

CITY OF KALAMAZOO 2023

Greenhouse Gas Report

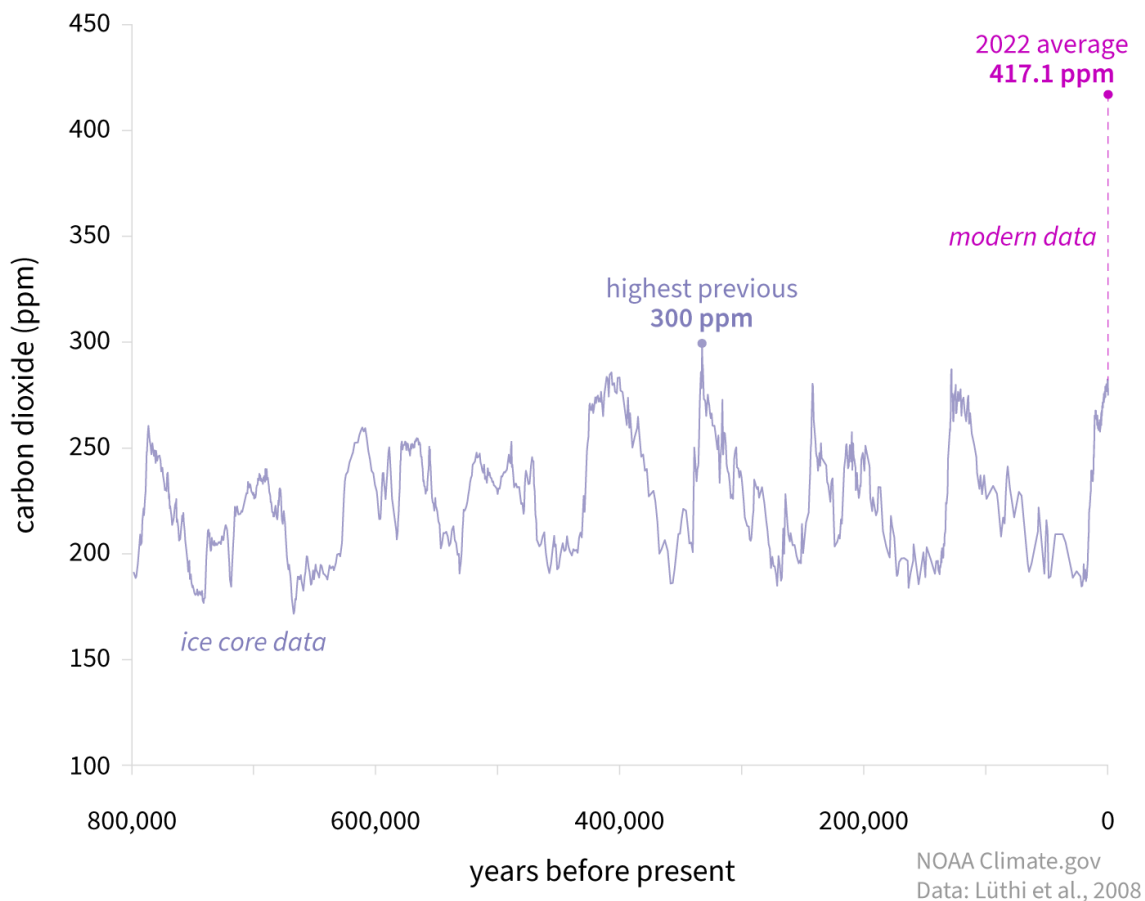


Kalamazoo as a Regional Climate Leader

Acknowledging the threat posed by increasing amounts of greenhouse gases in our atmosphere, the Kalamazoo City Commission declared a climate emergency in 2019. As a result of this declaration, the City Commission adopted its first Community Sustainability Plan that guides the city towards carbon neutrality by 2050. The plan called for two baseline reports to be completed, one on the emissions that result directly from the City's municipal activities, and one report of the total emissions produced within the city limits.

This report is an accounting of emissions resulting from City activities. A separate report will be published covering the total emissions produced across the community within the City of Kalamazoo limits. Most of the City emissions are generated from core city services and operations, which in some cases serve other municipalities and industries within the region.

