dominion Energy, Sharp Energy, Strick's LP Gas, Pico Propane, Euliss Propane
Government Agencies (4)	EPA, USDA, NCDEQ, Chatham County
ICLEI (1)	Google Environmental Insights Explorer

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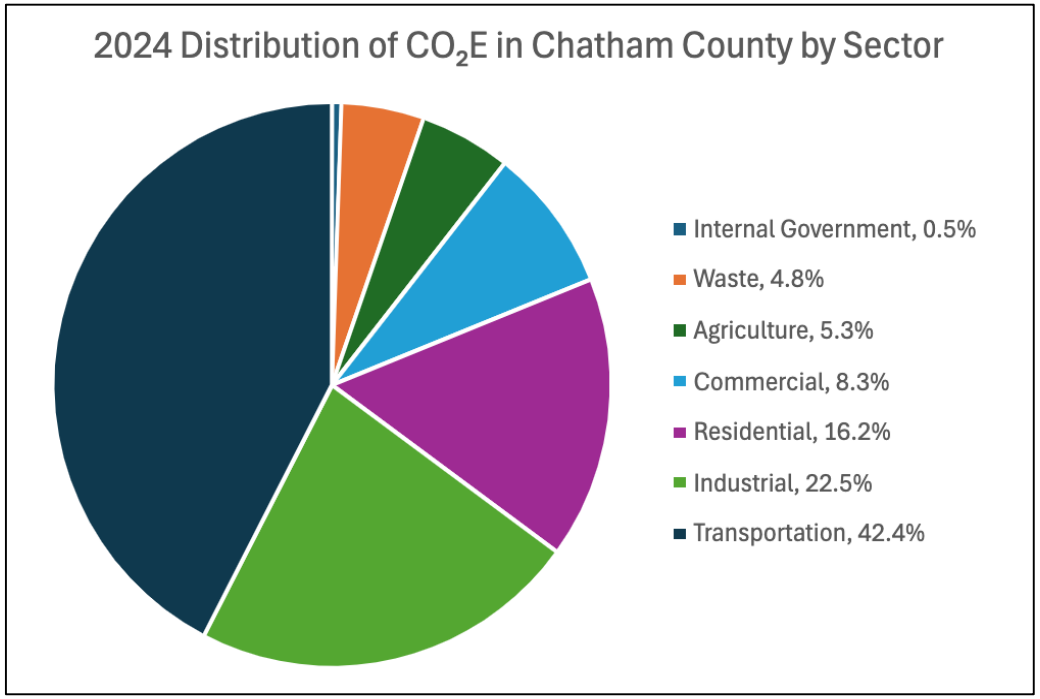
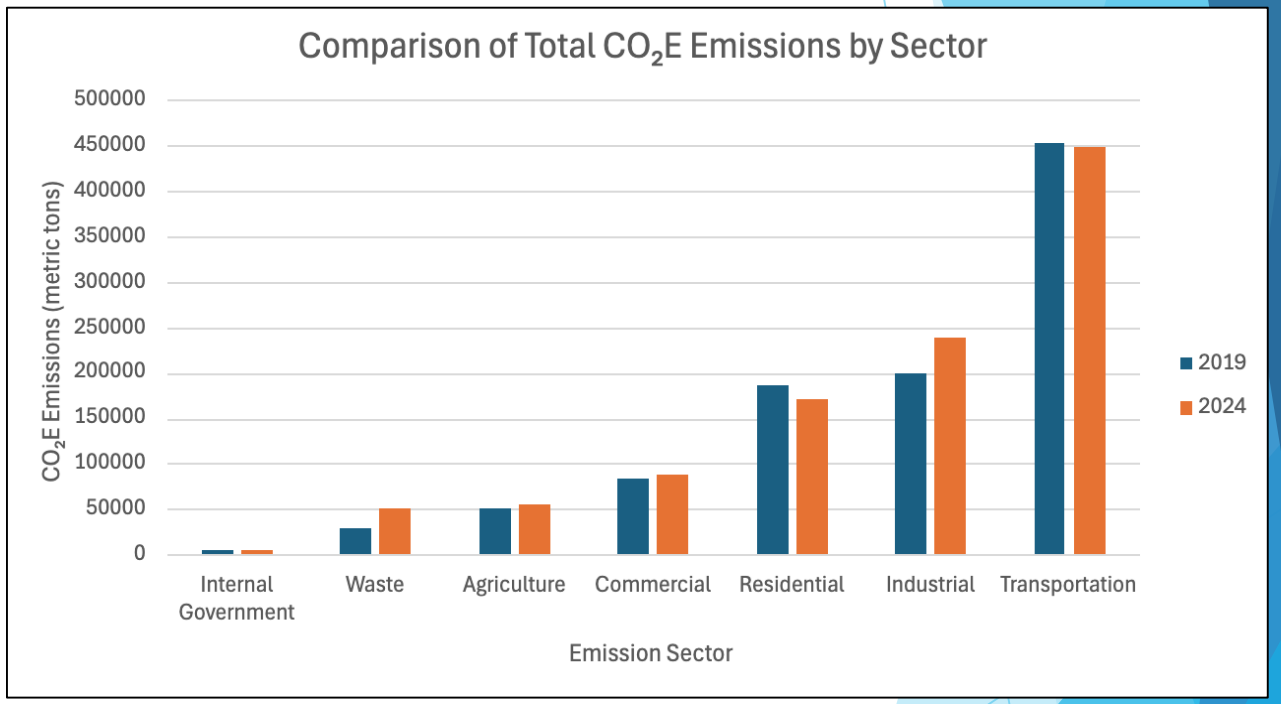
Chatham County Emissions by Sector





Transportation remains the largest emissions sector for the county at 42.4% of total emissions for 2024

