Photo Credit:
https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.facebook.com%2FDowntownHuntingtonIN%2F&psig=AOvVaw1gKB74jAgZHljdZHM_xYy3&ust=1628122797029000&source=images&cd=vfe&ved=0CAsQjRxqFwoTCJCFwpqMlvlCFQAAAAAdAAAAABAD

City of Huntington

2021 Community Greenhouse Gas Emissions Inventory

Prepared by
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With Assistance from ICLEI Local Governments for Sustainability
October 2021

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Letter from the Mayor

I never make enough time to work on my '77 Chrysler LeBaron but I always enjoy it when I get a chance. I'm a slouch when it comes to working on cars but even I know that when I do, I need to make sure it is in a well-ventilated space. The gases produced by engine and exhaust systems can be deadly if I don't respect them. Those same gases, over greater time and with greater output, affect our environment too. It's easy enough to open my garage door while I'm working on the car. It takes a lot more effort and resources to address the impact of largescale pollution.

Each of us must do our part to prepare to face the consequences of a changing climate. At the same time, some problems we have to solve together as a community. Improvements to storm water drainage and separating sewers from our storm water system are under way. Tree planting to cool off our community to help us weather more severe heat days is kicking off as well.

As a next step, the City of Huntington has worked with Indiana University to create a Greenhouse Gas (GHG) Emissions Inventory. The inventory creates a baseline so we know where we are and can set goals to improve. The following report focuses on Huntington's community. A similar report chronicles Huntington's local government operations specifically.

The challenges are daunting. Confirmation of the underlying research by private sector energy companies underscores the urgency. It will take us all working together to overcome these challenges with patience and diligence. Thank you for doing your part to learn more by reviewing this report.

Richard Strick, Mayor
Huntington, Indiana

Executive Summary

The City of Huntington recognizes the effects that greenhouse gas emissions from human activities have on our climate and the consequences we must face as a community. The City of Huntington is dedicated to making the community climate resilient with a stronger economy, a healthier environment, and a higher quality of life for its residents.

Huntington was one of 22 Indiana communities who produced a greenhouse gas (GHG) emissions inventory this year. The additional communities include Cedar Lake, Chesterton, East Chicago, Highland, Hobart, Indianapolis, La Porte, Lafayette, Lake County, Lake Station, LaPorte County, Merrillville, Munster, New Albany, New Castle, Porter County, Schererville, South Bend, Terre Haute, Tippecanoe County, and Valparaiso. Since 2019, 19 additional Indiana communities have completed a GHG emissions inventory. By the end of December 2021, approximately 50% of Indiana's population will be covered by a GHG emissions inventory, a great accomplishment taking Indiana one step further toward climate resiliency.

The City of Huntington partnered with Indiana University's Environmental Resilience Institute (ERI)[1] and ICLEI Local Governments for Sustainability (ICLEI USA)[2] to reduce the community's GHG emissions following the ERI's three stages in Climate Action Planning and ICLEI's Five Climate Mitigation Milestones. This report presents the results from the community-wide greenhouse gas (GHG) emissions inventory. Huntington will use these results to set emission reduction goals and present them in a written Climate Action Plan for the city.

Key Findings

Figure 1 represents the community-wide GHG emissions by sector. In the calendar year of 2019, Huntington, Ind., emitted approximately 417,514 metric tons of carbon dioxide equivalent ($MTCO_2e$).[3] The largest contributing sector in Huntington was commercial energy emitting 32% of the community's GHGs. The next largest contributors were industrial energy, 26%, and residential energy, 18%, while the remaining emissions came from transportation and mobile sources, solid waste, water and wastewater, and process and fugitive emissions.[4] This inventory determined that more than half of Huntington's emissions come from the energy sectors. These results will be reflected in Huntington's Climate Action Plan.

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[1] https://eri.iu.edu.

[2] https://icleiusa.org.

[3] $MTCO_2e$ is defined as Metric Tons of carbon dioxide equivalent. Also found in Glossary.

[4] In this inventory, process and fugitive emissions come from natural gas leakage.