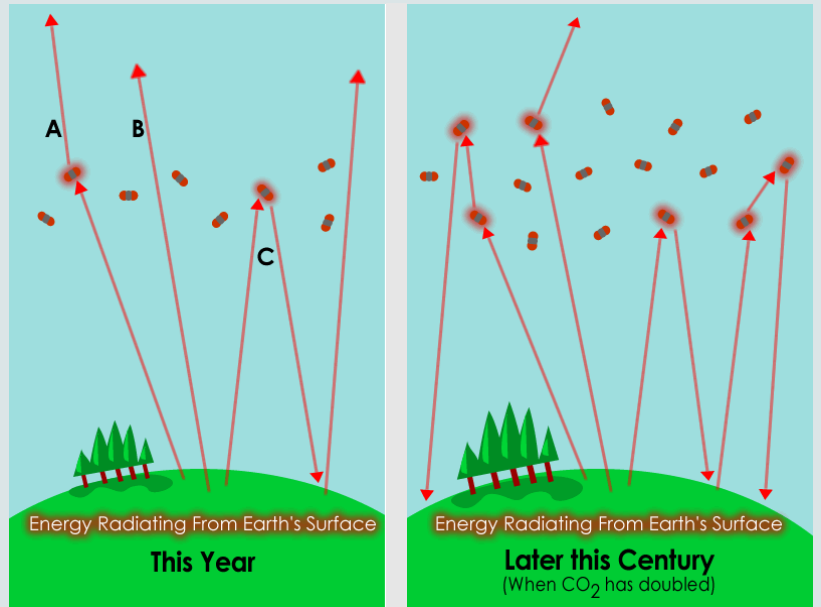
CARBON DIOXIDE OVER 800,000 YEARS



Why Act on Greenhouse Gas Emissions?

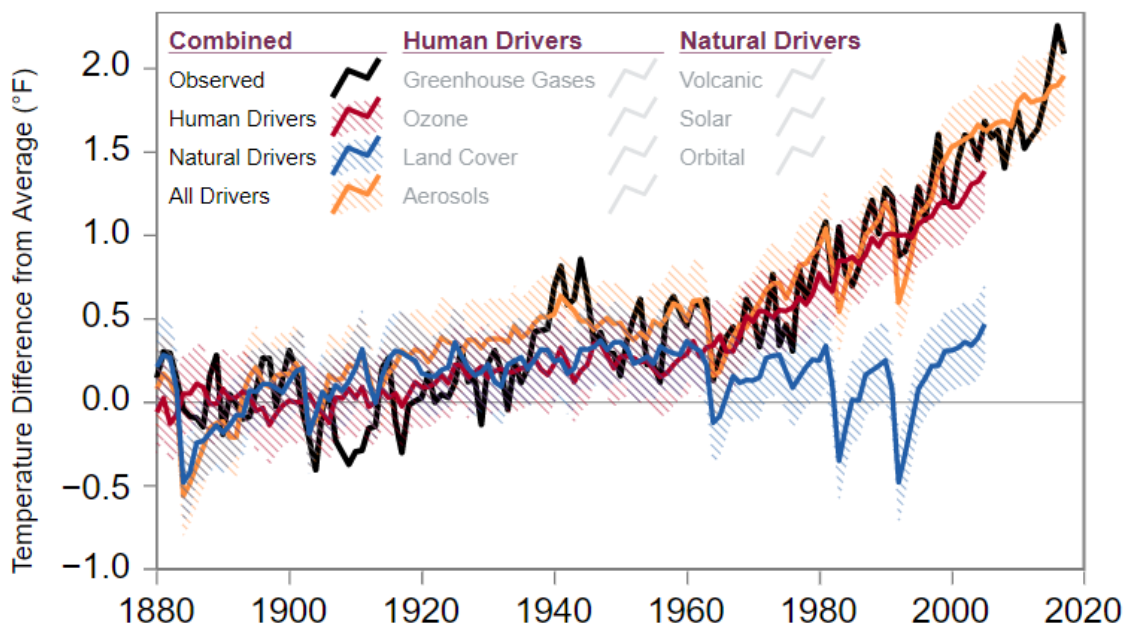
Greenhouse gases are effective at trapping heat in our atmosphere. Without these gases the Earth would be too cold for life. However, too much of these gases in the atmosphere can lead to increased temperatures, and this can change rainfall patterns, disrupt ecosystems, and negatively impact agriculture.

