

Local Greenhouse Gas Emissions Inventory Summary

The local emissions summaries in SEMCOG's Community Profiles were developed as part of the [Year 2019 Southeast Michigan Greenhouse Gas Emissions Inventory \(GHGI\) Report](#). This report summarizes greenhouse gas (GHG) emissions generated within the region. GHGs, which trap heat in the atmosphere, significantly contribute to climate change. The GHGI is not an exhaustive inventory but captures emissions from most major sources. It is intended to help decision makers understand key emissions sources and provide communities with the information needed to begin developing emissions reduction plans.

The local summaries should be seen as secondary to any location-specific inventories completed by communities. For many communities, they provide enough information to get started on local climate action planning. The inventories help communities build an understanding of the region's contributions to GHG emissions, actively plan for climate change, and strengthen resilience to anticipated climate impacts. The inventory report is the first step toward efforts to reduce emissions, as it identifies major sources of GHG emissions and provides information on emissions trends over time.

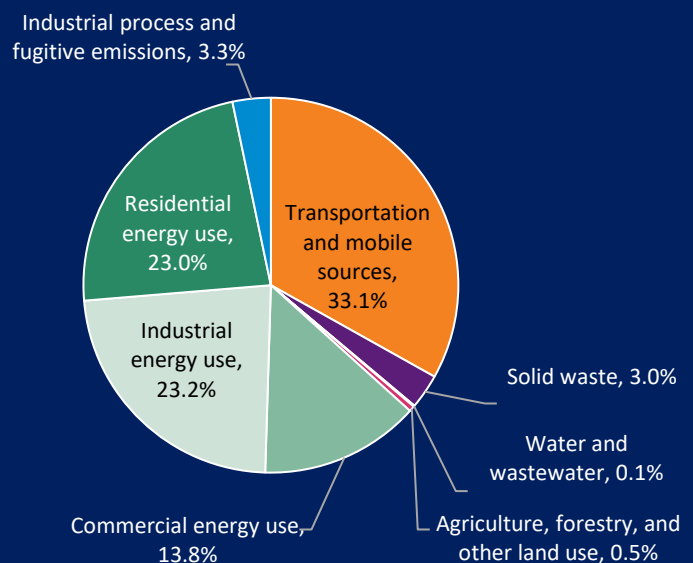
Regional Inventory Overview

The inventory was designed to comply with the [Global Protocol for Community-scale Greenhouse Gas Inventories](#) (GPC) BASIC requirements. The GPC represents an international standard in guidance to help local governments develop community GHG emissions inventories.

The regional GHGI provides a summary of emissions for the seven-county region in Southeast Michigan, including Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne Counties. For the GHGI, data was collected at the County level.

FIGURE 1. 2019 Regionwide GHG Emissions by Sector

The 2019 inventory shows that about 63% of the region's GHG emissions come from the stationary energy sector, which includes all fossil fuels used in the creation of electricity and natural gas consumption that heats homes and businesses. Transportation accounts for 33% of the region's GHG emissions, and solid waste, wastewater, and agriculture, forestry, and other land use (AFOLU) emissions account for most of the remaining 4 percent.



The inventory was conducted in compliance with the methods provided by the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC) and includes emissions from the following sectors:



Stationary energy is the use of electricity, natural gas, and non-utility fuels in residential, commercial, and industrial buildings, including furnaces, generators, or other stationary combustion equipment.



Transportation and mobile source emissions include on-road passenger and freight motor vehicle travel, public transportation, freight and passenger rail, off-road vehicles and equipment, and waterborne shipping in and out of ports in the region.



Waste and Wastewater Treatment involves emissions from solid waste disposal through composting, landfills, or incineration and water/ wastewater treatment processes.



Industrial Process and Fugitive emissions related to physical and chemical transformations of raw materials and fugitive emissions that occur through natural gas leakage and oil production wells.



