



CITY OF COLLINSVILLE, ILLINOIS

# GREENHOUSE GAS INVENTORY

2019 DATA REPORT  
PUBLISHED SEPTEMBER 2021

[www.collinsvilleil.org](http://www.collinsvilleil.org)  
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# **CHAPTER 1: PURPOSE & SCOPE**



# INTRODUCTION

An emissions inventory provides a high-level perspective of anthropogenic greenhouse gas (GHG) emissions from various economic sectors of a community. The 2019 Data Report is the first GHG inventory conducted by the City of Collinsville. The objective is to establish baseline measurements of GHG within the city's operations and the community at large. Having baseline data will help the city plan for and quantify sustainable projects, such as retrofitting a building with solar arrays, investing in a green municipal fleet comprised of electric vehicles, and encouraging new developments to be energy efficient.

A GHG Inventory is part of an effective management strategy of climate risks. The GHG inventory has been developed using Clearpath, an ICLEI (Local Governments for Sustainability) USA tool, which is the leading software platform for completing GHG inventories, forecasts, climate action plans, and monitoring at the community-wide or government-operations scales. Many local governments use ClearPath, allowing Collinsville to compare its GHG inventory to other cities that make their data public.

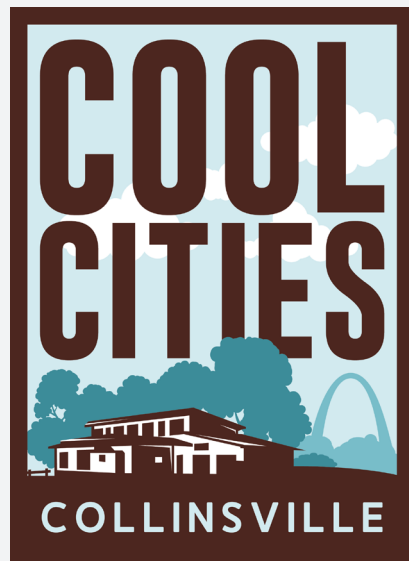
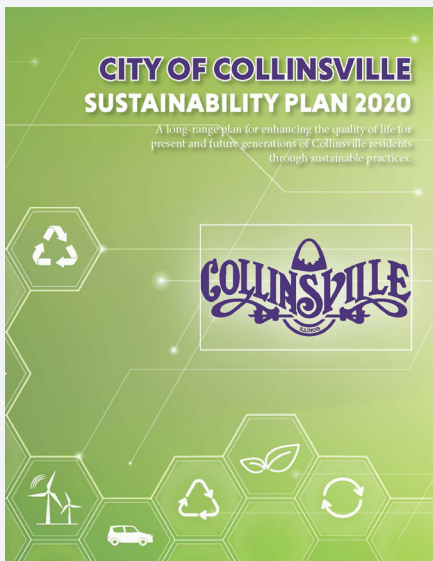
## HOW WE GOT HERE

### Cool Cities Committee

In 2018 the Collinsville City Council created the Cool Cities Committee, an advisory group of residents who assist the City by providing ideas and recommendations to make the City operations more energy efficient. The Committee coordinates efforts within the community to encourage residents and businesses to consider sustainable alternatives that benefit the environment.

### Sustainability Plan 2020

The City's Sustainability Plan, which was drafted by the Cool Cities Committee and adopted by the City Council in 2020, is a policy road map that prescribes sustainable objectives and strategies related to transportation, facilities, environmental management, land use planning, and community engagement. The Sustainability Plan recommends conducting a GHG inventory every three (3) years to measure GHG reduction improvements made in the City.



# BACKGROUND

## Greenhouse Gases



Carbon dioxide (CO<sub>2</sub>) enters the atmosphere through burning fossil fuels (coal, natural gas, and oil), solid waste, trees and other biological materials, and as a result of certain chemical reactions (e.g. manufacturing cement). Carbon dioxide is removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle.



Methane (CH<sub>4</sub>) is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices, land use and by the decay of organic waste in municipal solid waste landfills.

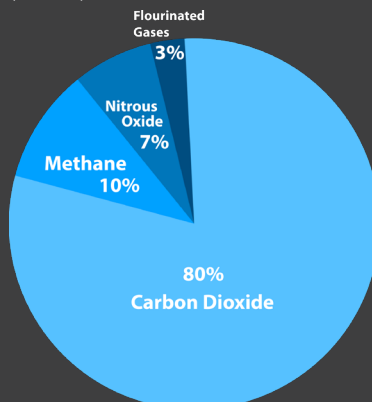


Nitrous oxide (N<sub>2</sub>O) is emitted during agricultural land use, industrial activities, combustion of fossil fuels and solid waste, as well as during treatment of wastewater.

HFC, PFC,  
SF<sub>6</sub>, NF<sub>3</sub>

Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulfur hexafluoride (SF<sub>6</sub>) Nitrogen trifluoride (NF<sub>3</sub>). These industrial gases are typically emitted in smaller quantities, but because they are potent greenhouse gases, they are sometimes referred to as High Global Warming Potential (GWP) gases.

Overview of U.S. Greenhouse Gas Emissions in 2019

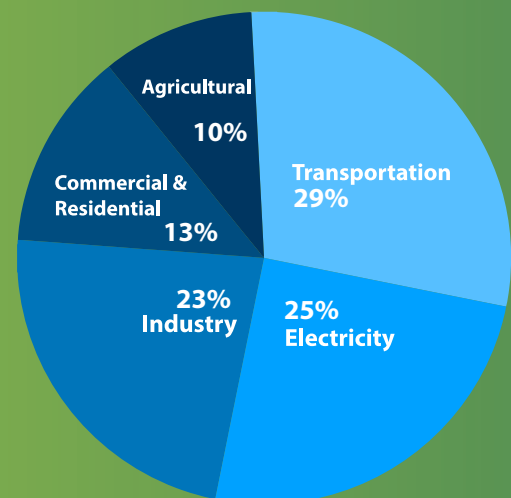


## Greenhouse Effect

The greenhouse effect is a natural process that is vital for the existence of life on Earth. The greenhouse effect maintains average global temperatures, prevents a large temperature range, and enables our planet to sustain life. This phenomenon has been aggravated by human activity, which has increased the amount of greenhouse gases released into the atmosphere. This large concentration of gases makes it difficult for the sun's heat to be returned to space, increasing temperatures and causing climate change across the planet. [1]

Carbon dioxide (CO<sub>2</sub>) is the primary greenhouse gas emitted through human activity. In 2019, CO<sub>2</sub> accounted for about 80 percent of all U.S. greenhouse gas emissions from human activities. The primary source of CO<sub>2</sub> emissions is the combustion of fossil fuels (coal, natural gas, and oil) for energy and transportation. [2] The leading sources of greenhouse gas emissions in the United States are transportation, electricity, industry, commercial and residential, and agriculture.

Sources of U.S. Greenhouse Gas Emissions in 2019



# CLIMATE CHANGE

Human activities are estimated to have caused approximately 1.0°C of global warming above pre-industrial levels, with a likely range of 0.8°C to 1.2°C. Global warming is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate. Warming caused by anthropogenic emissions from the pre-industrial period to the present will persist for centuries to millennia and will continue to cause further long-term changes in the climate system. These changes include sea level rise and associated impacts. Climate-related risks for natural and human systems are higher for global warming of 1.5°C than at present, but lower than at 2°C . These risks depend on the magnitude and rate of warming, geographic location, levels of development and vulnerability, and the implementation of adaptation and mitigation options. [3]

Average annual temperatures in the Midwest have been increasing over the last several decades. Between 1900 and 2010, the average air temperature increased by more than 1.5°C. The rate of increase in temperature has accelerated particularly in nighttime and winter temperatures. Precipitation is greatest in the eastern part of the Midwest. Heavy downpours are already common, and climate change is expected to intensify storms, leading to greater precipitation across the region during this century. Annual precipitation has risen by as much as 20% in some areas. Projections of future precipitation indicate that heavy downpours are likely to occur primarily in winter and spring months while summers will become drier, especially in the southern portion of the region. [4]

Many communities in the United States have started to take address climate change at the local level. Reducing fossil fuel use in the community can have many benefits beyond reducing greenhouse gas emissions. More efficient energy use decreases utility and transportation costs for residents and businesses. Retrofitting homes and businesses to be more efficient creates local jobs. In addition, when residents save on energy costs, that money is more likely to be spent at local businesses and grow to the local economy. Reducing fossil fuel use improves air quality and improves residents' health.