The amount of greenhouse gases in the atmosphere has increased since the Industrial Revolution. Widespread burning of coal and other fossil fuels releases unprecedented amounts of greenhouse gases like carbon dioxide, methane, and nitrous oxide into our atmosphere. Methane is also released into our atmosphere through agricultural practices and decaying organic materials in landfills.



The graphic above illustrates how greenhouse gases are effective at trapping heating in the atmosphere.

Human and Natural Influences on Global Temperature



About this Greenhouse Gas Report

This greenhouse gas report details the emissions attributable to the City of Kalamazoo's municipal activities. It was completed with the assistance of the International Council for Local Environmental Initiatives (ICLEI) and their ClearPath software. This program calculated the CO₂e emissions numbers. In keeping with universal standards, emissions were analyzed by category, or scope. These three scopes include:

Scope 1 Emissions - Scope 1 emissions are those that are the direct result of city activity. Some examples of Scope 1 emissions are exhaust from city vehicles and gases from the city compost facility.

Scope 2 Emissions - Scope 2 emissions are indirect

CO₂e = Carbon Dioxide Equivalent

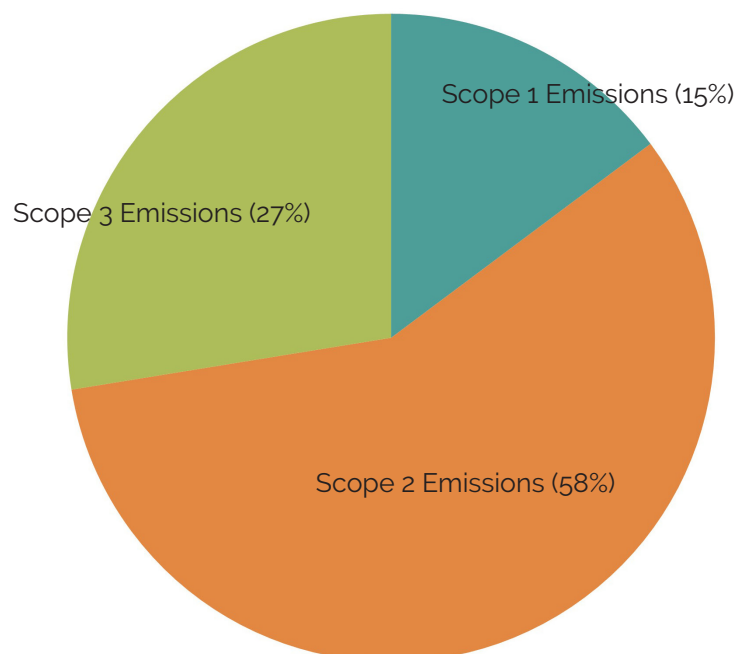
CO₂e is a standard unit of measurement that is used to help make it easier to compare the different greenhouse gases and their ability to trap heat.

emissions associated with purchased electricity. For example, Scope 2 emissions include emissions purchased from a power plant located outside the city and used at a city building in Kalamazoo.

Scope 3 Emissions - Scope 3 emissions are those related to a City activity but not a direct result of that activity or occur beyond the City's borders. An example of Scope 3 emissions in this report is the decomposition of biosolids processed in the city and sent to landfills that are located elsewhere in Michigan.

(See 2022 City of Kalamazoo Greenhouse Gas Emissions by Scope)

2022 CITY OF KALAMAZOO GREENHOUSE GAS EMISSIONS BY SCOPE



This report covers emissions for the year 2022 from City-owned operations and assets.

The calculations in this report will be reproduced annually to track carbon emissions and develop strategies to meet the City's goal of carbon neutrality by 2050.

Understanding the Results

As mentioned above, there are multiple greenhouse gases. These gases have different capabilities when trapping heat. Methane, for example, is 28 times more potent than carbon dioxide. To make sense of these numbers, greenhouse gases are presented as carbon dioxide equivalent, or CO₂e. Emissions labeled as CO₂e include more than just carbon dioxide. CO₂e is a standard unit of measurement that accounts for the different abilities of these gases to trap heat.