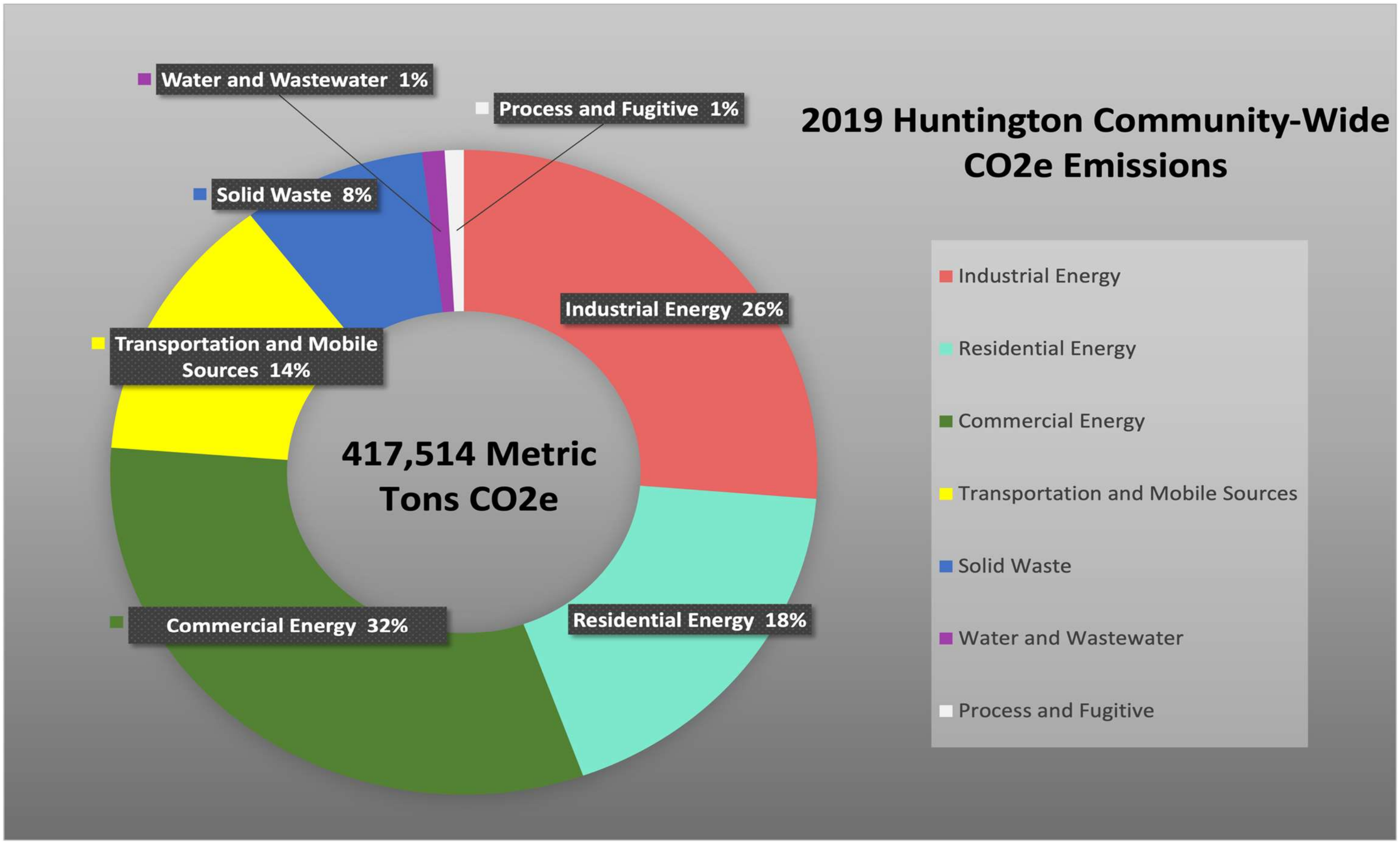

Figure 1: Community-Wide GHG emissions by sector in Huntington, Ind., during the 2019 calendar year.

The Community Inventory Results section of this report provides more details on the GHG emissions in Huntington. This baseline inventory will be used to compare the city's future emissions and assess any trends over time.

Introduction

Naturally occurring gases dispersed in the atmosphere determine the Earth's climate by trapping solar radiation. This phenomenon is known as the greenhouse effect. Overwhelming evidence shows that human activities are increasing the concentration of greenhouse gases and changing the global climate. The most significant contributor is the burning of fossil fuels for transportation, electricity generation and other purposes, which introduces large amounts of carbon dioxide and other greenhouse gases into the atmosphere. Collectively, these gases intensify the natural greenhouse effect, causing global average surface and lower atmospheric temperatures to rise. Global climate change influences seasonal patterns and intensifies weather events, threatening the safety, quality of life, and economic prosperity of communities everywhere.[5] Many regions are already experiencing the consequences of global climate change, and Huntington is no exception.[6]

What does climate change mean for Huntington?

Indiana is becoming warmer and wetter with each passing year as a direct result of GHG emissions from human activities. Midwestern states are expected to experience the consequences of climate change as much as coastline states.[7] Figure 2 highlights the challenges Indiana is expected to face based on the 2018 Indiana Climate Change Impacts Assessment (IN CCIA).[8] These challenges include record-breaking heat waves, a delayed fall freeze, reduced water and air quality, decreased productivity of corn and soybean crops, loss of species, increased heavy rainfall, shorter winters, and increased demand for cooling.