[1] V. (2021). Greenhouse Gases | Monitoring References | National Centers for Environmental Information (NCEI). Greenhouse Gases | Monitoring References. <https://www.ncdc.noaa.gov/monitoring-references/faq/greenhouse-gases.php>

[2] Overview of Greenhouse Gases. (2021, July 27). US EPA. <https://www.epa.gov/ghgemissions/overview-greenhouse-gases>

[3] IPCC, 2018: Summary for Policymakers. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. World Meteorological Organization, Geneva, Switzerland, 32 pp.

[4] Climate Impacts in the Midwest | Climate Change Impacts | US EPA. (2021). Climate Impacts in the Midwest. <https://climatechange.chicago.gov/climate-impacts/climate-impacts-midwest>

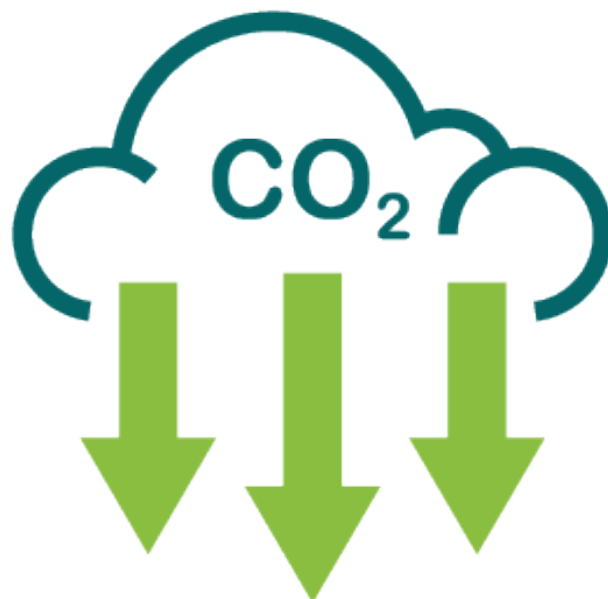
# GREENHOUSE GAS INVENTORY AS A STEP TOWARD CARBON NEUTRALITY

Facing the climate crisis requires the concerted efforts of local governments and their partners, those that are close to the communities directly dealing with the impacts of climate change. Cities, towns and counties are well placed to define coherent and inclusive plans that address integrated climate action – climate change adaptation, resilience and mitigation. Existing targets and plans need to be reviewed to provide in the necessary level of ambition and outline how to achieve net-zero emissions by 2050 at the latest. Creating a road map for climate neutrality requires Collinsville to identify priority sectors for action, while considering climate justice, inclusiveness, local job creation and other benefits of sustainable development.

To complete this inventory, Collinsville utilized tools and guidelines from ICLEI (Local Governments for Sustainability), which provides direction for greenhouse gas emissions accounting and defines climate neutrality as follows:

The targeted reduction of greenhouse gas (GHG) emissions and GHG avoidance in government operations and across the community in all sectors to an absolute net-zero emission level by 2050 at the latest. In parallel with this, it is critical to adapt to climate change and enhance climate resilience across all sectors, in all systems and processes.

To achieve ambitious emissions reduction, and move toward climate neutrality, Collinsville will need to set a clear goal and act rapidly following a holistic and integrated approach. Climate action is an opportunity for our community to experience a wide range of co-benefits, such as creating socio-economic opportunities, reducing poverty and inequality, and improving the health of people and nature.





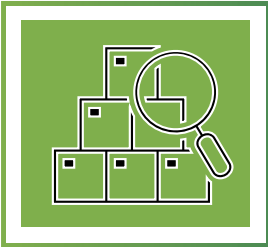
# INVENTORY METHODOLOGY

The first steps toward tangibly reducing greenhouse gas emissions include determining baseline emissions levels and identifying sources and activities that generate emissions in the community. This report presents emissions from the Collinsville community as a whole, as well as those generated by Collinsville government operations. The government operations inventory is a subset of the community inventory, as shown in Figure 1. For example, data on commercial energy use by the community includes energy consumed by municipal buildings, and community vehicle-miles-traveled estimates include miles driven by municipal fleet vehicles.

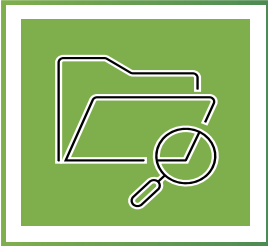


Figure 1.

The GHG inventory development process included four key steps:



Scope and plan inventory: reviewed accounting standards and methods, determined organizational and operational boundaries, and chose a base year.



Collect data: developed data collection procedures, tools, and guidelines, compiled and reviewed facility data (e.g., electricity, natural gas), requested data from local companies (e.g., Ameren, Southwestern Electric Power Company), estimated missing data to fill gaps, chose emission factors.



Develop the GHG inventory: input data into the ClearPath software.



Identify target areas for emissions reduction: finalized data, reported data, proposed recommendations to be included in the City's Sustainability Plan.

# QUANTIFYING SOURCES AND ACTIVITIES

Communities contribute to greenhouse gas emissions in many ways. Two central categories of emissions are used in the community inventory: 1) GHG emissions that are produced by “sources” located within the community boundary, and 2) GHG emissions produced as a consequence of community “activities”.

Source	Any physical process inside the jurisdictional boundary that releases GHG emissions into the atmosphere
Activity	The use of energy, materials, and/or services by members of the community that result in the creation of GHG emissions.

By reporting on both GHG emissions sources and activities, local governments can develop and promote a deeper understanding of GHG emissions associated with their communities. A purely source-based GHG inventory estimates total emissions released within the community’s jurisdictional boundary. In contrast, a purely activity-based inventory provides perspective on the efficiency of the community, even when the associated emissions occur outside the jurisdictional boundary. The division of emissions into sources and activities replaces the Scopes framework currently used in government operations inventories, which does not have a clear application to community-wide inventories.

## QUANTIFICATION METHODS

Greenhouse gas emissions can be quantified in two ways:

1

Measurement-based methodologies refer to the direct measurement of greenhouse gas emissions (from a monitoring system) emitted from a flue of a power plant, wastewater treatment plant, landfill, or industrial facility.

2

Calculation-based methodologies calculate emissions using activity data and emission factors utilizing the basic equation below:

$$\text{Activity Data} \times \text{Emission Factor} = \text{Emissions}$$

Most emission sources in this inventory are quantified using calculation-based methodologies. Activity data refer to the relevant measurement of energy use or other greenhouse gas-generating processes such as fuel consumption by fuel type, metered annual electricity consumption, and annual vehicle miles traveled. Please see appendices for a detailed listing of the activity data used in composing this inventory.

Known emission factors are used to convert energy usage or other activity data into associated quantities of emissions. Emission factors are usually expressed in terms of emissions per unit of activity data (e.g. lbs. of CO<sub>2</sub>/kWh of electricity). For this inventory, calculations were made using ICLEI’s ClearPath tool.

# GHG INVENTORY TRACKS

The City of Collinsville has conducted both the community-wide and government-operations scales to have a more comprehensive inventory. The base year for the Collinsville inventory is 2019 because the year 2020 would not accurately represent the City’s emissions due to reductions in activity caused by the COVID-19 pandemic.

According to the US EPA, the local government-scale track approach is appropriate for organizations that want to understand the GHG emissions of only government facilities and operations (e.g., government building, vehicle fleet, streetlights). This method may be suitable for government organizations interested in promoting green government operations. The community-scale track approach is for organizations that want to understand the GHG emissions of the entire community, including the local government operations. This approach may be more suitable for organizations that aim to implement projects to engage the community to be more sustainable.