Data Sources

The data for this report was provided by Consumer's Energy and the City's Department of Public Services. Consumer's Energy provided the City's utility data for 2022, including all gas and electric use. The City's Public Services department provided data on gallons of gasoline and diesel fuel used by the city's

fleet, as well as the amount of leaves composted and estimated amount of controlled combustion of organic woody debris, and tonnage of biosolids sent to landfills.

MAKING SENSE OF THE NUMBERS

Greenhouse gases aren't visible to the naked eye, so it can be hard to envision the scale of the problem. And the gases in this report are presented as metric tons. But what does a metric ton of an invisible gas look like?

Think of a basketball filled with air (gas). This ball has a diameter of approximately 9 and a half inches. If you wanted to fill a basketball with a metric ton of greenhouse gases, that ball would need to have a 32-foot diameter.

A basketball that size is about the size of a single-family house. Throughout this report, you will encounter numbers reported in metric tons. This analogy should help to visualize what is presented.



The Breakdown

The City as a Whole

50,053 Metric Tons of CO₂e Emissions

Greenhouse gas emissions from the city as a whole come from energy used to power core municipal services and operations. Overall, the main energy sources are vehicle fuel, electricity, and natural gas. Additional emissions are generated from solid waste. Scope 3 emissions like employee commute and purchasing will be included in future reports.

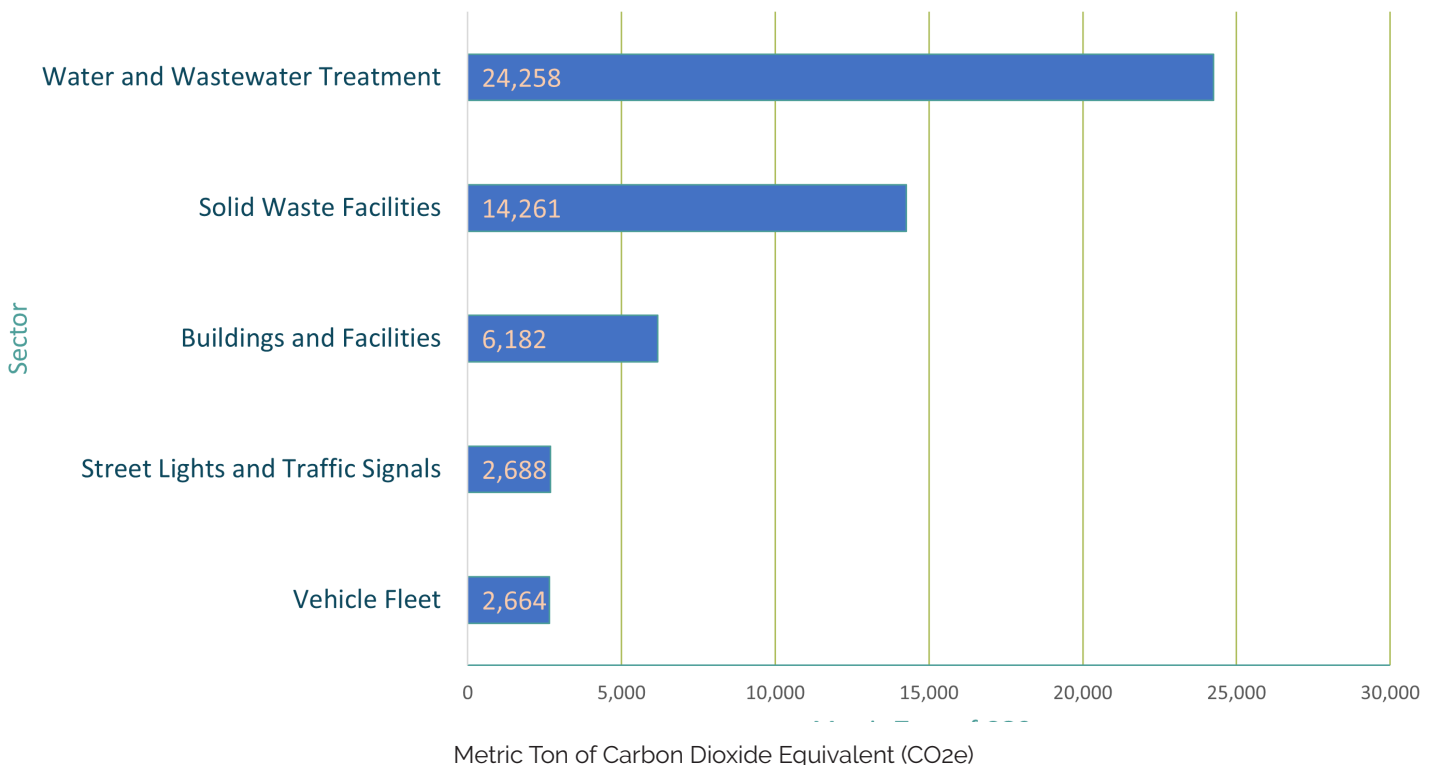
In service to its citizens, the city used 200,000 gallons of gasoline and 88,900 gallons of diesel fuel. This fuel powered everything from snowplows to fire trucks to chainsaws. Additionally, the city used 50,430,018 kWh