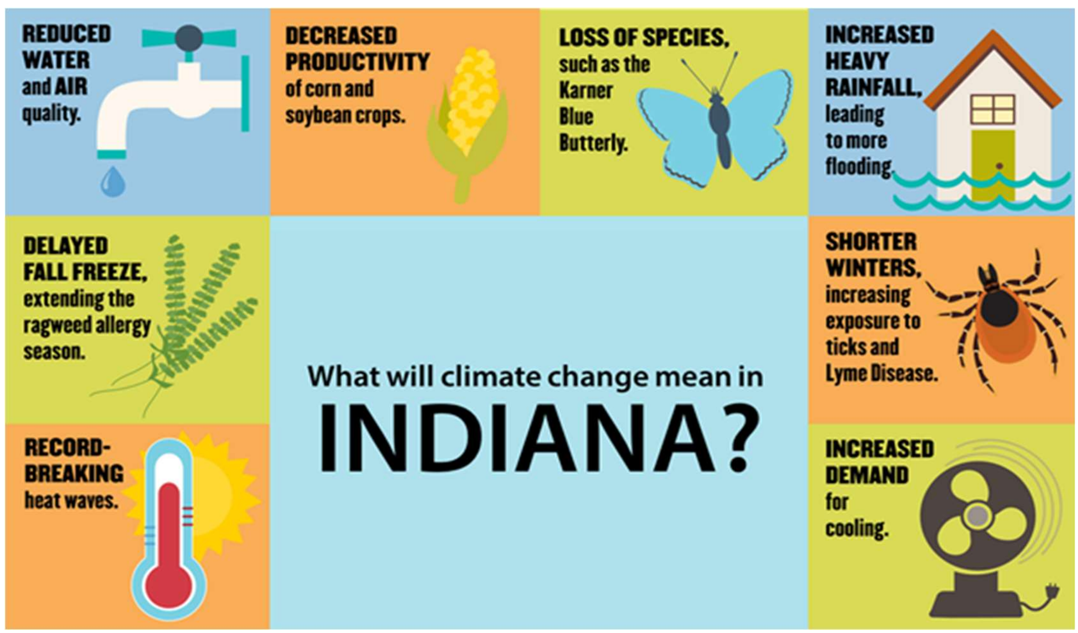

Figure 2: Indiana Climate Change Impacts according to the 2018 Indiana Climate Change Impacts Assessment. The figure was created by the City of South Bend, http://docs.southbendin.gov/WebLink/0/edoc/296977/South%20Bend%20Climate%20Action%20Plan.pdf.

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[5] International Panel on Climate Change. 2014. Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp. Retrieved from https://www.ipcc.ch/report/ar5/syr/.

[6] The first paragraph in the "Introduction" section of this inventory was written and produced by ICLEI USA.

[7] Indiana's Past & Future Climate: A Report from the Indiana Climate Change Impacts Assessment. 2018. Retrieved from https://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=1000&context=climatetr.

[8] Indiana's Past & Future Climate: A Report from the Indiana Climate Change Impacts Assessment. 2018. Retrieved from https://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=1000&context=climatetr.

Record-Breaking Heat Waves

Huntington is currently experiencing an average of 24 high heat days and nights during the summer months. If GHGs continue to be emitted in the quantity and at the rate they are now, Huntington can expect to experience between 66 to 79 high heat days and nights by 2050. Extreme heat events can lead to a decrease in the quality of health, particularly for vulnerable populations, such as children, the elderly, low-income communities, and those with pre-existing health conditions.[9]

Delayed Fall Freeze

A delayed fall freeze is a result of global warming temperatures and longer summers. This could increase the growth of plants, such as ragweed, resulting in a longer allergy season for Huntington. According to the Indiana Climate Change Impacts Assessment, Indiana's frost-free season is projected to increase by 3.5 to 4.5 weeks by 2050.[10]

Heavy Rainfall and Reduced Water Quality

42% of the precipitation in Indiana comes from heavy rainfall events and this percentage is expected to increase by 13 to 20% by 2050.[11] When heavy rainfall events occur, the city experiences flooding risks and water pollution from combined sewer system overflow. Huntington is currently working on stormwater efficiency, floodplain infrastructure development, and river improvements such as debris cleanups and the removal of low head dams to be proactive and prepared for future heavy rainfall events.

Reduced Air Quality

Air quality is measured by how much ambient air is pollution-free. GHGs are the main contributors to air pollution and as emissions increase, the air quality in Huntington reduces. Poor air quality increases irritation of the eyes, nose, and throat, causes respiratory conditions such as shortness of breath or asthma, and negatively affects the heart and cardiovascular system.[12]

Loss of Species and Decreased Crop Productivity

Environmental stressors such as increased temperatures of air and water, and increased drought risk, may reduce the populations of different species in Indiana. Loss of species may reduce or eliminate ecological services such as flood control, water purification, and crop pollination.[13] The most common pollinators in

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[9] US EPA (United States Environmental Protection Agency). 2016. Climate Change and Extreme Heat What You Can Do to Prepare. Retrieved from https://www.epa.gov/sites/default/files/2016-10/documents/extreme-heat-guidebook.pdf.

[10] PCCRC (Purdue Climate Change Research Center). 2018. Indiana's Past & Future Climate: A Report from the Indiana Climate Change Impacts Assessment. Retrieved from https://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=1000&context=climatetr.

[11] PCCRC (Purdue Climate Change Research Center). 2018. Indiana's Past & Future Climate: A Report from the Indiana Climate Change Impacts Assessment. Retrieved from https://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=1000&context=climatetr.

[12] US EPA (United States Environmental Protection Agency). 2021. Research on Health Effects from Air Pollution. Retrieved from https://www.epa.gov/air-research/research-health-effects-air-pollution.

[13] U.S. Climate Resilience Toolkit. 2019. Biodiversity and Ecosystems. Retrieved from https://toolkit.climate.gov/regions/midwest/biodiversity-and-ecosystems.

Indiana are bees (i.e., honeybees and bumblebees), pollen wasps, and certain moths, butterflies and beetles.[14] These pollinators are vital for food and crop production in Indiana, and if their populations decline, a decrease in crop productivity can be expected.

Increased Demand for Cooling

When GHGs are emitted into the Earth's atmosphere, they become trapped through the greenhouse effect resulting in the warming of the planet. As temperatures continue to increase and Huntington experiences more high heat events, there may be a significant increase in demand for cooling. Consequently, a high demand for cooling puts a strain on electricity systems and increases GHG emissions.[15]

ICLEI Climate Mitigation Milestones[16]

In response to the climate emergency, many communities in the United States are taking responsibility for addressing emissions at the local level. Since many of the major sources of greenhouse gas emissions are directly or indirectly controlled through local policies, local governments have a strong role to play in reducing greenhouse gas emissions within their boundaries, as well as influencing regional emissions through partnerships and advocacy. Through proactive measures around land use patterns, transportation demand management, energy efficiency, green building, waste diversion, and more, local governments can dramatically reduce emissions in their communities. In addition, local governments are primarily responsible for the provision of emergency services and the mitigation of natural disaster impacts.