The objective of the Collinsville sustainability plan is to improve the quality of life for present and future residents. For instance, the city aims to seek and promote new green businesses and green jobs, and promote walking and biking. Operationally, Collinsville also aims to increase solar panel installations on city facilities and replace its municipal fleet with electric vehicles. The impacts of these actions can be tracked in future inventories. Both community-wide and government-operation scales are appropriate for the City of Collinsville and will contribute to reaching the goals identified in the sustainability plan.

## COMMUNITY-WIDE TRACK



- Residential Energy
- Non-Residential Energy
- Transportation
- Solid Waste
- Water & Wastewater
- Process & Fugitive Emissions

## GOVERNMENT-OPERATIONS TRACK



- Buildings & Facilities
- Streetlights & Traffic Signals
- Vehicle Fleet
- Transit Fleet
- Employee Commute
- Water & Wastewater Treatment Facilities

# **CHAPTER 2: COMMUNITY-WIDE INVENTORY RESULTS**

# ENERGY: COMMUNITY-WIDE

The stationary energy sector includes emissions generated from energy consumption in homes, offices, schools, stores, manufacturing facilities, and other buildings within the community. Electricity and natural gas consumption were used to determine the greenhouse gas emissions for the residential and non-residential sectors of Collinsville. Non-residential energy includes commercial and industrial energy data. Ameren Illinois supplies both electricity and natural gas to customers within city limits while Southwest Electric Cooperative Inc. supplies only electricity. For additional details on electricity and natural gas emissions, see page 33 of the Appendix.

**Table 1. Community-Wide Energy Emissions Data**

COMMUNITY SECTOR	SOUTHWESTERN ELECTRIC ELECTRICITY GENERATION (KWH)	AMEREN ELECTRICITY GENERATION (KWH)	ENERGY CONSUMPTION (MMBTU)	GHG EMISSIONS (METRIC TONS CO2E)
Residential energy	Electricity (Ameren & Southwest Electric Coop)	167,290,672	kWh	121,088
	Natural Gas	7,824,578.2	Therms	41,616
<b>RESIDENTIAL ENERGY TOTAL</b>				<b>162,704</b>
Non-Residential Energy	Electricity	102,729,518	kWh	74,358
	Natural gas	2,545,436.4	Therms	13,538
<b>NON-RESIDENTIAL ENERGY TOTAL</b>				<b>87,896</b>
Source: Ameren Illinois & Southwestern Electric Cooperative Inc				



**TOTAL EMISSIONS**  
CO2e: 250,600 mt

# TRANSPORTATION: COMMUNITY-WIDE

Transportation data was collected using Google Environmental Insights Explorer (EIE), which uses exclusive data sources and modeling capabilities to help cities measure emission sources. Google EIE calculates annual transportation emissions based on an extrapolation of the local distance traveled for all trips taken, the types of vehicles and average fuel consumption of each mode. The EIE estimate is a total of all trips taken within the City of Collinsville and trips that cross the City boundary. The vehicle miles traveled for all trips is aggregated and modeled city-wide using location information from Google Location History and other sources.

Madison County Transit (MCT), a public transit system dedicated to providing public mass transportation within Madison County, Illinois, provided the public transit data. The total vehicle miles travelled in 2019 was 4,660,974 miles traveled. The transportation sector estimates the amount of greenhouse gases that are emitted by vehicles using the roads within the city limits of Collinsville. For additional information, see page 34 of the Appendix for On-Road Vehicle Data, Fuel Type Data, and Public Transit Data from MCT.

**Table 2: Transportation Emissions Data**

SECTOR	FUEL OR SOURCE	2019 USAGE	USAGE UNIT	2019 EMISSIONS (MTCO2E)
On-road transportation	Gasoline (passenger vehicles, motorcycle, light trucks, and heavy trucks)	201,266,757.1	Annual VMT	83,976
	Diesel (passenger vehicles, motorcycle, light trucks, and heavy trucks)	21,472,017.9	Annual VMT	31,714
Public Transit	Madison County Transit (Diesel)	3,806,291	Annual VMT	7,933
	Gasoline Senior Citizen and Disabled Shuttle Bus	20,003.89	Annual VMT	34.34
	Diesel Senior Citizen and Disabled Shuttle Bus	3,092.11	Annual VMT	6.16

Source: Google Environmental Insights Explorer, Madison County Transit, City of Collinsville



**TOTAL EMISSIONS**  
CO2e: 123,663.5 mt

# SOLID WASTE: COMMUNITY-WIDE

Republic Services is responsible for collecting and landfilling Collinsville's municipal solid waste of Collinsville. The calculation of the greenhouse gas emissions used the waste generated in the City of Collinsville in 2019 and the quantity of landfill gas sent to flare in the Roxana landfill. Collinsville generated 7,159.17 tons of waste in the calendar year 2019, including trash and yard waste. We also created a waste factor set for the calendar year 2019. Waste factor sets are designed to specify the composition of the waste stream, which in turn affects emissions. However, Republic Services indicated that they do not have waste characterization for the Roxana Landfill site. The ClearPath User Guide recommends simply specifying 100% Mixed MSW when specific waste characterization data is not available.

**Table 3: Solid Waste Data**

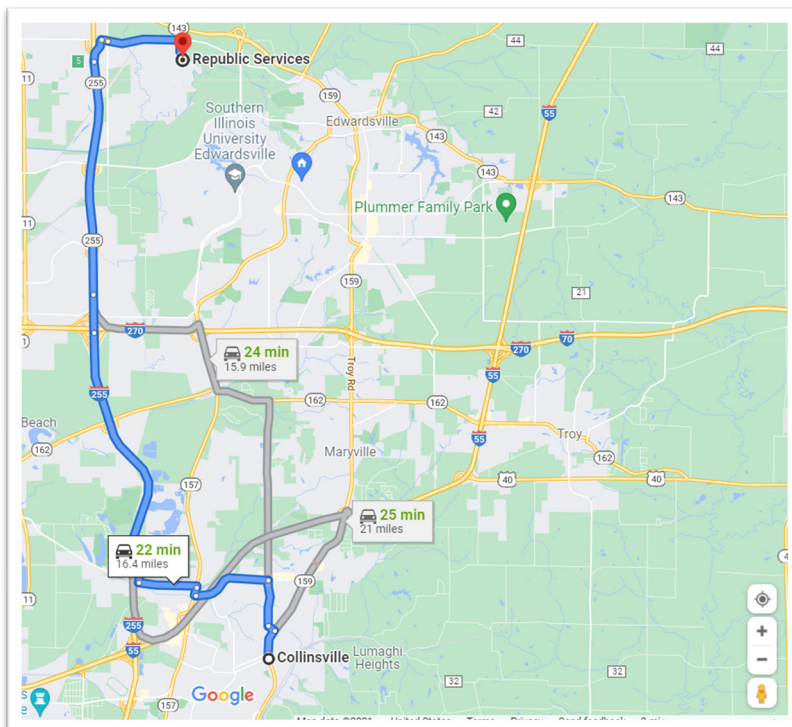
SECTOR	FUEL OR SOURCE	2019 USAGE	USAGE UNIT	2019 EMISSIONS (MTCO2E)
Solid Waste	Waste Generated	7,685.21	Tons	5,019.9

Source: Republic Services

**Table 4: Monthly Solid Waste Generation Data**

2019	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Trash	571.95	492.43	513	609.81	638.66	635.93	679.02	655.03	552.4	605.84	591.05	614.05	7,159.17
Recycle	150.18	120.11	115.13	156.93	133.36	125.43	136.58	138.55	114.17	141.21	128.73	145.44	1,605.82
Yard Waste	1.71	0	0	97.63	76.35	51.62	53.28	40.65	37.01	40.13	77.7	49.96	526.04
Diversion Rate	20.80%	19.61%	18.33%	20.47%	17.27%	16.47%	16.75%	17.46%	17.13%	18.90%	17.88%	19.15%	18.32%

Source: Republic Services



**TOTAL EMISSIONS**  
CO2e: 5,019.9 mt

# WATER & WASTE WATER: COMMUNITY-WIDE

The potable water data includes the energy consumption used for the extraction, treatment, and distribution of potable water, and the volume of potable water delivered to residents and businesses of Collinsville. The wastewater data includes the amount of electricity or natural gas used at the wastewater facility in the baseline calendar year. The City of Collinsville's Water Department is a full-service utility of the City. It has the responsibility for pumping water out of the ground, sending water to the treatment plant, treating water to the highest quality standards, and delivering water to homes and businesses. Wastewater is generated within or outside the city boundary but is treated within the city boundary. The total population of the service area for the three systems (Collinsville, Maryville & Mounds Public Water District) that are serviced by the WWTP is approximately 36,000.