of electricity and 80,304.6 million cubic feet (MCF) of natural gas in 2022. This electricity and natural gas provided power to city buildings, allowed for the pumping of water to and from our homes, and kept our streetlights and traffic signals on.

The City also handles different types of waste, from tree limbs to everything we flush or send down the drain. Total emissions from the combustion of these fuel sources and the disposal of solid waste resulted in 14,261 metric tons of CO₂e released into the atmosphere.

(See 2022 City of Kalamazoo Greenhouse Gas Emissions by Category graph).

2022 CO₂e EMISSIONS BY SECTOR FOR CITY OF KALAMAZOO MUNICIPAL OPERATIONS



Water & Wastewater Treatment

48% of CO₂e emissions

Most greenhouse gas emissions from city activities are released when supplying and treating water. Electric energy is used to pump water to and from homes, as well as operating the city's water reclamation plant. It is important to note that while the City of Kalamazoo's population is 72,873, the City's water reclamation (wastewater) plant serves over 200,000 residents throughout Kalamazoo County, even stretching into portions of Van Buren and Barry Counties. The City of Kalamazoo assumes a carbon burden for the surrounding communities as wastewater is processed within Kalamazoo's boundaries.

(See 2022 Comparison of Emissions from Water Supply and Wastewater in Kalamazoo).

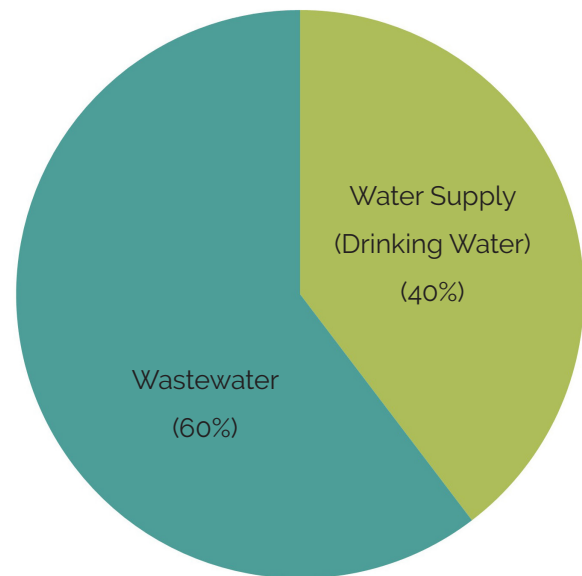
Solid Waste Facilities

28% of CO₂e emissions

Citizens of Kalamazoo no doubt wonder what happens to the organic waste they place at the curb. Leaf composting is overseen by the city and composted within the city limits. In 2022, the City of Kalamazoo picked up 4,290 tons of leaves and brought them to the City-run composting facility. Composting these leaves released 299 metric tons of CO₂e.

Tree work conducted by the City of Kalamazoo results in a large amount of organic woody debris. In 2022, this organic woody debris was combusted. This resulted in 167 metric tons of CO₂e being released.

2022 COMPARISON OF EMISSIONS FROM WATER SUPPLY AND WASTEWATER IN KALAMAZOO



This process was halted in 2023, and all current and future tree refuse will be chipped. Chipping allows for the carbon that is sequestered in the tree to remain in the wood chips and ends up being added to the soil as an amendment that benefits soil health.