ICLEI provides a framework and methodology for local governments to identify and reduce greenhouse gas emissions, organized along Five Milestones, shown in Figure 3:

1. Conduct an inventory and forecast of local greenhouse gas emissions.
2. Establish a greenhouse gas emissions science-based target.[17]
3. Develop a climate action plan for achieving the emissions reduction target.
4. Implement the climate action plan.
5. Monitor and report on progress.

Figure 3: ICLEI Climate Mitigation Milestones

[14] Indiana Department of Agriculture. 2021. Pollinator Habitat. Retrieved from https://www.in.gov/isda/programs-and-initiatives/pollinator-habitat/.

[15] IEA (International Energy Agency). 2021. The Future of Cooling: Opportunities for Energy-Efficient Air Conditioning. Retrieved from https://www.iea.org/reports/the-future-of-cooling.

[16] The "ICLEI Climate Mitigation and Milestones" section of this inventory was written and produced by ICLEI USA.

[17] Science-Based Targets are calculated climate goals, in line with the latest climate science, that represent your community's fair share of the ambition necessary to meet the Paris Agreement commitment of keeping warming below 1.5°C. To achieve this goal, the Intergovernmental Panel

This report represents the completion of ICLEI's Climate Mitigation Milestone One and provides a foundation for future work to reduce greenhouse gas emissions in Huntington.

on Climate Change (IPCC) states that we must reduce global emissions by 50% by 2030 and achieve climate neutrality by 2050. Equitably reducing global emissions by 50% requires that high-emitting, wealthy nations reduce their emissions by more than 50%.

Inventory Methodology

What is a greenhouse gas emissions inventory?

Greenhouse gas (GHG) inventories estimate the amount of GHG emissions produced by an entity in a given period of time. It provides an understanding of the quantity of emissions produced, the different sources of the emissions, and how to reduce the emissions. It is recommended that the City of Huntington completes a GHG emissions inventory every three to five years to assess the community's emissions over time. Comparing inventories from different years will allow the city to determine trends of emissions (i.e., decrease, increase, or no change) within Huntington's community.

This report presents Huntington's community-wide GHG emissions. Huntington is one of many communities conducting GHG inventories to quantify the city's GHG emissions with the purpose to set emission reduction goals for the community and contribute to the goals of the global climate movement.

Greenhouse Gases Included in the Inventory[18]

Three greenhouse gases are included in this inventory: carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). Many of the charts in this report represent emissions in "carbon dioxide equivalent" (CO_2e)[19] values, calculated using the Global Warming Potentials (GWP)[20] for methane and nitrous oxide from the IPCC 5th Assessment Report. The GWP was developed to compare the magnitude of global warming impacts of different greenhouse gases.[21] It is a measure of the amount of heat a unit of greenhouse gas will trap in the atmosphere over a period time, relative to the emissions of 1 ton of CO_2.[22] For instance, CH_4 is estimated to have a GWP of 28, meaning it holds more heat than CO_2.[23] Table 1 includes the GWP for methane and nitrous oxide.

Table 1: Global Warming Potential Values (IPPC, 2014).

Greenhouse Gas	Global Warming Potential
Carbon dioxide (CO_2)	1
Methane (CH_4)	28
Nitrous oxide (N_2O)	265

[18] The "Greenhouse Gas Included in the Inventory" section of this inventory was written and produced by ICLEI USA.
[19] $MTCO_2e$ is defined as Metric Tons of carbon dioxide equivalent. Also found in Glossary.
[20] Find Global Warming Potential (GWP) definition in the Glossary.
[21] USEPA (United States Environmental Protection Agency). 2021. Greenhouse Gas Emissions: Understanding Global Warming Potentials. Retrieved from https://www.epa.gov/ghgemissions/understanding-global-warming-potentials.
[22] USEPA (United States Environmental Protection Agency). 2021. Greenhouse Gas Emissions: Understanding Global Warming Potentials. Retrieved from https://www.epa.gov/ghgemissions/understanding-global-warming-potentials.
[23] USEPA (United States Environmental Protection Agency). 2021. Greenhouse Gas Emissions: Understanding Global Warming Potentials. Retrieved from https://www.epa.gov/ghgemissions/understanding-global-warming-potentials.

Community Emissions Protocol[24]

For this inventory, Huntington followed the approaches and methods provided by the Global Protocol for Community Scale GHG Emissions (GPC)[25], the official protocol specified by the Global Covenant of Mayors. In addition, this inventory draws on methods from ICLEI's U.S. Community Protocol, which provides more detailed methodology specific to U.S. communities. Version 1.2 of the U.S. Community Protocol for Accounting and Reporting GHG Emissions[26] was released by ICLEI in 2019 and represents a national standard in guidance to help U.S. local governments develop effective community GHG emissions inventories. It establishes reporting requirements for all community GHG emissions inventories, provides detailed accounting guidance for quantifying GHG emissions associated with a range of emission sources and community activities, and provides a number of optional reporting frameworks to help local governments customize their community GHG emissions inventory reports based on their local goals and capacities.