Municipal wastewater can be treated aerobically (in presence of oxygen) or anaerobically (in absence of oxygen). The facility is primarily aerobic. When wastewater is treated anaerobically, methane (CH<sub>4</sub>) is produced. Both types of treatment, anaerobic and aerobic, also generate nitrous oxide (N<sub>2</sub>O) through the nitrification and denitrification of sewage nitrogen. N<sub>2</sub>O and CH<sub>4</sub> are potent GHGs that are accounted for during wastewater treatment, while CO<sub>2</sub> from wastewater treatment is considered to be biogenic in origin and reported separately. Nitrous oxide is produced when using nitrification to treat the water. This WWTP does not keep site-specific measurements of nitrous oxide emissions.

**Table 5. Water & Wastewater Treatment Data**

SECTOR	FUEL OR SOURCE	2019 USAGE	USAGE UNIT	2019 EMISSIONS (MTCO <sub>2</sub> E)
Water and Wastewater	Wastewater Treatment Energy Usage	2,683,769.61	kWh	1942.6
	Potable Water Electricity Usage	566,830.2	kWh	439.87
	Potable Water Natural Gas Usage	5,562.06	Therms	

Source: City of Collinsville



**TOTAL EMISSIONS**  
CO<sub>2</sub>e: 2,382.47 mt



# PROCESS & FUGITIVE EMISSIONS: COMMUNITY-WIDE

Process and fugitive emissions are gases and vapors accidentally released into the atmosphere. Most fugitive emissions come from industrial activities, like factory operations. These emissions contribute to climate change and air pollution. Because there are very little emissions generated from industrial activities within the City of Collinsville, process and fugitive emissions are relatively low compared to the other categories. The total emissions listed in Table 9 are based on residential and commercial natural gas used by the community with an estimated 0.3% leakage rate.

**Table 6. Process & Fugitive Emissions Data**

FUEL OR SOURCE	2019 USAGE	USAGE UNIT	2019 EMISSIONS (MTCO2E)
Fugitive Emissions from Natural Gas Distribution	10,370,015	Therms	1,799.1
Source: Ameren			

**Table 7. Process & Fugitive Source Data**

SOURCE	2019 USAGE	USAGE UNIT
Non-Residential Energy	2,545,436.4	Therms
Residential Energy	7,824,578.2	Therms
Total	10,370,015	Therms
Source: Ameren		



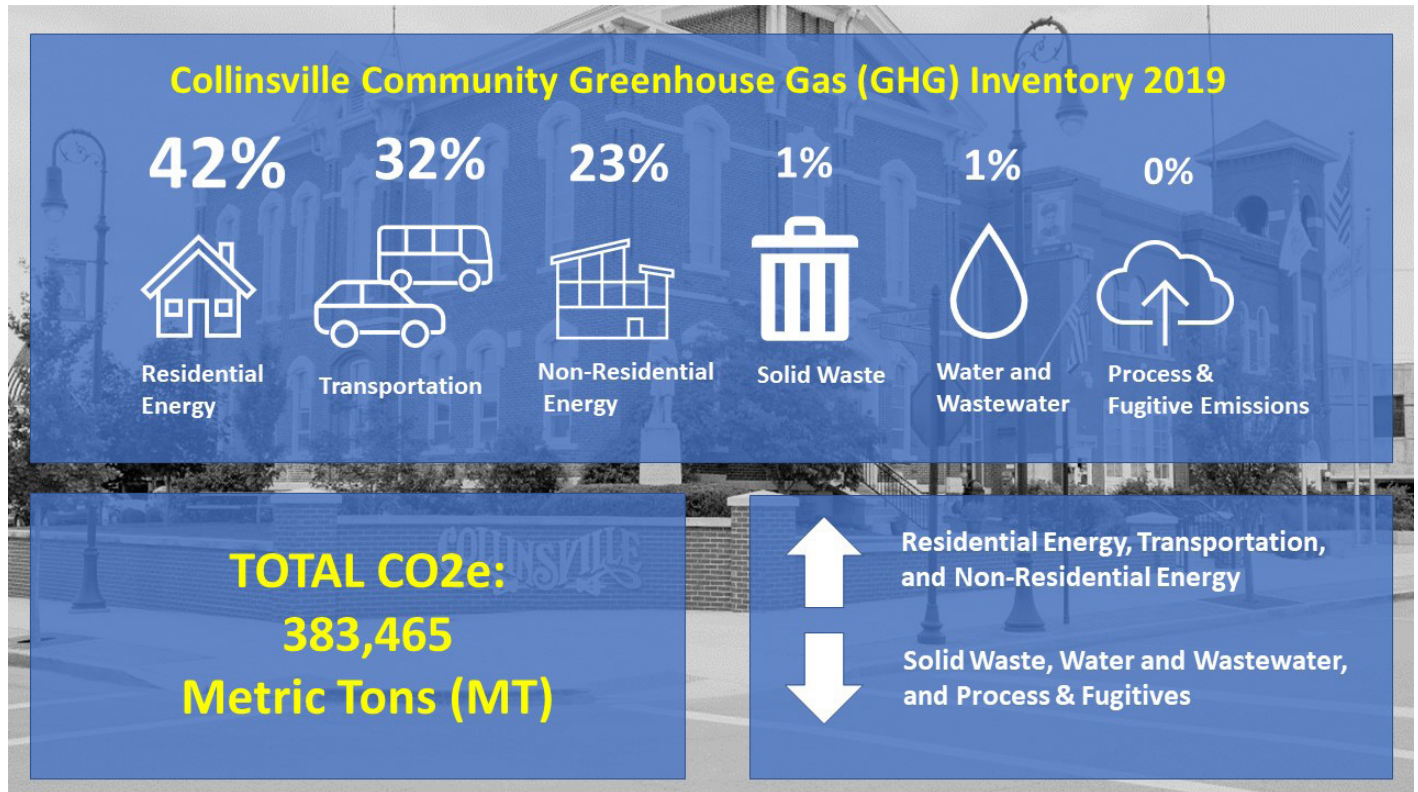
**TOTAL EMISSIONS**  
CO2e: 1,799.1

# COMMUNITY-WIDE SUMMARY

SECTOR	FUEL OR SOURCE	2019 USAGE	USAGE UNIT	2019 EMISSIONS (MTCO2E)
Residential energy	Electricity (Ameren & Southwestern Electric Cooperative Inc)	167,290,672	kWh	121,088
	Natural Gas	7,824,578.2	Therms	41,616
<b>RESIDENTIAL ENERGY TOTAL</b>				<b>162,704</b>
Non-Residential Energy	Electricity	102,729,518	kWh	74,358
	Natural Gas	2,545,436.4	Therms	13,538
<b>NON-RESIDENTIAL ENERGY TOTAL</b>				<b>87,897</b>
On-road transportation	Gasoline (passenger vehicles, motorcycle, light trucks, and heavy trucks)	201,266,757.1	Annual VMT	83,976
	Diesel (passenger vehicles, motorcycle, light trucks, and heavy trucks)	21,472,017.9	Annual VMT	31,714
Public Transit	Madison County Transit (Diesel)	3,806,291	Annual Revenue Miles Traveled	7,933
	Gasoline Senior Citizen and Disabled Shuttle Bus	20,003.89	Annual VMT	34.34
	Diesel Senior Citizen and Disabled Shuttle Bus	3,092.11	Annual VMT	6.16
<b>TRANSPORTATION TOTAL</b>				<b>123,663.5</b>
Solid Waste	Waste Generated	7,685.21	Tons	5,019.9
<b>SOLID WASTE TOTAL</b>				<b>5,019.9</b>
Water and Wastewater	Wastewater Treatment Energy Usage	2,683,769.61	kWh	1942.6
	Potable Water Electricity Usage	566,830.2	kWh	439.87
	Potable Water Natural Gas Usage	5,562.06	Therms	
<b>WATER AND WASTEWATER TOTAL</b>				<b>2,382.47</b>
Process & Fugitive Emissions	Fugitive Emissions from Natural Gas Distribution	10,370,015	Therms	1,799.1
<b>PROCESS &amp; FUGITIVE TOTAL</b>				<b>1,799.1</b>
<b>TOTAL COMMUNITY-WIDE EMISSIONS</b>				<b>383,465</b>