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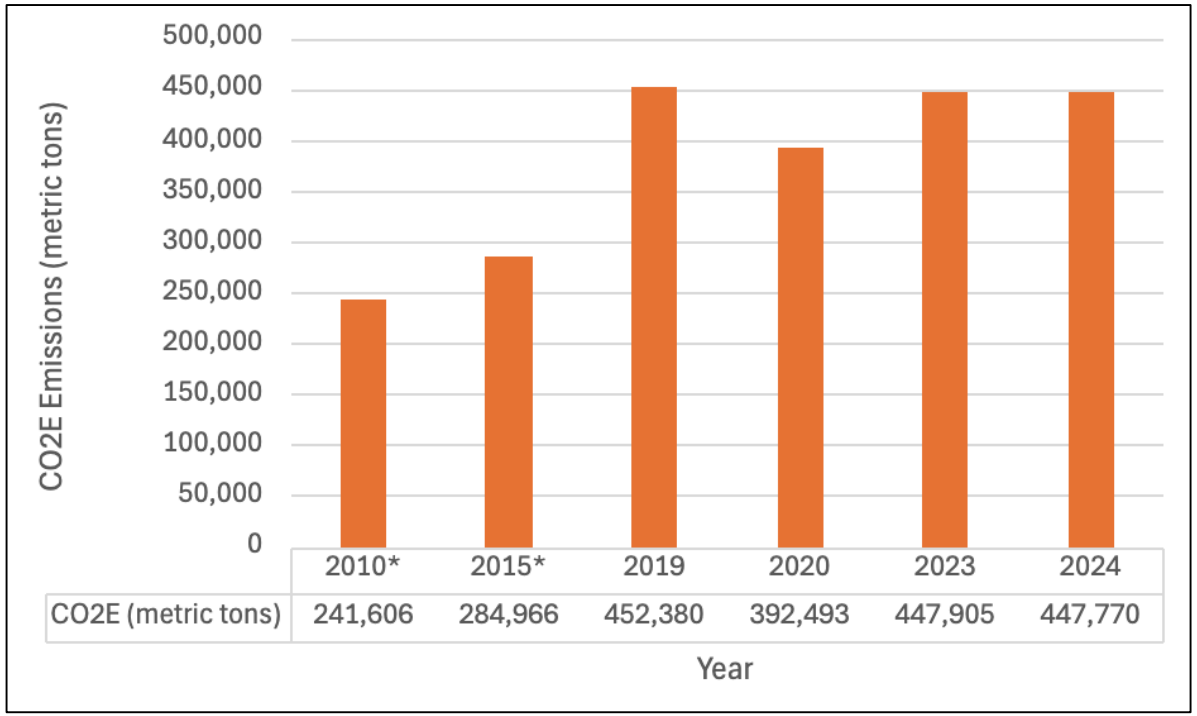
Transportation



**2010 and 2015 used different methodology and data sources to calculate transportation emissions.*

- 41-42% of total emissions for Chatham County
- 36% of total emissions for state of NC in 2024 (50,350,000 metric tons CO_2e)
  - Chatham County is 0.9% of the State's emissions
- Low emissions during COVID-19
  - 14% higher today
- 1,518 EVs registered in Chatham County as of September 2024 (NCDOT)
- 12 EV charging stations in Chatham County

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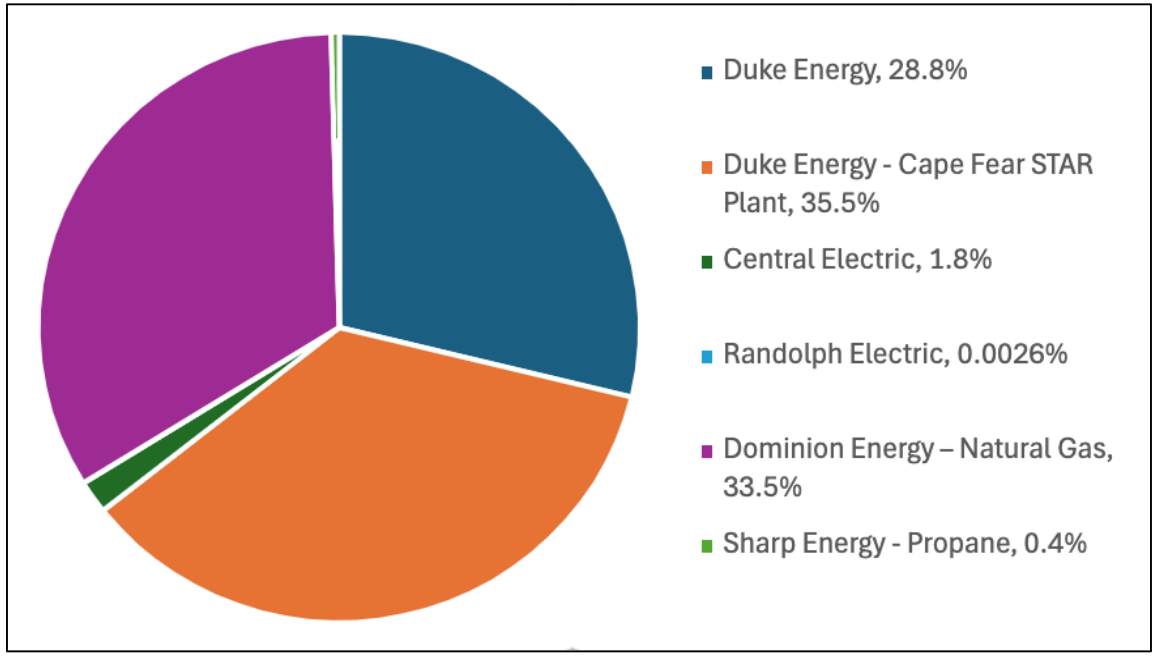
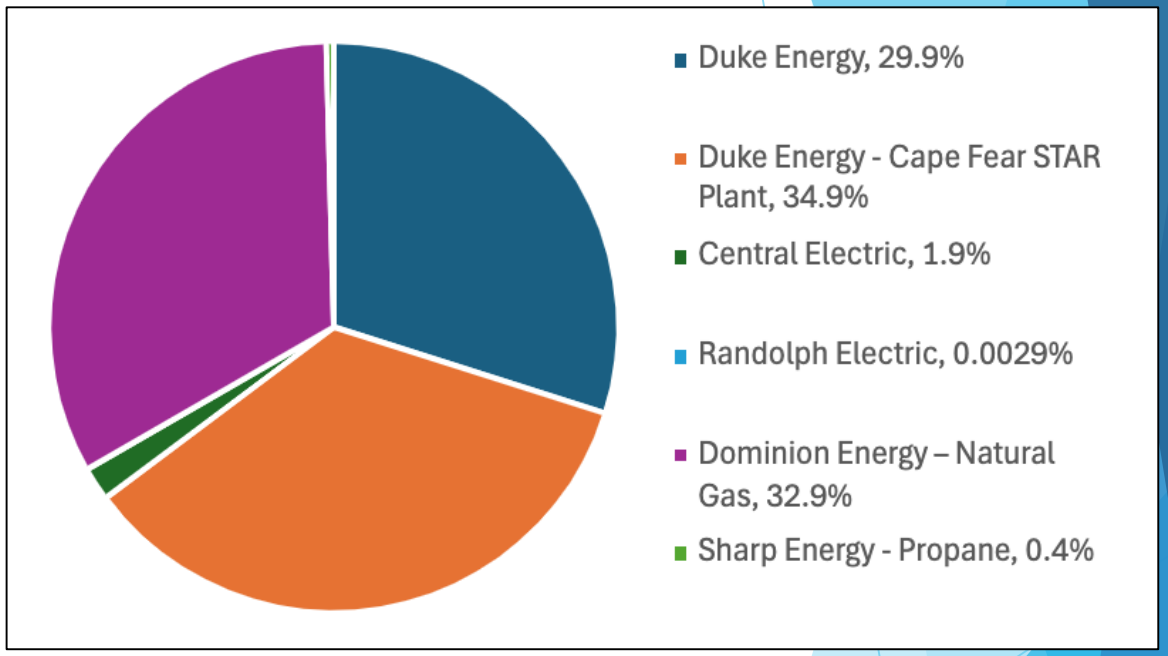
Industrial