The community inventory in this report includes emissions from the five Basic Emissions Generating Activities required by the GPC Community Protocol. These activities are:

- Use of electricity by the community.
- Use of fuel in residential and commercial stationary combustion equipment.
- On-road passenger and freight motor vehicle travel.
- Use of energy in potable water and wastewater treatment and distribution.
- Generation of solid waste by the community.

The GPC community inventory also includes the following activities:

- Wastewater processing.
- Fugitive emissions from natural gas leakage.

Carbon dioxide represents the vast majority (99.6 %) of the community emissions and is produced from burning fossil fuels such as coal, gasoline, diesel, and natural gas. Nitrous oxide accounts for about 0.0011 % of community-wide emissions, primarily from grid electricity (from fuel combusted to create electricity) and gasoline used for passenger vehicles. Methane accounts for about 0.38% of community-wide emissions and comes primarily from grid electricity (from fuel combusted to create electricity), gasoline used for passenger vehicles, the methane-to-energy plant, flaring of digester gas, and leakage from the local natural gas distribution system.[27]

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[24] The "Community Emission Protocol" section of this inventory was written and produced by ICLEI USA.

[25] ICLEI (ICLEI Local Governments for Sustainability). 2012. Global Protocol for Community Scale Greenhouse Gas Emissions. Retrieved form https://ghgprotocol.org/sites/default/files/standards/GHGP_GPC_0.pdf.

[26] ICLEI (ICLEI Local Governments for Sustainability). 2012. US Community Protocol for Accounting and Reporting Greenhouse Gas Emissions. Retrieved from http://www.icleiusa.org/tools/ghg-protocol/community-protocol.

Quantifying Greenhouse Gas Emissions[28]

Sources and Activities

Communities contribute to greenhouse gas emissions in many ways. Two central categorizations 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".

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 emissions inventory could be summed to estimate total emissions released within the community's jurisdictional boundary. In contrast, a purely activity-based emissions inventory could provide 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 that is used in the local government operations inventories, but that does not have a clear definition for application to community inventories.

Base Year

The inventory process requires the selection of a base year with which to compare current emissions. Huntington's community greenhouse gas emissions inventory utilizes the calendar year of 2019 as its baseline year because it is the most recent year for which the necessary data are available.[29]

Quantification Methods

Greenhouse gas emissions can be quantified in two ways:

- 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.
- Calculation-based methodologies calculate emissions using activity data and emission factors. To calculate emissions accordingly, the basic equation below is used:

Activity Data x Emission Factor = 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

[28] The "Quantifying Greenhouse Gas Emissions" section of this inventory was written and produced by ICLEI USA.
[29] Note: 2020 was not used as the baseline due to skewed data caused by COVID-19.

are used to convert energy usage or other activity data into associated quantities of emissions. Emissions factors are usually expressed in terms of emissions per unit of activity data (e.g., lbs. CO_2/kWh of electricity). For this inventory, calculations were made using ICLEI's ClearPath tool.

Community Inventory Results

Community Profile

Huntington, Ind., has an estimated population of 17,065 people[30] and approximately 4,719 households[31] in the 2019 baseline year. The community inventory includes all emissions produced within the city borders of Huntington shown in Figure 4.