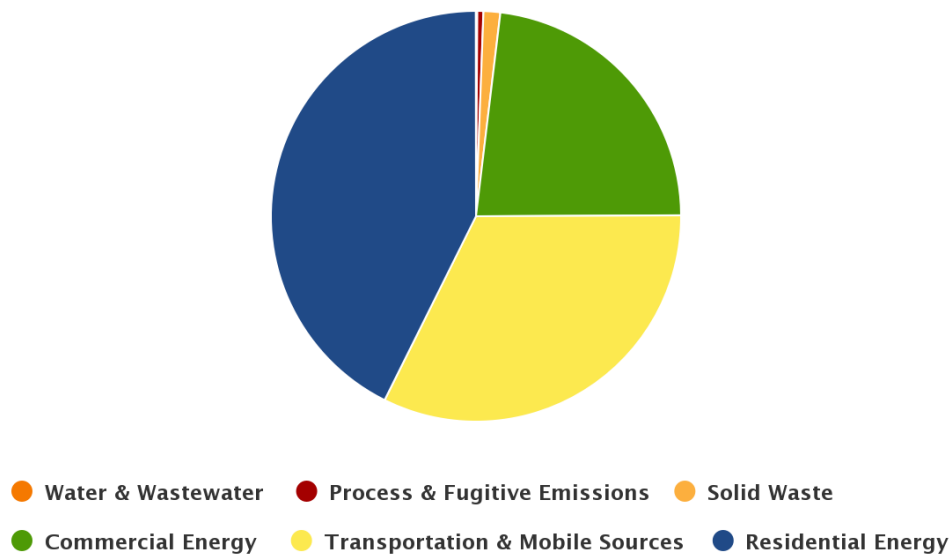


# COMMUNITY-WIDE SUMMARY *CONTINUED*



As per the GHG inventory of 2019, the largest GHG contributor is Residential Energy with 42% of emissions. The next largest contributors are Transportation at 32% and Non-Residential Energy (Commercial & Industrial) at 23%. Actions to reduce emissions in these three sectors will be a key part of the climate action plan. Solid Waste, Water and Wastewater, and Process & Fugitive Emissions were responsible for the remaining (less than 3%) emissions.

CO<sub>2</sub>e By Category



# **CHAPTER 3: GOVERNMENT OPERATIONS INVENTORY RESULTS**

# BUILDINGS & FACILITIES: GOV OPERATIONS

The buildings and facilities section of the inventory includes all the buildings and structures owned and operated by the City of Collinsville. Electricity and natural gas consumption were compiled to determine the greenhouse gas emissions. Ameren and Southwestern Electric Cooperative Inc. supplies all the electricity for these facilities and Ameren provides natural gas.

**Table 8. Buildings & Facilities Emissions Data**

COMMUNITY SECTOR	FUEL OR SOURCE	2019 USAGE	USAGE UNIT	2019 EMISSIONS (MTCO2E)
Buildings & Facilities	Electricity	2,108,134	kWh	1,525.90
	Natural Gas	40,596.4	Therms	215.92

Source: Ameren Illinois

**Table 9. Electricity and Natural Gas Usage by Month**

2019	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Electricity	183,096	170,332	172,375	154,437	166,906	200,380	227,290	185,259	181,301	163,923	140,607	162,228	2,108,134
Natural Gas	7,449	8,857	7,498	2,719	1,184	529	385	352	279	615	4,560	6,169	40,596

Source: Ameren Illinois



**TOTAL EMISSIONS**  
CO2e: 1,741.82 mt

# STREETLIGHTS & TRAFFIC SIGNALS: GOV OPERATIONS

Ameren and Southwestern Electric Cooperative Inc. provide streetlights on all the city rights-of-way (ROW) and facilities. The city pays a flat rate for the energy and maintenance cost for the ROW lighting. Ameren covers 60% of the total cost of the city's ROW lighting as per a franchise agreement with the city. Southwestern Electrical Cooperative Inc. bills the city per type of light based on the bulb wattage. Maintenance expenses, such as replacement of burnt bulbs, repair broken arm, etc., are paid by the utility providers. The cost of improvements requested by the city, such as replacing a bulb that is not burnt out with a brighter bulb, installing a new light in a dim location, etc., is paid by the city.



Traffic signals within the city are metered and the city pays the energy cost plus all transmission and service fees to the respective utility provider. The city shares the energy expense proportionately with Illinois Department of Transportation (IDOT) based on the jurisdiction of the roads being served by the traffic signal.

**Table 10. Street Lights & Traffic Signal Emissions Data**

COMMUNITY SECTOR	FUEL OR SOURCE	2019 USAGE	USAGE UNIT	2019 EMISSIONS (MTCO2E)
Street Lights & Traffic Signals	Electricity	1,503,352	kWh	1,088.20
Source: Ameren Illinois & Southwestern Electric Cooperative Inc				

**Table 11. Street Lights & Traffic Signal Electricity Usage by Month**

2019	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Electricity (kWh)	175,949	139,753	135,476	116,717	100,610	103,605	97,634	100,895	122,130	122,319	136,259	152,005	1,503,352
Source: Ameren Illinois & Southwestern Electric Cooperative Inc													



**TOTAL EMISSIONS**  
CO2e: 1,088.20 mt

# VEHICLE FLEET: GOV OPERATIONS

The vehicle fleet sector of the inventory quantifies the greenhouse gases emitted from all vehicles owned by the City of Collinsville. The Fleet Maintenance Department provided the quantity of gasoline and diesel fuel consumed by city-owned vehicles. Vehicle miles travelled (VMT) were compiled based on vehicle type (Passenger, Light Truck, Heavy Truck). The following departments operate city vehicles: Street, Police, Fire, City Hall, Parks, Gateway, Water, Sewer, Facilities Maintenance, and Fleet Maintenance.

**Table 12. Vehicle Fleet Emission Data**

COMMUNITY SECTOR	FUEL OR SOURCE	2019 USAGE	USAGE UNIT	2019 EMISSIONS (MTCO2E)
Vehicle Fleet	Gasoline (on-road)	59,448.1	Gallons	521.95
	Diesel (on-road)	40,437.8	Gallons	412.87

Source: Collinsville Fleet Maintenance Department

**Table 13. Vehicle Type & Vehicle Miles Travelled (VMT) By Department**

STREETS DEPARTMENT			WATER DEPARTMENT		
Vehicle Type	VMT	% of Total Miles	Vehicle Type	VMT	% of Total Miles
Heavy Truck	67,400	60.59%	Heavy Truck	8,060	14.94%
Light Truck	43,831	39.41%	Light Truck	45,884	85.06%
Total	111,231	100.00%	Total	53,944	100.00%
POLICE DEPARTMENT			GATEWAY CONVENTION CENTER		
Vehicle Type	VMT	% of Total Miles	Vehicle Type	VMT	% of Total Miles
Passenger	323,118	100.00%	Light Truck	43,936	100.00%
Total	323,118	100.00%	Total	43,936	100.00%
FIRE DEPARTMENT			WASTEWATER DEPARTMENT		
Vehicle Type	VMT	% of Total Miles	Vehicle Type	VMT	% of Total Miles
Heavy Truck	32,118	77.75%	Heavy Truck	10,913	18.00%
Passenger	9,191	22.25%	Light Truck	49,706	82.00%
Total	41,309	100.00%	Total	60,619	100.00%
CITY HALL			FACILITIES MAINTENANCE		
Vehicle Type	VMT	% of Total Miles	Vehicle Type	VMT	% of Total Miles
Passenger	41,067	100.00%	Light Truck	5,365	100.00%
Total	41,067	100.00%	Total	5,365	100.00%
PARKS			FLEET MAINTENANCE		
Vehicle Type	VMT	% of Total Miles	Vehicle Type	VMT	% of Total Miles
Light Truck	12,456	100.00%	Light Truck	3,806	100.00%
Total	12,456	100.00%	Total	3,806	100.00%