2023 Industrial CO_2E Emissions

- Total: 233,413 metric tons CO_2E (21.7% of overall annual emissions)



2024 Industrial CO_2E Emissions

- Total: 237,885 metric tons CO_2E (22.5% of overall annual emissions)

Cape Fear STAR Plant is responsible for 35% of Industrial emissions in 2023 and 2024 (~83,000 metric tons of CO_2E)

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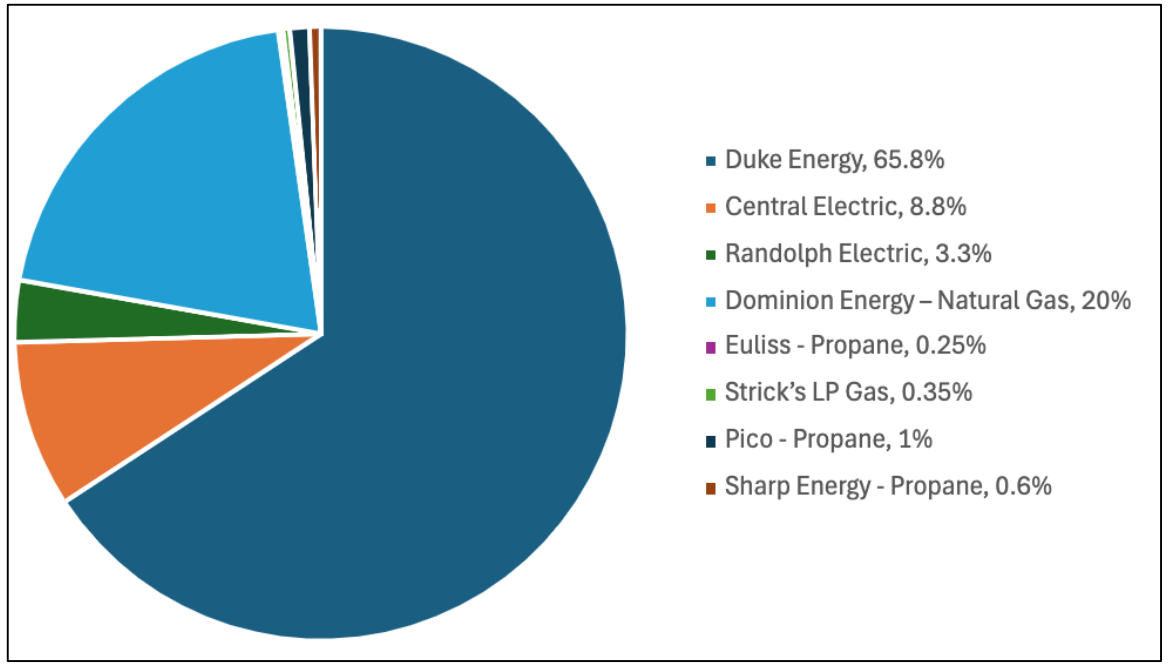
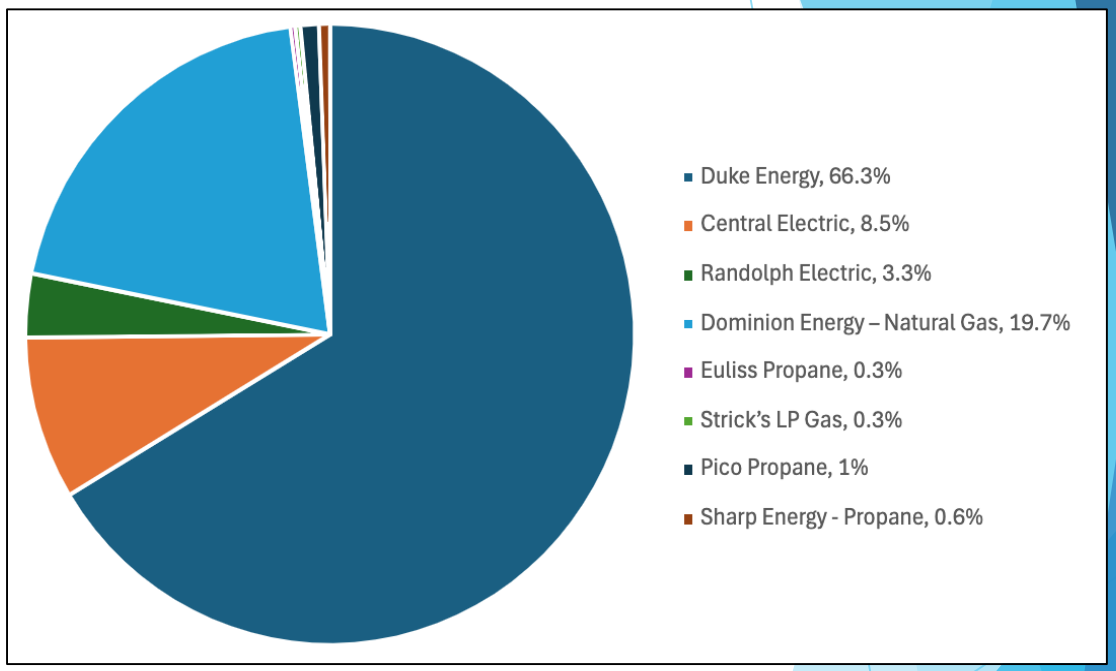
Residential



2023 Residential CO_2E Emissions

- Total: 163,626 metric tons CO_2E (15.2% of overall annual emissions)



2024 Residential CO_2E Emissions

- Total: 170,750 metric tons CO_2E (16.2% of overall annual emissions)