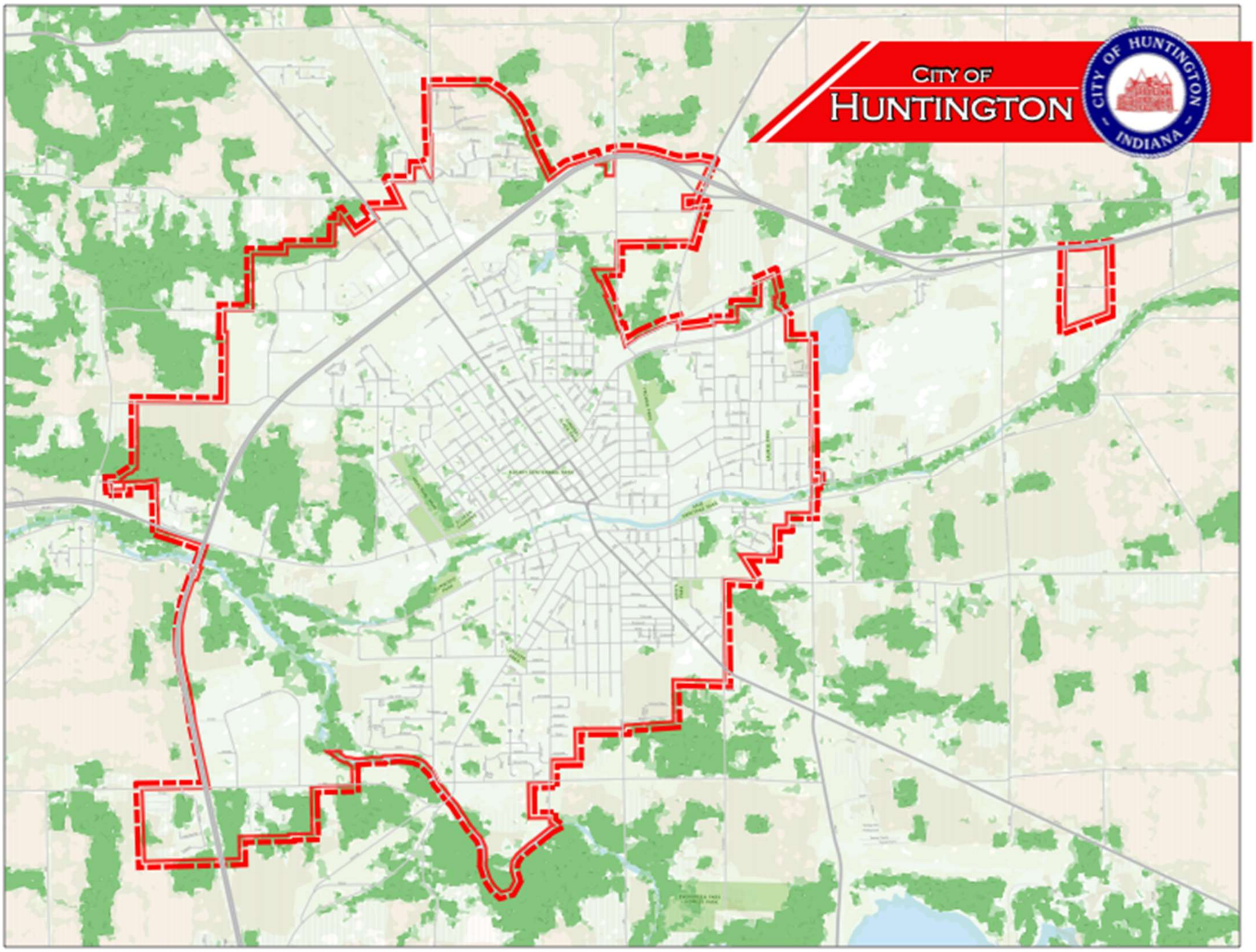

Figure 4: City of Huntington map with city borders.

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[30] Data Commons. 2021. Huntington. Retrieved from https://datacommons.org/place/geoId/1835302?utm_medium=explore&mprop=count&popt=Person&hl=en.
[31] United States Census Bureau. 2021. Housing Characteristics. Retrieved from https://data.census.gov/cedsci/table?g=0100000US_8600000US46750&y=2019&d=ACS%205-Year%20Estimates%20Data%20Profiles&tid=ACSDP5Y2019.DP04&hidePreview=true.

Inventory Results by Sector

In the calendar year of 2019, Huntington, Ind., emitted approximately 417,514 $MTCO_2e$.[32] The community-wide GHG inventory results are represented in Figure 5 and Table 2.

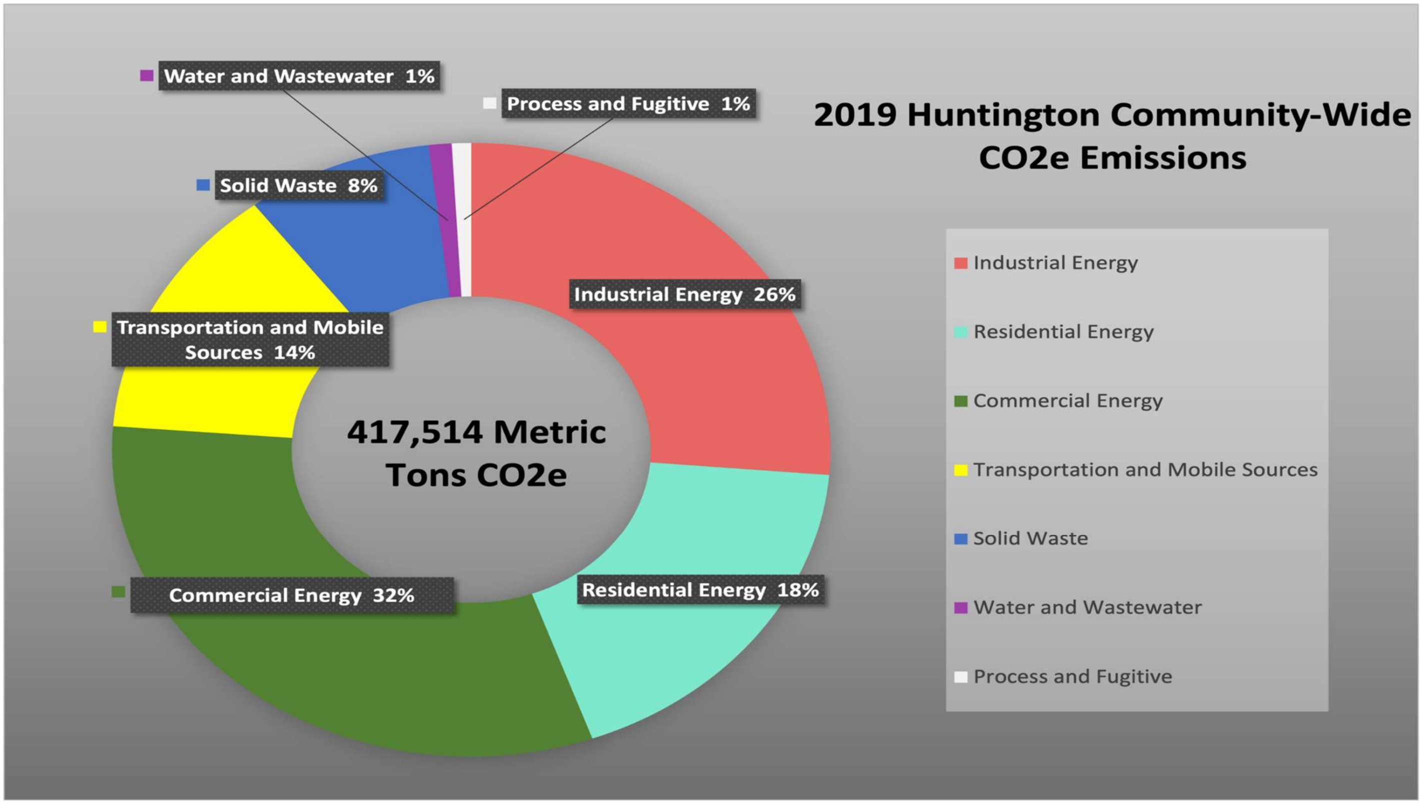

Figure 5: Community-Wide GHG emissions by sector in Huntington, Ind., during the 2019 calendar year