**Table 14: Total Vehicle Miles Travelled**

FUEL TYPE	VMT
Gasoline	414,737.89
Diesel	282,133.00
Total	696,850.89

Source: Collinsville Fleet Maintenance Department



**TOTAL EMISSIONS**  
CO2e: 934.82 mt

# TRANSIT FLEET: GOV OPERATIONS

The only form of public transit the City of Collinsville offers is the senior/disabled person’s shuttle. The City of Collinsville does not own the shuttles, but lease them from Madison County Transit on a 5-year recurring agreement. The total annual miles traveled by the shuttles in 2019 was 23,096 miles. The data has been organized by gasoline and diesel for more precise results.

**Table 15. Transit Fleet Emission Data**

SECTOR	FUEL OR SOURCE	2019 USAGE	USAGE UNIT	2019 EMISSIONS (MTCO2E)
Transit Fleet	Diesel	603	Gallons	6.16
	Gasoline	3,901	Gallons	34.34

Source: Collinsville City of Collinsville

**Table 16. Total Vehicle Miles Travelled by Month**

2019	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
VMT	1,839	1,977	2,029	2,089	2,598	1,752	1,774	2,041	1,855	1,937	1,557	1,648	23,096

Source: Collinsville City of Collinsville



**TOTAL EMISSIONS**  
CO2e: 40.5 mt



# EMPLOYEE COMMUTE: GOV OPERATIONS

In preparation for the inventory, we surveyed all fulltime employees (FTEs) to estimate the annual vehicle miles travelled by employees on their work commutes and better understand employee commuting habits. It should be noted that it was not possible to survey all 2019 employees due to new hires and departures over the time this inventory was created. In 2019, the City of Collinsville had 205 FTEs. The survey response rate was 51 percent, or 105 FTEs. Due to the response rate and the consideration that not all employees work a five (5) day workweek, total miles travelled by the 105 survey participants was scaled to reflect 205 FTEs with a standard Monday through Friday workweek. The employee commute sector calculates the GHG emissions from vehicle miles traveled by city employees commuting to and from work. The total vehicle miles traveled by employees was estimated to be 887,974.2 miles.

The employee air travel sector aimed to calculate the emissions caused by work-related air travel by city employees on airplanes owned or operated by third parties. It included the total distance travelled by air for employees in the reporting year. Eight (8) city employees from the Community Development Department, Police Department, Public Works Department, Fire Department, and Gateway Convention Center travelled a total of 13,223 miles to attend conferences and training events. Full details on the employee commute survey and employee air travel can be found in the Appendix on pages 34 & 35.

**Table 17. Employee Commute Emission Data**

SECTOR	FUEL OR SOURCE	2019 USAGE	USAGE UNIT	2019 EMISSIONS (MTCO2E)
Employee Commute	Gasoline Employee Commute from and to work	887,974.2	Annual VMT	406.17
	Employee Air Travel	13,223	Passenger Miles/Year	2.16

Source: Collinsville City of Collinsville



**TOTAL EMISSIONS**  
CO2e: 408.33 mt

# WATER & WASTEWATER TREATMENT FACILITIES: GOV OPERATIONS

The water and wastewater facilities sector includes all Collinsville Water and Wastewater Treatment Plant electricity consumption. Collinsville owns and operates the water and wastewater facilities. The Water Treatment Plant is responsible for the treatment and production of safe water for the community's drinking water and fire protection. The Wastewater Treatment Plant is responsible for management and maintenance of the Wastewater Treatment Facility and treatment of the city's domestic wastewater ensuring the protection of public health and that all regulatory requirements and limits are consistently achieved. It should be noted that this inventory includes electricity and natural gas usage from both the new Water Treatment Plant that went online June of 2019 and the old Water Treatment Plant which went offline May of 2019.

**Table 18. Water & Wastewater Treatment Plant Emission Data**

COMMUNITY SECTOR	FUEL OR SOURCE	2019 USAGE	USAGE UNIT	2019 EMISSIONS (MTCO2E)
Water & Wastewater Treatment Facilities	Wastewater Treatment Electricity Usage	3,795,452	kWh	1,409
	Potable Water Electricity Usage	801,625	kWh	297.58
	Potable Water Natural Gas Usage	7,866	Therms	41.71
Source: Ameren Illinois & Southwestern Electric Cooperative Inc				

**Table 19. Wastewater Treatment Plant Electricity Usage**

2019	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Electricity (kWh)	421,966	433,780	392,754	299,864	352,594	325,355	311,791	275,257	231,152	211,482	247,414	292,115	3,795,452
Source: Ameren Illinois & Southwestern Electric Cooperative Inc													

**Table 20. Water Treatment Plant Electricity & Natural Gas Usage**

2019	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Electricity (kWh)	188,820	158,622	148,227	141,264	113,626	7,742	7,495	6,790	7,025	7,681	5,739	8,594	801,625
Natural Gas (Therms)	924	1,425	276	52	0	344	367	268	297	273	1,581	2,009	7,866
Source: Ameren Illinois & Southwestern Electric Cooperative Inc													