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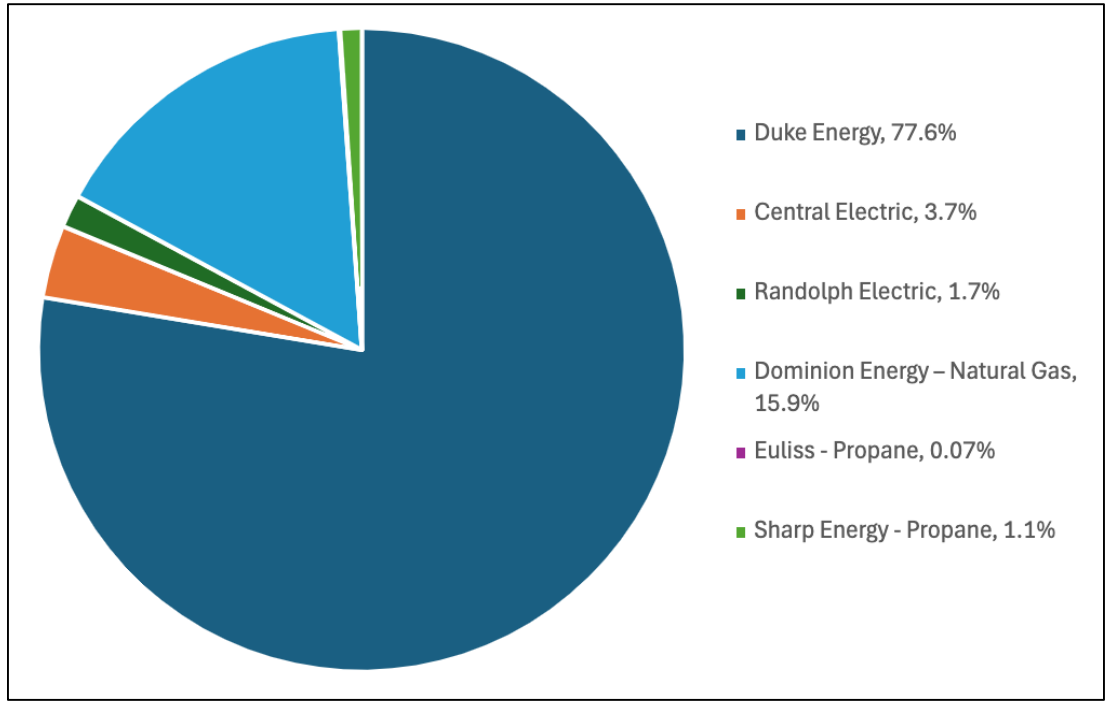
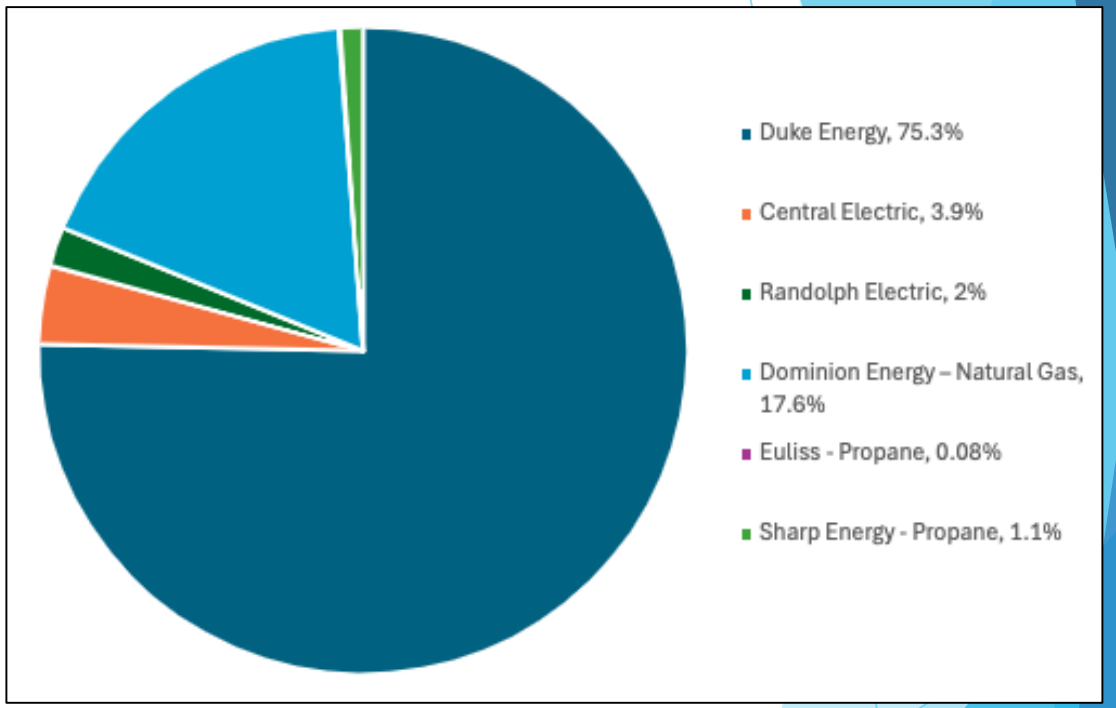
Commercial



2023 Commercial CO_2E Emissions

- Total: 92,993 metric tons (8.6% of overall annual emissions)



2024 Commercial CO_2E Emissions

- Total: 87,417 metric tons (8.3% of overall annual emissions)

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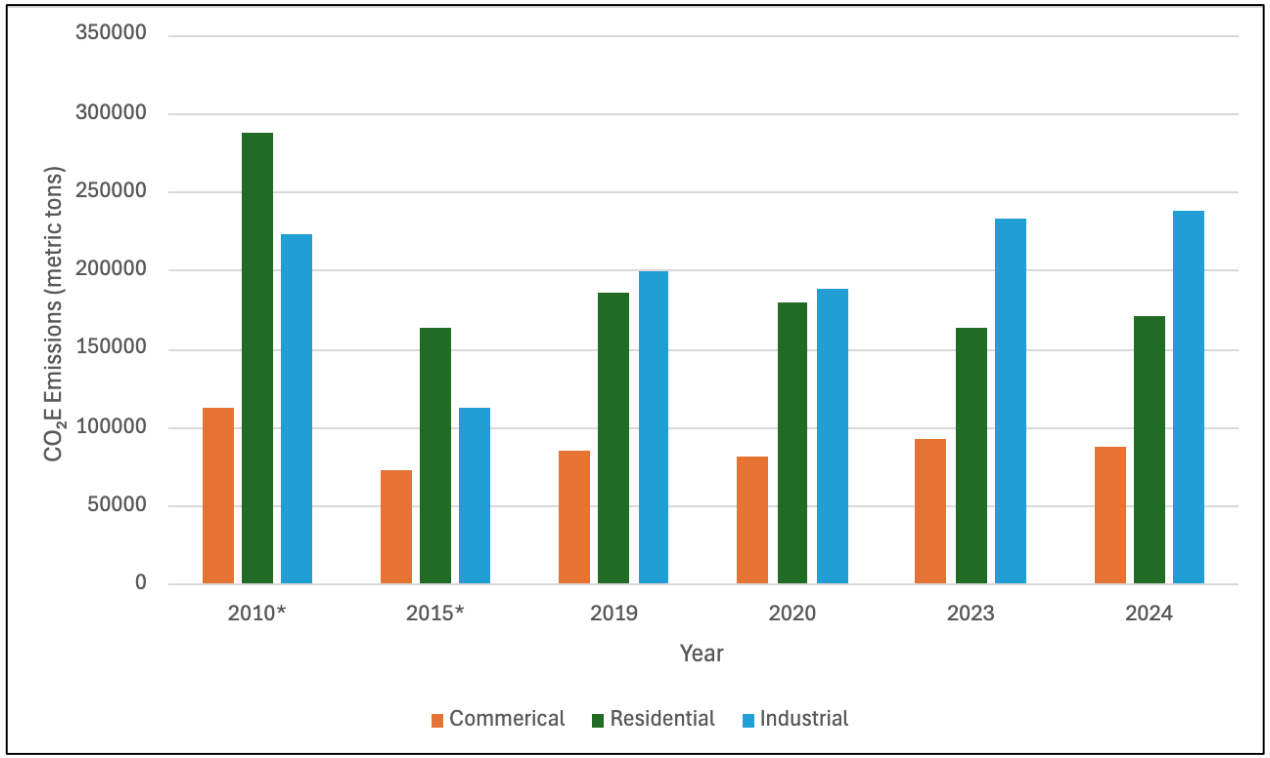
Total Commercial, Residential, and Industrial CO_2E Emissions by Year