Energy

The entire energy sector, including energy use from the commercial, industrial, and residential sectors, was the largest contributor to Huntington's GHG emissions. Individually, the commercial (132,340 $MTCO_2e$, 32%)[33], industrial (109,856 $MTCO_2e$, 26%), and residential energy (76,047 $MTCO_2e$, 18%), sectors were the top three contributors. Approximately 318,243 $MTCO_2e$ was sourced from the entire energy sector and contributed to about 76% of Huntington's emissions. Huntington's entire energy sector includes energy in the form of electricity, natural gas, and petroleum oils.

Duke Energy is the main energy provider for electricity in Huntington, Ind. Data from Duke Energy was collected by the Environmental Resilience Cohort to alleviate multiple data asks being sent to the data provider. Heartland REMC does provide some electricity to portions of the city, including a few commercial facilities and the Huntington Municipal Airport.

[32] $MTCO_2e$ is defined as Metric Tons of carbon dioxide equivalent. Also found in Glossary.
[33] $MTCO_2e$ is defined as Metric Tons of carbon dioxide equivalent. Also found in Glossary.

CenterPoint Energy is the main natural gas provider in Huntington, Ind. Unfortunately, CenterPoint Energy failed to provide the necessary data to complete the inventory when asked. The residential and non-residential natural gas data included in the inventory was estimated using national averages from the U.S. Energy Information Administration (EIA)[34] that were allocated using Census data from the United States Census Bureau's On the Map tool.[35]

Transportation and Mobile Sources

Transportation and Mobile Sources contributed about 14% of Huntington's GHG emissions, emitting approximately 56,234 $MTCO_2e$.[36] The Transportation and Mobile Sources sector includes emissions from the communities' on-road vehicle and off-road transportation, the Huntington Municipal Airport, and Erie Railroad. The on-road vehicle transportation was estimated in vehicle miles traveled (VMT) using data from the Indiana Department of Transportation.[37] The off-road transportation was estimated using direct GHG emissions from EPA National Emissions Inventory.[38]

Solid Waste

The Solid Waste sector contributed about 8% of Huntington's GHG emissions, emitting approximately 35,086 $MTCO_2e$.[39] This sector included solid waste generated from residential, commercial business, government, and industrial facilities. The Huntington Landfill, the last local government-owned landfill in Indiana, closed in May of 2019. The Huntington Landfill accepted solid waste from residential and local government facilities in Huntington, Ind. Since the landfill closed in the middle of the inventory baseline year of 2019, the data used in the inventory is from 2018. The commercial and industrial solid waste is an estimation using county CENSUS data from Huntington County United Economic Development (HCUED)[40] and EPA national waste averages.[41]

Water and Wastewater

The Water and Wastewater sector contributed about 1% of Huntington's GHG emissions, emitting approximately 4,326 $MTCO_2e$.[42] This sector includes emissions from the two potable water facilities and one wastewater treatment facility owned by Huntington's government.

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[34] USEIA (United States Energy Information Administration). 2021. Natural Gas Summary. Retrieved from https://www.eia.gov/dnav/ng/ng_sum_lsum_a_EPG0_vrs_mmcf_a.htm.

[35] United States Census Bureau. 2021. On the Map. Retrieved from https://onthemap.ces.census.gov/.

[36] $MTCO_2e$ is defined as Metric Tons of carbon dioxide equivalent. Also found in Glossary.

[37] INDOT (Indiana Department of Transportation). 2021. Traffic Data. Retrieved from https://www.in.gov/indot/2469.htm.

[38] USEPA (United States Environmental Protection Agency). 2021. 2017 National Emissions Inventory (NEI) Data. Retrieved from https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data.

[39] $MTCO_2e$ is defined as Metric Tons of carbon dioxide equivalent. Also found in Glossary.

[40] HCUED (Huntington County United Economic Development). 2021. Huntington. Retrieved from https://properties.zoomprospector.com/huntingtoncountyin/community/Huntington/1835302?.

[41] USEPA (United States Environmental Protection Agency). 2021. National Overview: Facts and Figures on Materials, Wastes, and Recycling. Retrieved from https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/national-overview-facts-and-figures-materials.

[42] $MTCO_2e$ is defined as Metric Tons of carbon dioxide equivalent. Also found in Glossary.

Process and Fugitive Emissions

The Process and Fugitive sector contributed about 1% of Huntington's GHG emissions, emitting approximately 3,625 $MTCO_2e$. This sector includes the natural gas leakage produced by natural gas consumption from the water and wastewater facilities, residential energy, commercial energy, and industrial energy.

Table 2: Breakdown of Community GHG Emissions Inventory results.