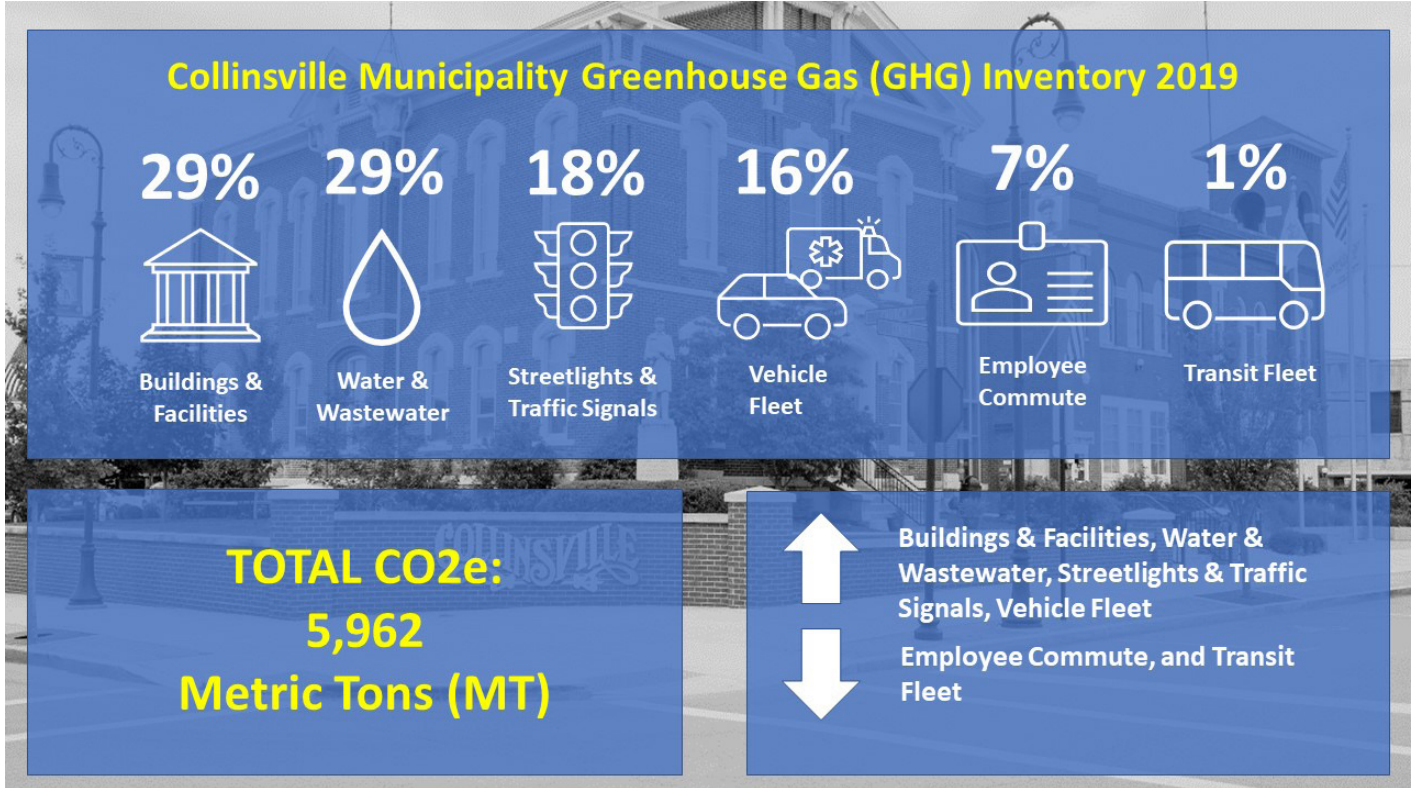
**TOTAL EMISSIONS**  
CO2e: 1,748.29 mt

# GOV OPERATIONS SUMMARY

SECTOR	FUEL OR SOURCE	2019 USAGE	USAGE UNIT	2019 EMISSIONS (MTCO2E)
Buildings & Facilities	Electricity	2,108,134	kWh	1,525.90
	Natural Gas	40,596.4	Therms	215.92
<b>BUILDINGS &amp; FACILITIES TOTAL</b>				<b>1,741.82</b>
Street Lights & Traffic Signals	Electricity	1,503,352	kWh	1,088.20
<b>STREET LIGHTS &amp; TRAFFIC SIGNALS TOTAL</b>				<b>1,088.20</b>
Vehicle Fleet	Gasoline (on-road)	59448.1	Gallons	521.95
	Diesel (on-road)	40437.8	Gallons	412.87
<b>FLEET VEHICLE TOTAL</b>				<b>934.82</b>
Transit Fleet	Diesel	603	Gallons	6.16
	Gasoline	3901	Gallons	34.34
<b>TRANSIT FLEET TOTAL</b>				<b>40.5</b>
Employee Commute	Gasoline Employee Commute from and to work	887,974.2	Annual VMT	406.17
	Employee Air Travel	13,223	Passenger Miles/Year	2.16
<b>EMPLOYEE COMMUTE TOTAL</b>				<b>408.33</b>
Water & Wastewater Treatment Facilities	Wastewater Treatment Electricity Usage	3,795,452	kWh	1,409
	Potable Water Electricity Usage	801,625	kWh	297.58
	Potable Water Natural Gas Usage	7,866	Therms	41.71
<b>WATER AND WASTEWATER TOTAL</b>				<b>1,748.29</b>
<b>TOTAL GOVERNMENT EMISSIONS</b>				<b>5,962</b>

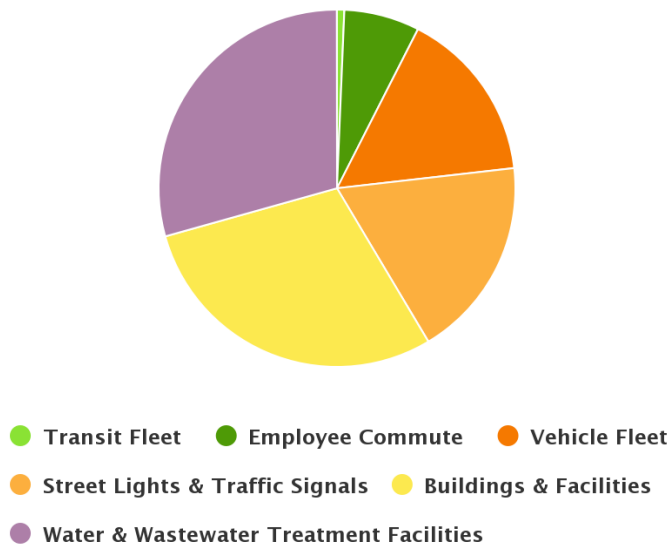


# GOV OPERATIONS SUMMARY CONTINUED



As per the GHG inventory of 2019, the largest GHG contributors are Buildings & Facilities and Water & Wastewater operations (29% respectively). The next largest contributor is Streetlights & Traffic Signals (18%), followed by Vehicle Fleet (16%). Actions to reduce emissions from these sectors will be a key part of any future climate action plan developed by the City of Collinsville. The Employee Commute and Transit Fleet were responsible for the remainder (less than 8%) of local government operations emissions.

CO<sub>2</sub>e By Category



# **CHAPTER 4: RECOMMENDATIONS AND CONCLUSIONS**

# COMMUNITY-WIDE TRACK RECOMMENDATIONS

The inventory results should be used to determine and prioritize actions to reduce emissions within the community. Based on the community-wide inventory results, the following areas have the greatest potential for emissions reduction:

1. Create accessible, online information about energy efficiency and clean energy options for residents and businesses.
2. Implement a local green business challenge to encourage businesses to make their operations more energy efficient.
3. Partner with utilities to promote energy efficiency programs to the community.
4. Publicize community achievements and educate the public on sustainability efforts in various media sources.
5. Coordinate with Willoughby Farm, Collinsville District 10, and the Madison County Green Schools program to educate the community on energy-efficient practices and renewable energy.
6. Promote alternative modes of transportation, including public transit, electric vehicles, car pooling, and bike/pedestrian options.

# GOV OPERATIONS TRACK RECOMMENDATIONS

The inventory results should be used to determine and prioritize actions to reduce emissions within the government operations. Based on the government operations inventory results, the following areas have the greatest potential for emissions reduction:

1. Improve energy efficiency at the water and wastewater facilities.
2. Coordinate with Ameren to utilize more energy efficient streetlights and traffic signals.
3. Install solar panels on city buildings and facilities where possible and feasible.
4. Upgrade to energy efficient building systems, such as HVAC systems and LED lighting.
5. Implement the use of electric vehicles for the city fleet and electric charging stations at city facilities.
6. Encourage best practices for employees, such as shutting off electronics after hours and car pooling to work.



# FUTURE INVENTORY RECOMMENDATIONS

Completion of another GHG inventory in three (3) years is recommended in order to assess progress from any actions implemented. The detailed methodology section of this report, as well as notes and attached data files in the ClearPath tool, will be helpful to complete a future inventory consistent with this one. This GHG Inventory was prepared with the best, currently-available data. However, opportunities exist to improve the inventory as additional information becomes available. Future inventories should be calculated using the same methods, data sources, and boundary definitions. In other words, all emissions over time should be estimated consistently. This being the case, Collinsville should recalculate the 2019 base year emissions if they encounter significant changes related to structural changes in the inventory boundary, changes in calculation methodology or improvements in data accuracy, and discovery of significant errors. [5]

## CONCLUSIONS

This inventory marks the completion of Milestone One of the Five ICLEI Climate Mitigation Milestones. Understanding the city's highest emitting sectors helps identify where we should focus our emissions-reductions efforts. The next steps are to forecast emissions, set an emissions-reduction target, and develop a climate action plan for achieving the emissions reduction target. A climate action plan includes specific policy proposals and planning processes that Collinsville will use to inform and implement a climate change mitigation strategy. The climate action plan should address the regional and local climate risks and vulnerabilities, goals and targets, alternative policy options, and recommendations and strategies for implementation. [6]

The Intergovernmental Panel on Climate Change (IPCC) states that in order to meet the Paris Agreement commitment of keeping warming below 1.5°C we must reduce global emissions by 50% by 2030 and reach climate neutrality by 2050. Equitably reducing global emissions by 50% requires that high-emitting, wealthy nations reduce their emissions by more than 50%. More than ever, it is imperative that countries, regions, and local governments set targets that are ambitious enough to slash carbon emissions between now and mid-century.