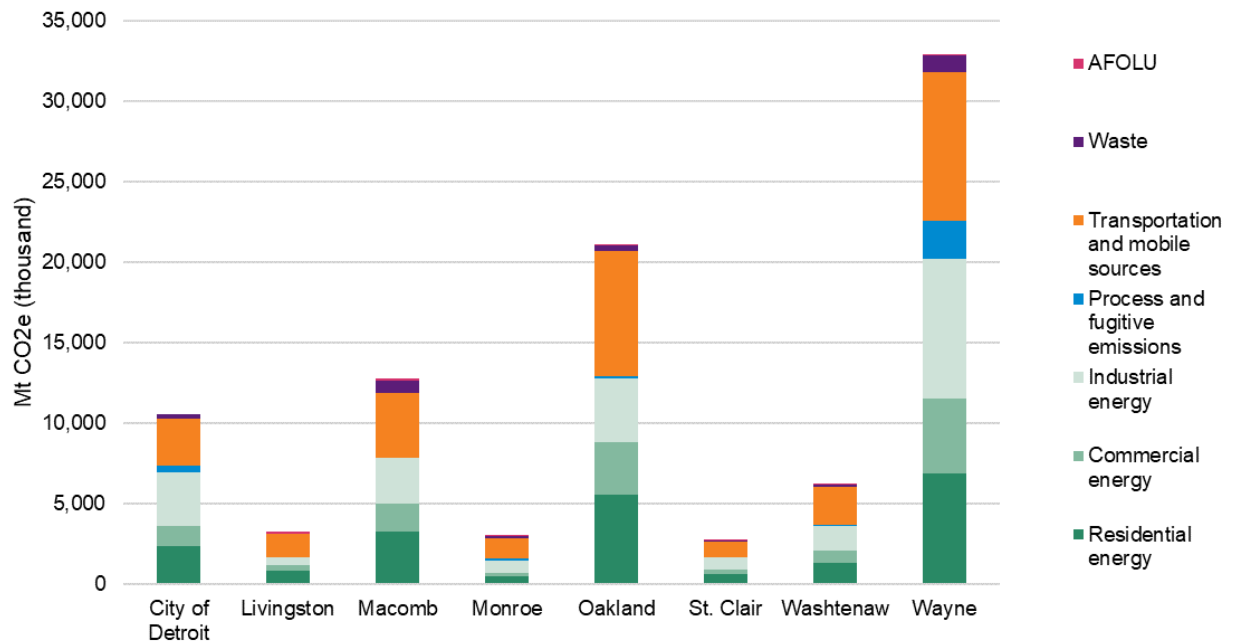
Agriculture, Forestry, and Land Use (AFLOU) involve emissions as well as carbon sequestration from forests, crops, and other vegetation as well as livestock and manure management.

The breakdown of regional emissions by sector and geography are available in Table 1 and Figure 2, below.

TABLE 1. 2019 Regional Emissions by Sector (MTCO₂e)

Sector	Total Emissions (MTCO ₂ e)	Percent of Total
Stationary energy	49,120,435	60.01%
Industrial energy use	18,989,739	23.20%
Residential energy use	18,846,455	23.02%
Commercial energy use	11,284,241	13.79%
Industrial process and fugitive emissions	2,695,788	3.29%
Transportation and mobile sources	27,107,314	33.12%
Waste	2,538,223	3.10%
Solid waste	2,456,456	3.00%
Water and wastewater	81,767	0.10%
Agriculture, forestry, and other land use	394,644	0.48%
Total	81,856,404	100.00%

FIGURE 2. 2019 Regional Emissions by Geography and Sector (MTCO₂e)



Breakdown from County to Community Level

Local emissions summaries were developed as part of the 2019 Regional GHGI. The simplified community-specific emission profiles for all the communities within the Southeast Michigan boundary (i.e., cities, townships, and villages) are included in [SEMCOG's Community Profiles](#).

Data was collected at the County level. For more details on the methods and data sources used to prepare in the original inventory, please refer to the full [Year 2019 Southeast Michigan Greenhouse Gas Emissions Inventory \(GHGI\) Report](#). Emissions estimates for each community were developed by downscaling the county-level GHG emissions inventory results based on either percentage of county population or percentage of county jobs in relevant sectors (such as manufacturing), as is most appropriate for each emissions-generating activity. Note that for the City of Detroit, emissions were calculated for all sectors apart from agriculture were calculated using the methods described in the full inventory. Agricultural emissions were calculated using the disaggregation method shown in Table 2.

On-road transportation data was calculated using a specialized analysis of Vehicle Miles Traveled (VMT) for trips originating in a community. This method for transportation used anonymized Location-based Services (LBS) data. It allows for the emissions to be attributed to the geography where the trip began. This process provides the ability to understand the drivers of VMT and where it is generated. The percentage of community level emissions was then assigned to gasoline or diesel sources based on the percentage of total VMT within the county. At the community level, transportation emissions do not include waterborne transportation, off-road vehicles and devices, or transit. Overall these were a small percentage of overall emissions.

The basis for the community level estimates is summarized in Table 2, below.

TABLE 2. Community-Level

Emissions Source	Basis of Community-Level Estimate
Residential electricity	Percentage of Community-Level Households Within County
Residential fuels	Percentage of Community-Level Households Within County
Commercial electricity	Percentage of Community-Level Jobs Within County (excluding manufacturing)
Commercial fuels	Percentage of Community-Level Jobs Within County (excluding manufacturing)
Industrial electricity	Percentage of Community-Level Manufacturing Jobs Within County
Industrial fuels	Percentage of Community-Level Manufacturing Jobs Within County
Process and fugitive	Percentage of Community-Level Manufacturing Jobs Within County
On-road gasoline	Percentage of Community-Level VMT Within County using on a Location-Based Data Analysis of Trip Origins
On-road diesel	Percentage of Community-Level VMT Within County using on a Location-Based Data Analysis of Trip Origins
Solid waste	Percentage of Population Within County
Water and wastewater	Percentage of Population Within County
Agriculture	Percentage of Community-Level Land Area Outside Adjusted Urban Census Boundary With County