**2010 and 2015 used different methodology and data sources to calculate CRI emissions.*

- 45.5% of emissions in 2023
  - 490,032 metric tons of CO_2E
- 47% of emissions in 2024
  - 496,052 metric tons of CO_2E
- Industrial emissions have increased the most since last report (about 19%)
- Residential emissions have slightly decreased (about 8%)

Duke Energy is responsible for approximately 70% of all emissions across the Commercial, Residential, and Industrial sectors

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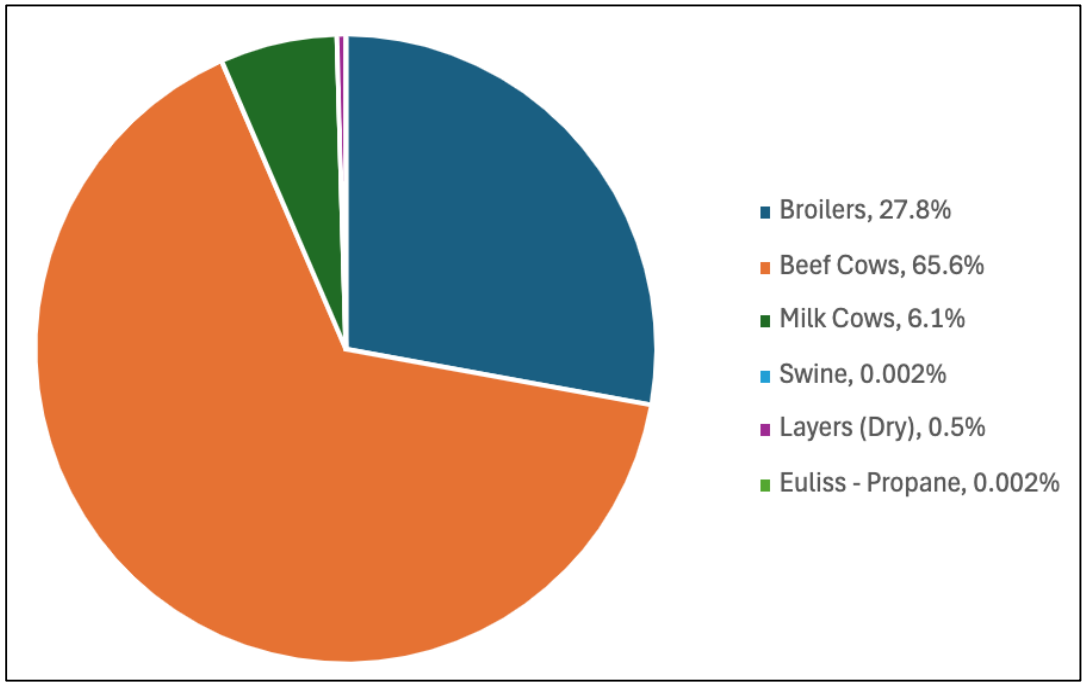
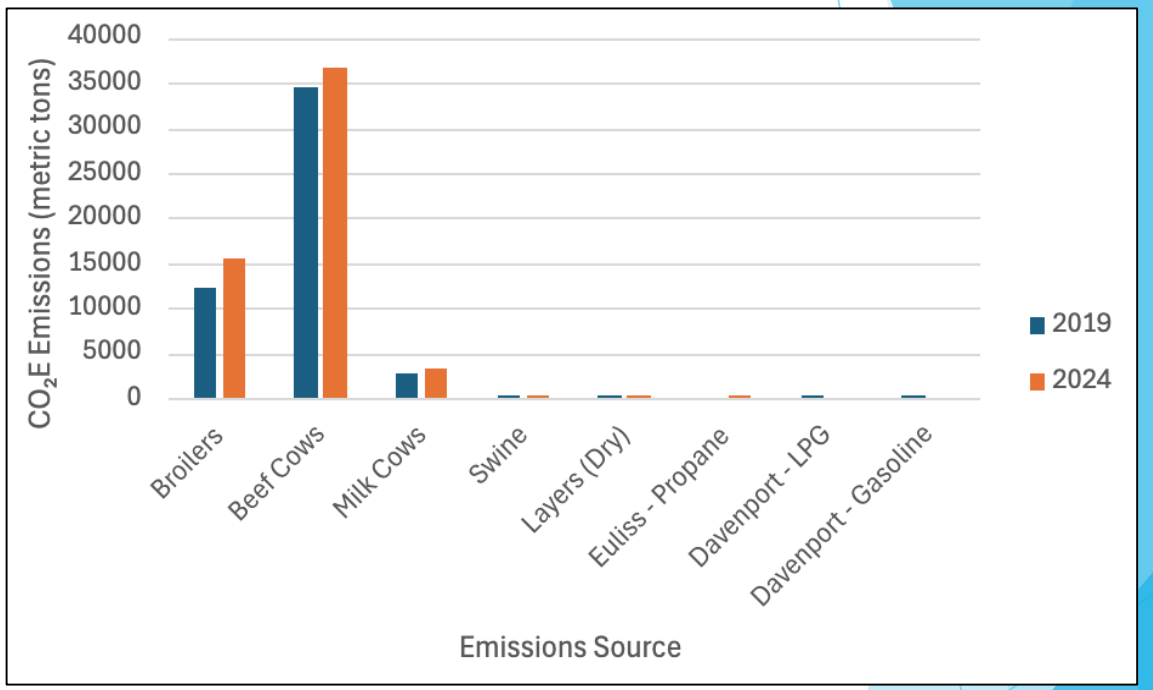
Agriculture



2024 Agriculture CO_2E Emissions



2019 and 2024 Comparison of Total CO_2E Emissions by Source

- Total: 55,911 metric tons (5.2% of overall annual emissions)

Beef cows and broilers (poultry) are responsible for the majority of emissions within the Agriculture sector