Science-Based targets are calculated climate goals, in line with the latest climate science, that represent a community's fair share of the global ambition necessary to meet the Paris Agreement commitment. To achieve a science-based target, community education, involvement, and partnerships will be instrumental. Collinsville will continue to track key energy use and emissions indicators on an on-going basis. It is recommended that communities update their inventories regularly, especially as plans are implemented, to ensure measurement and verification of impacts. Regular inventories also allow for "rolling averages" to provide insight into sustained changes and can help reduce the chance of an anomalous year being incorrectly interpreted. This inventory shows that residential, commercial, and public authority sales energy as well as community-wide transportation patterns will be a particularly important focus area. Through these efforts and others, Collinsville can achieve environmental, economic, and social benefits beyond reducing emissions.

[5] Fong, W. K., & C40, M. D. (2014). Global protocol for community-scale greenhouse gas emission inventories.

[6] Developing a State Climate Change Action Plan. (2017, May 31). US EPA. <https://archive.epa.gov/epa/statelocalclimate/developing-state-climate-change-action-plan.html#one>

# APPENDIX



# DATA CHECKLIST

Data Checklist	Organization
Residential Electricity	Ameren and Southwestern Electric Cooperative
Commercial and Industrial Energy	Ameren and Southwestern Electric Cooperative
Commercial Natural Gas	Ameren
Residential Natural Gas	Ameren
Sales to Public Authority/ Street and Highway Light Electricity	Ameren and Southwestern Electric Cooperative
On-road Vehicles	Google Environmental Insights Explorer
Public Transit	Madison County Transit and City of Collinsville
Solid Waste	Republic Services
Water and Wastewater Facilities	City of Collinsville
Vehicle Fleet, Transit Fleet, and Employee Commute	City of Collinsville

## COMMUNITY ENERGY DATA

COMMUNITY SECTOR	SOUTHWESTERN ELECTRIC ELECTRICITY GENERATION (KWH)	AMEREN ELECTRICITY GENERATION (KWH)	ENERGY CONSUMPTION (MMBTU)	GHG EMISSIONS (METRIC TONS CO2E)
Residential	24,910,322	142,380,350	570,958	121,088
Non-Residential	14,787,398	87,942,190	350,613	74,358
Total	39,697,720	230,322,540	921,571	195,446
Source: Ameren Illinois & Southwestern Electric Cooperative Inc				

COMMUNITY SECTOR	AMEREN ELECTRICITY GENERATION (KWH)	ENERGY CONSUMPTION (MMBTU)	GHG EMISSIONS (METRIC TONS CO2E)
Residential	7,824,578.22	782,458	41,616
Non-Residential	2,506,179.37	250,618	13,329
Total	10,330,757.60	1,033,076	54,945
Source: Ameren Illinois			

# COMMUNITY TRANSPORTATION DATA

VEHICLE TYPE	IN-BOUNDARY VMT	INBOUND VMT	OUTBOUND VMT	TOTAL IN-BOUNDARY VMT
All Automobiles	32,260,362	189,332,876	191,623,950	222,738,775.00
Source: Google Environmental Insights Explorer				

FUEL TYPE	GAS	DIESEL
VMT	201,266,757.1	21,472,017.91
% Passenger	75.89%	3.36%
% Light-Duty	21.83%	8.07%
% Heavy-Duty	1.59%	88.57%
% Motorcycle	0.69%	0%
Source: Google Environmental Insights Explorer		

FUEL TYPE	GAS	DIESEL
VMT	201,266,757.1	21,472,017.91
Passenger	152,741,341.96	721,459.80
Light-Duty	43,936,533.07	1,732,791.85
Heavy-Duty	3,200,141.44	19,017,766.26
Motorcycle	1,388,740.62	0
Source: Google Environmental Insights Explorer		

PUBLIC TRANSIT	ANNUAL MILES	GHG EMISSIONS (MTCO2E)
MCT	4,660,974	7,933
Source: Madison County Transit		

# EMPLOYEE AIR TRAVEL PASSENGER MILES

DEPARTMENT	DEPARTURE	RETURN TRIP	PASSENGER MILES
Community Development	St. Louis, MO to Dallas Fortworth, TX, then Dallas Fortworth, TX to San Francisco, CA	San Francisco, CA to Phoenix, AR then Phoenix, AR to St. Louis, MO	3,924
Police Department	St. Louis, MO to Phoenix, AR	Phoenix, AR to St. Louis, MO	2,524
Public Works Department	St. Louis, MO to Denver, CO	Denver, CO to St. Louis, MO	1,540
Gateway Center	St. Louis, MO to Greenbay, WI	Greenbay, WI to Belleville, IL	831
Fire Department	St. Louis, MO to Middletown, Pennsylvania	Middletown, Pennsylvania to St. Louis, MO	1,468
	St. Louis, MO to Middletown, Pennsylvania	Middletown, Pennsylvania to St. Louis, MO	1,468
	St. Louis, MO to Middletown, Pennsylvania	Middletown, Pennsylvania to St. Louis, MO	1,468
Source: Collinsville City of Collinsville			

# EMPLOYEE COMMUTE SURVEY

Q1: WHAT DEPARTMENT ARE YOU IN?		
DEPARTMENT	VOLUME	TOTAL %
Community Development	7	7%
Finance Department	10	10%
Parks & Recreation	9	9%
Gateway Convention Center	5	5%
Police Department	25	24%
Fire Department	19	18%
Public Works	23	22%
Information Technology	3	3%
Administration	4	4%
<b>Total</b>	<b>105</b>	<b>100%</b>

Source: City of Collinsville via Survey Monkey

Q2: HOW DO YOU COMMUTE TO WORK?		
MODE OF TRANSPORTATION	VOLUME	TOTAL %
Drive	104	99%
Carpool	0	0%
Bike	0	0%
Walk	1	1%
Public Transit	0	0%
Other	0	0%
<b>Total</b>	<b>105</b>	<b>100%</b>

Source: City of Collinsville via Survey Monkey

Q3: IF YOU TAKE PUBLIC TRANSIT, WHAT IS THE APPROXIMATE DISTANCE IN MILES YOU TRAVEL TO AND FROM WORK EACH DAY (ROUND TRIP)?		
MODE OF TRANSPORTATION	VOLUME OF EMPLOYEES	MILES TRAVELED
Public Transit	0	0
<b>Total</b>	<b>0</b>	<b>0</b>

Source: City of Collinsville via Survey Monkey

Q5: HOW MANY DAYS A WEEK TO DO YOU DRIVE TO WORK?		
DAYS PER WEEK	RESPONSES	TOTAL %
0 Days	1	1%
1 Day	0	0%
2 Days	13	12%
3 Days	4	4%
4 Days	12	11%
5 Days	75	71%
6 Days	0	0%
7 Days	0	0%
<b>Total</b>	<b>105</b>	<b>100%</b>

Source: City of Collinsville via Survey Monkey

Q4: IF YOU DRIVE A VEHICLE, WHAT IS THE APPROXIMATE DISTANCE IN MILES YOU DRIVE TO AND FROM WORK EACH DAY (ROUND TRIP)?		
MODE OF TRANSPORTATION	VOLUME OF EMPLOYEES	MILES TRAVELED
Drive to work	104	1,726.10
<b>Total</b>	<b>104</b>	<b>1,726.10</b>

Source: City of Collinsville via Survey Monkey

Q6: WHAT TYPE OF VEHICLE DO YOU DRIVE TO COMMUTE TO WORK?		
DAYS PER WEEK	RESPONSES	TOTAL %
Passenger Vehicle	39	37.5%
Light Truck or SUV	64	61.5
Heavy Truck	1	1%
<b>Total</b>	<b>104</b>	<b>100%</b>

Source: City of Collinsville via Survey Monkey

Q7: WHAT TYPE OF FUEL DOES YOUR VEHICLE USE?		
FUEL TYPE	RESPONSES	TOTAL %
Gasoline	98	94%
Diesel	5	5%
Electric	1	1%
Ethanol	0	0%
<b>Total</b>	<b>104</b>	<b>100%</b>

Source: City of Collinsville via Survey Monkey