The Kalamazoo Water Reclamation Plant treats waste from over nineteen local jurisdictions. Cleaning the wastewater results in a large amount of biosolids that must be sent to landfill. These biosolids decomposing in the landfill resulted in 13,795 metric tons of CO₂e being released.

Buildings & Facilities (and Other)

12% of CO₂e emissions

The City of Kalamazoo operates buildings and facilities throughout the city limits. These buildings include public safety stations, City Hall, and general office space. Also included in this category are harder

to define facilities, such as the Farmer's Market and Kik Pool. Additionally, electric and natural gas use that could not be definitively attributed to another category is included in this category as "other". Collectively, buildings and facilities resulted in 6,182 metric tons of CO₂e being released.

Streetlights and Traffic Signals

5% of CO₂e emissions

Streetlights and traffic signals are powered by electricity provided by Consumer's Energy, in coordination with the City of Kalamazoo which resulted in 2,688 metric tons of CO₂e being released.

Vehicle Fleet

5% of CO₂e emissions

In 2022, the City of Kalamazoo owned and operated 437 vehicles. All these vehicles are internal combustion engines. 118 are diesel and 319 are gasoline. Also included in vehicle fleet emissions are those emissions produced by small engines like those in chainsaws. Small engines use the same fuel sources as the vehicles, thus are included in this section. All of these engines resulted in 2,664 metric tons of CO₂e being released.

Comparisons & Analysis

It is important to know where the City of Kalamazoo stands in relation to peer cities. The City of South Bend, Indiana emitted 42,225 metric tons of CO₂e in 2017. Traverse City, Michigan emitted 10,692 metric tons of CO₂e in 2009. Emissions data for the City of Kalamazoo are consistent with the type of operations

its maintains, including a large wastewater treatment plant that serves many industrial and community customers. These other city reports are available online, and interested individuals are encouraged to consult them if they have questions about the results.

Removal of Carbon Dioxide from the Atmosphere

Trees and other vegetation "breathe" carbon dioxide, removing it from the atmosphere. This can offset emissions produced by human activity. The ClearPath software does not consider carbon emissions offsets by trees at the government level. But quick calculations can be made. According to an estimate by the Arbor Day Foundation, a mature tree will take in 48 pounds of CO₂ a year. Treating CO₂ as if it were CO₂e, and assuming a tree takes in 48 pounds of CO₂ a year, the city would need 2.2 million trees to offset its annual emissions. To put the number of trees under city control in context, there are around 22,000 street trees in the City. Trees are important, but they won't offset the emissions we're producing.

Questions?

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To contact the City of Kalamazoo's Environmental Concerns Committee:

environmental@kalamazoo-city.org

Looking to Next Year

An updated report will be completed by the end of 2024 for the emissions produced in 2023. This report will include categories not listed in this report, as data collection methods improve. Expected categories to be included in the future are emissions from City contracted services, employee commute, and city purchasing emissions. It is expected that as other data sources are included, the emission numbers will go up, however, the City of Kalamazoo is taking concrete steps now to decrease emissions from sources identified in this baseline report.



Biosolids Processing - The City of Kalamazoo will look towards a more sustainable means of processing biosolids. This will decrease the emissions from biosolids decomposing in landfills.



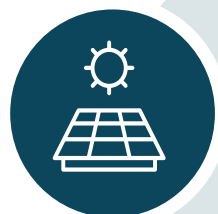
Composting Woody Debris - The practice of controlled combustion disposal of organic woody debris has been discontinued. Woody debris will now be composted and returned to the soil.



Diesel to Biofuel - Diesel vehicles in the city will now run on biofuel, decreasing the amount of CO₂e released from the operation of these vehicles.



Electrifying Fleet - The City of Kalamazoo is adding electric vehicles to its fleet, decreasing the amount of gasoline used. This will increase the electric use by the City, but renewable energy sources will be considered to offset the shift to electrically powered vehicles.



Exploring Solar Grants - The City of Kalamazoo will explore grant opportunities to install solar panels on its buildings where feasible and practical. In addition to solar panels, the City of Kalamazoo will work towards improving the energy efficiency of its buildings.