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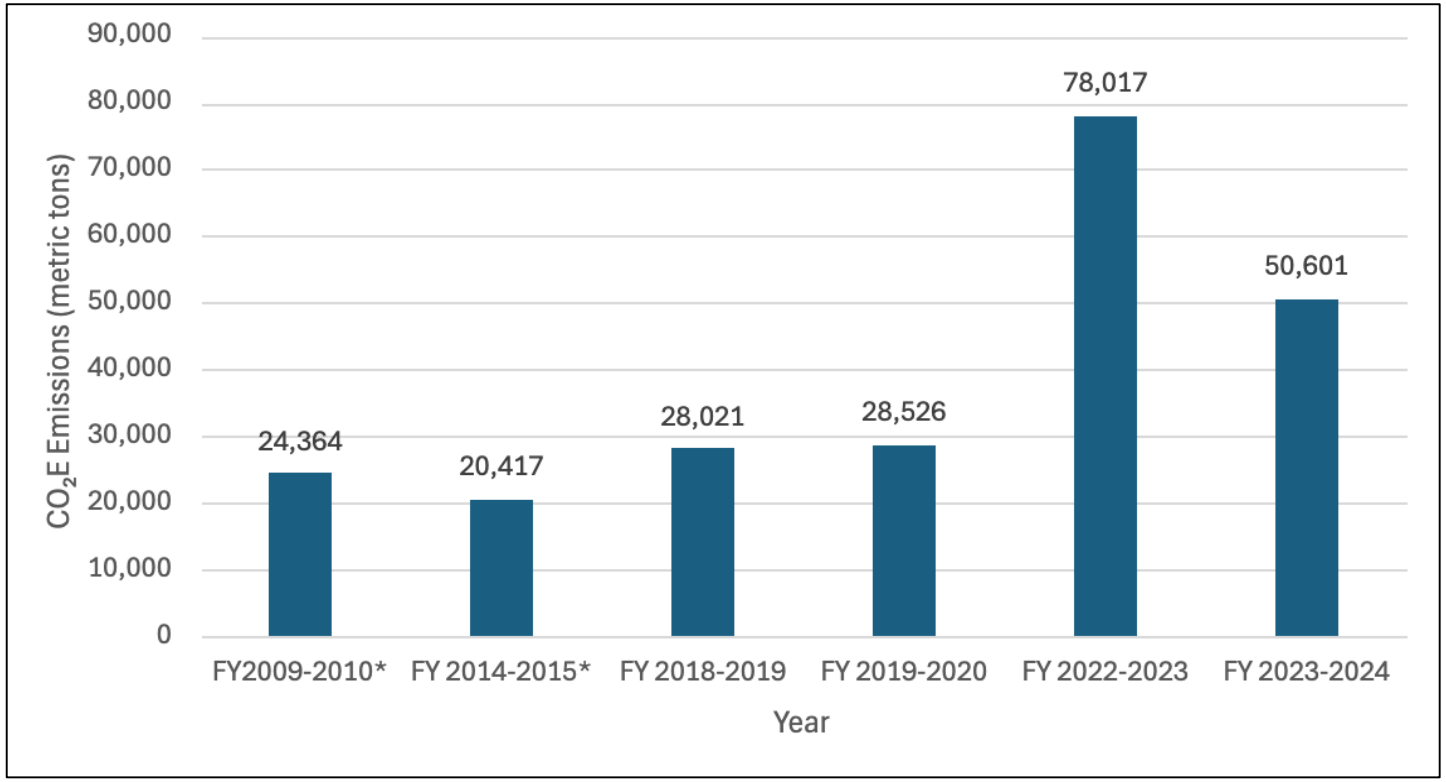
Total Waste CO_2E Emissions by Year



**FY2009-2010 and FY2014-2015 emissions data were not included in previous inventories. This inventory used current methodology and resources to retroactively calculate emissions data from these years.*

The increase in waste emissions can be attributed to higher construction and demolition debris generated from large construction projects in the county (NCDEQ)

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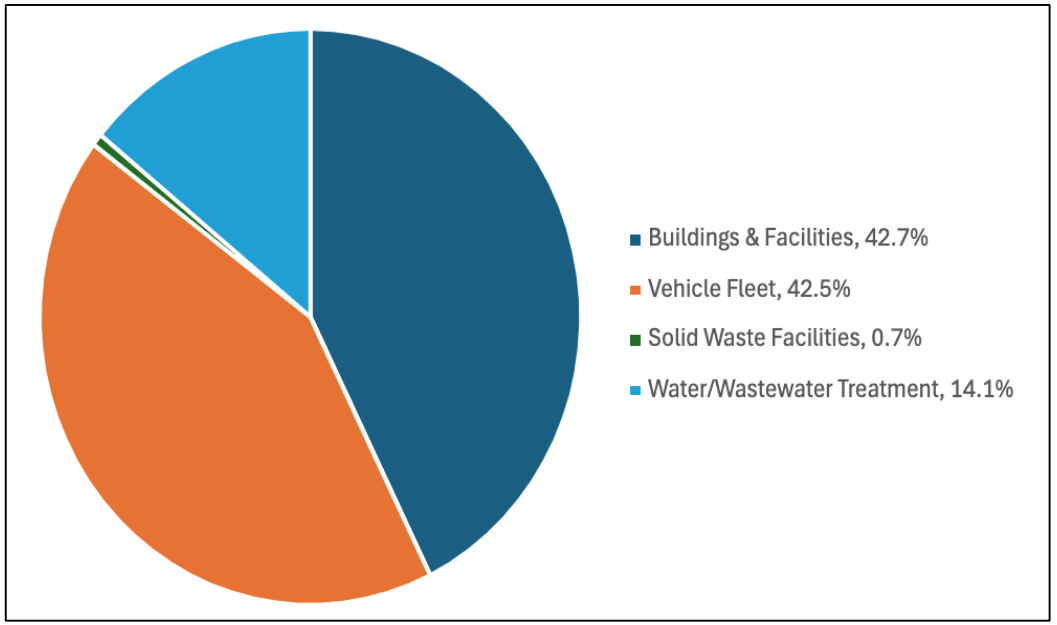
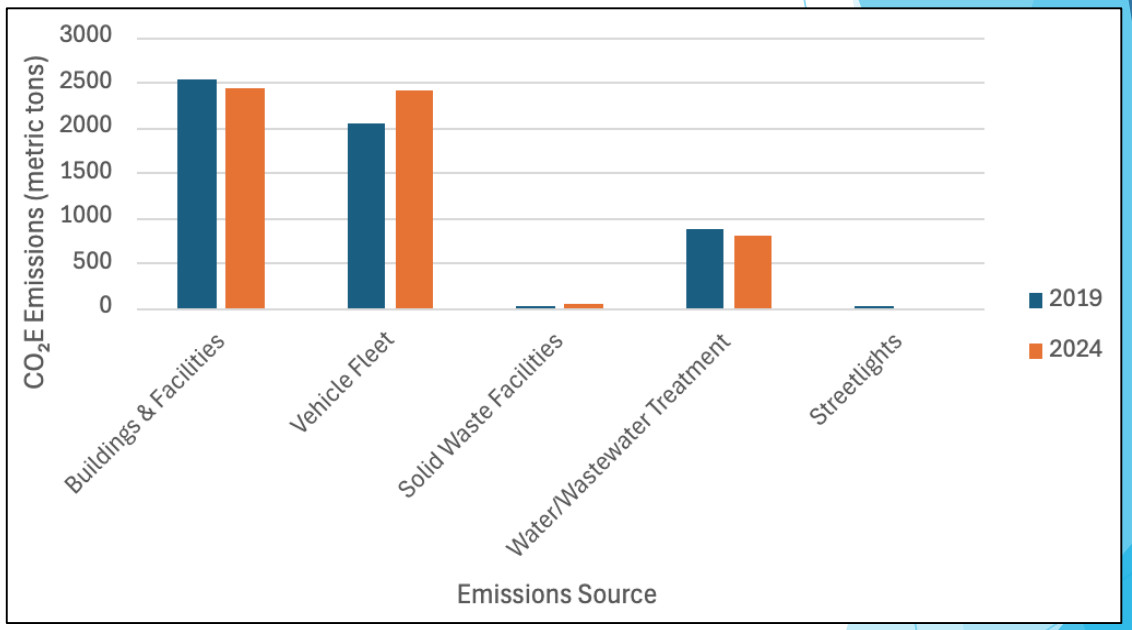
Internal Government



2024 Internal Government CO_2E Emissions



2019 and 2024 Comparison of Total CO_2E Emissions by Source

- Total: 5,683 metric tons (0.5% of overall annual emissions)

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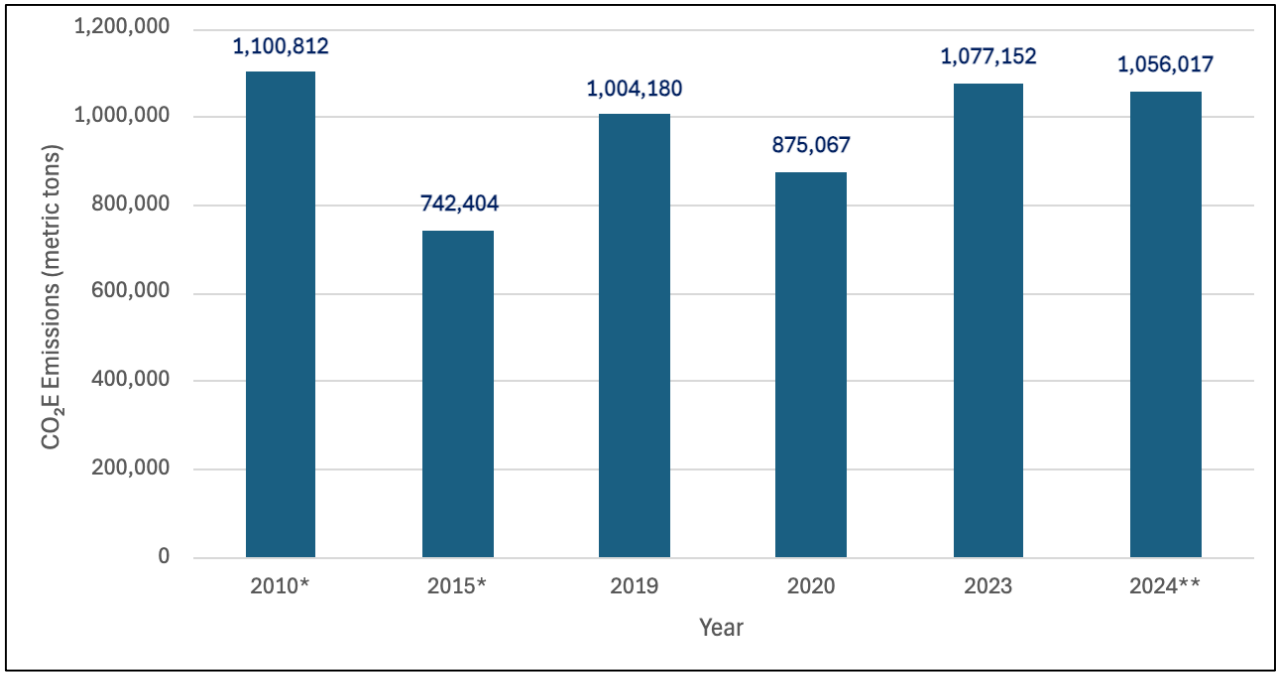
Trends in CO_2E Emissions Over Time



**2010 and 2015 used different methodology and data sources to calculate emissions.*

***2024 data is an estimate based on 2023 data due to some data sources not being updated at the time of the creation of this presentation.*

Contributing factors to changes over time:

- Population growth (8% from 2020 to 2024)
- Residents working from home increased from 6.7% in 2019 to 16.1% in NC in 2023 (US Census Bureau)
- Duke Energy Cape Fear STAR Plant in operation until 2035
- Other new developments: Chatham Park Mixed Use Project & Wolfspeed
- Increasing global temperatures that increase overall energy usage
  - Summer average temperatures in NC have been the warmest on record for the last 16 years from 2005 to 2020 (NOAA)
- Green investments: solar energy & electric vehicles

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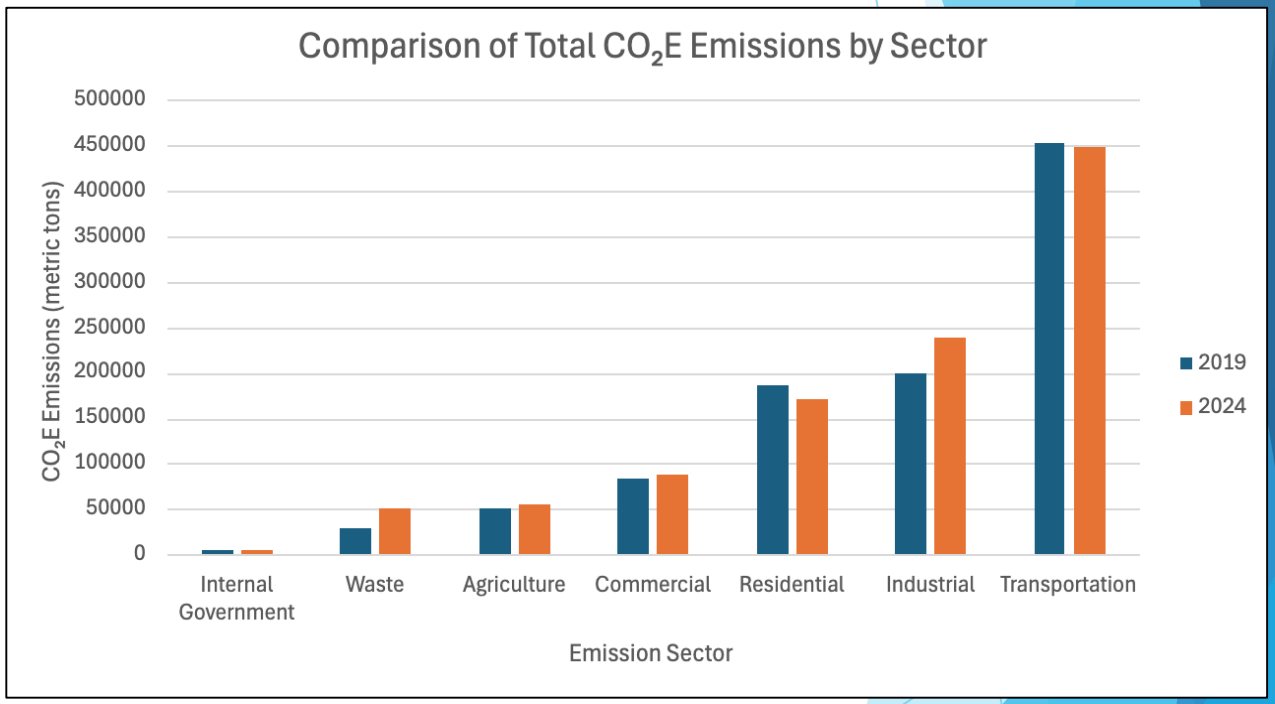
Changes in CO_2E Emissions from 2019 to 2024

Sector	2019 CO_2E (metric tons)	2024 CO_2E (metric tons)	Percent Change in CO_2E Emissions
Internal Government	5,463	5,683	4.0%
Waste	28,021	50,601	80.6%
Agriculture	50,576	55,911	10.5%
Commercial	82,841	87,417	5.5%
Residential	185,403	170,750	**-8%**
Industrial	199,496	237,885	19.2%
Transportation	452,380	447,770	**-1%**
Total	1,004,180	1,056,017	**5.2%**



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Carbon Sink

- Forest & trees play a critical role in mitigating climate change by acting like "carbon sinks" that remove CO_2 from the atmosphere through photosynthesis
  - Chatham County is 64.8% forest land
- Current net GHG balance from forest and trees: -1,039,419 metric tons of CO_2E per year
  - 9.7% change since last report (net GHG balance of -1,151,631 metric tons of CO_2E per year in 2019-2020)
- Total emissions in Chatham County in 2024: 1,056,017 metric tons of CO_2E
- Difference: +16,598 metric tons CO_2E

Figure 2. Land cover in Chatham from the National Land Cover Database, 2016

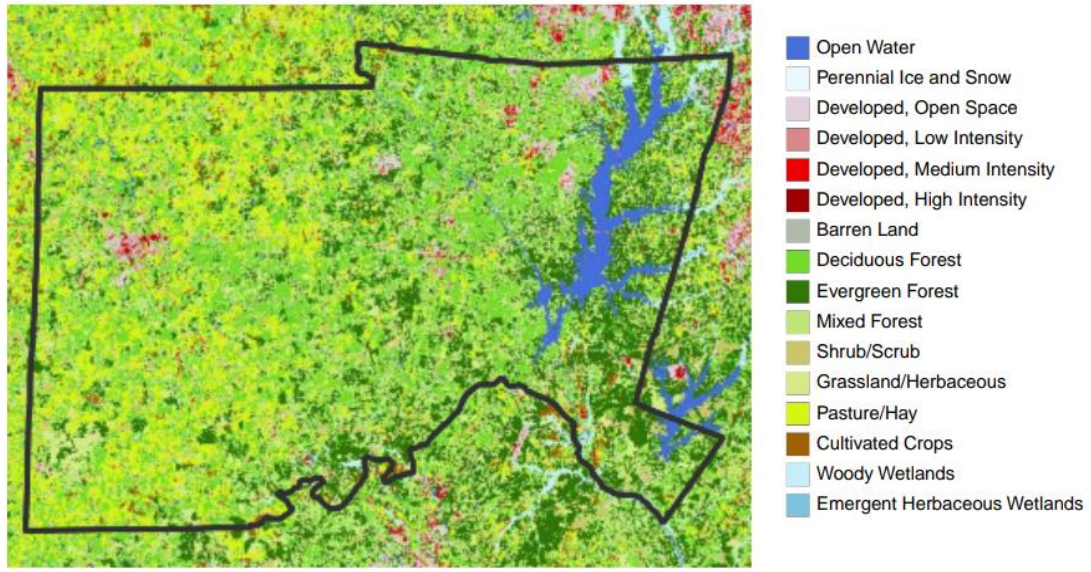
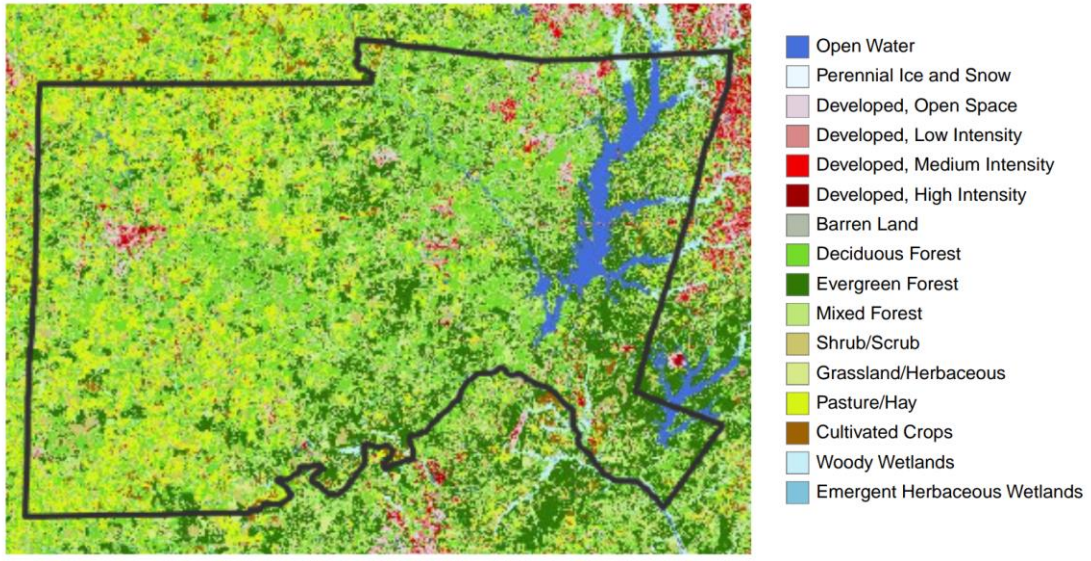


Figure 2. Land cover in Chatham from the National Land Cover Database, 2021



Green Updates to Chatham County

Electric Vehicles

1,518 EVs registered & 12 charging stations in Chatham County as of September 2024

Increasing EVs in Chatham County Fleet

Highest EVs per capita

Solar Panel Expansion

2022: 25-kilowatt solar system installed on Environmental Quality Building

2023: A 154-kilowatt solar system installed on Agriculture and Conference Center

2023: Chatham County Schools administrative building designed with rooftop solar power system

Solar Power Generation

168,843 kWh in 2023

227,904 kWh in 2024

2022-2023: Solarize the Triangle campaign allowing residents and businesses to save on the cost of solar system

Sustainable Facilities

All new buildings are to be designated to achieve Leadership in Energy and Environmental Design (LEED) Silver rating

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On the Horizon

- More population growth
- Industrial developments:
  - Wolfspeed (tech manufacturer)
  - MetOx (tech manufacturer)
  - Vinfast (electric car manufacturer)
- Residential construction:
  - Disney Asteria
- Electrify the Triangle Program
  - Public education for rebates & incentives to switch from gas to electric power sources to increase efficiency
- Duke Energy's goal to be carbon neutral by 2050

Wolfspeed's under-construction factory in Siler City, N.C. Photo: Zachery Eanes/Axios

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Thank you!