Sector	Fuel or source	2019 Usage	Usage unit	2019 Emissions ($MTCO_2e$)
Residential Energy	Electricity (Duke Energy)	59,559,821	kWh	50,704
	Natural Gas	454,839	MMBtu	24,191
	Kerosene	3,253	Gallons	33.256
	Distillate Fuel Oil	27,783	Gallons	285.47
	Hydrocarbon Gas Liquids	81,750	Gallons	461.67
	Other Fuels	63,591	Gallons	371.92
			Residential Energy Total:	**76,047**
Commercial Energy	Electricity (Duke Energy)	54,314,937	kWh	46,239.3
	Electricity (Heartland REMC)	2,116,702	kWh	1,031.321
	Natural gas	1,599,464	MMBtu	82,035
			Commercial energy Total:	**132,340**
Industrial Energy	Electricity (Duke Energy)	100,188,783	kWh	85,292
	Propane (Huntington Landfill)	1,009	Gallons	5.678
	Coal Coke Combustion (Isolatek International)	1,000	MMBtu	24,558
			Industrial energy Total:	**109,856**
On-road Transportation	Gasoline (passenger vehicles)	43,360,504	VMT	18,313
	Diesel (freight trucks)	4,604,655	VMT	4,773
Aviation	Jet A (Jet Kerosene)	24,876	Gallons	243.35
	Aviation Gasoline	31,625	Gallons	263.71
Off-Road	Diesel	0	-----	25,232
	Gasoline	0	-----	3,986.5
	Other	0	-----	3,413.5
Rail	Diesel	93,126	MMBtu	10.42
			Transportation and Mobile Sources Total:	**56,234**
Solid Waste	Residential and Municipal Government Waste Generated (Huntington Municipal Landfill)	34,594	Tons	33,487
	Commercial Waste Generated	5,206	Tons	1,598.8
			Solid waste Total:	**35,086**
Water and Wastewater	Water Treatment Electricity	2,048,386	kWh	998.04
	Water Treatment Natural Gas	342,370	Therms	1,820.9
	Wastewater Treatment Electricity	2,206,729	kWh	1,075.2
	Wastewater Treatment Natural Gas	7,647	Therms	40.677
	Wastewater Treatment Digester Gas Combustion	30,000	scf/Day	1.878
	Wastewater Treatment Digester Gas Flaring	6,000	scf/Day	388.56
			Water and wastewater Total:	**4,326**
Process & Fugitive Emissions	Fugitive Emissions from Natural Gas Distribution	350,018	Therms	60.726
	Fugitive Emissions from Natural Gas Distribution	2,054,303	MMBtu	3,564.1
			Process & Fugitive Total:	**3,625**
			Total Community-Wide Emissions:	**417,514**

Next Steps

The results from this inventory will be used to set goals and determine projects to implement in Huntington to reduce the community's GHG emissions. These goals and projects will be reported in Huntington's Climate Action Plan. Based on the inventory results, the following areas have the greatest opportunity for emission reduction in Huntington:

Energy Efficiency. Huntington's three largest contributing sectors for GHG emissions are commercial, industrial, and residential energy, contributing about 76% of Huntington's GHG emissions. Making the facilities in Huntington more energy efficient has the potential to significantly reduce the community's GHG emissions. The first step towards energy efficiency is conducting an energy audit. Huntington's main energy provider is Duke Energy, who provides a free energy audit[43] for homeowners. The energy audit is a full assessment of a residential home and reports ways to decrease energy consumption such as adding more insulation or changing your windows.

Renewable Energy. As Huntington becomes more energy efficient, the City and community may begin to transition their main energy sources to renewable energy. Oil, natural gas, and coal are non-renewable resources, meaning they are finite.[44] Transitioning to renewable energy such as solar energy, wind power, and hydropower will not only reduce the community's GHG emissions, but also lead Huntington to a clean energy future with energy independence.[45]

Greenspace. Huntington's high heat days are expected to increase from 24 days to 66 to 79 days by 2050. In order to prepare for the increase in high heat days, Huntington is planning to implement projects that will increase greenspace and specifically tree canopy coverage within the city, such as an arboretum at Evergreen Park and the planting of street trees. Tree canopy coverage provides shade and reduces summer peak temperatures and air pollution.[46] In addition to climate benefits, it provides wildlife habitat, aesthetic benefits, and enhances property value.[47] Residents may increase their own tree canopy coverage by planting trees on their own property.

Electric Vehicles. Currently, 14% of Huntington's community-wide GHG emissions are produced from the Transportation and Mobile Sources sector. Electric vehicles (EV) provide many benefits such as zero GHG emissions, a reduction of fuel costs, and a reduction of noise pollution.[48] As stated in the LGO GHG Emissions Inventory Report, the local government could focus on transitioning their own vehicle fleet to EVs, starting with city official take-home vehicles or a larger vehicle fleet such as the police vehicles. In addition to transitioning the government's vehicle fleet, the government could implement projects to install EV charging stations in Huntington. Currently, there are only 40 high-powered public

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[43] Duke Energy. 2021. Free Energy Assessment. Retrieved from https://www.duke-energy.com/Home/Products/Home-Energy-House-Call.
[44] United States Department of Energy. 2021. Fossil. Retrieved from https://www.energy.gov/science-innovation/energy-sources/fossil.
[45] "Energy Independence" is defined in the Glossary Section.
[46] USDA (United States Department of Agriculture Forest Service). Urban Natural Resources Stewardship: Urban Tree Canopy. Retrieved from https://www.nrs.fs.fed.us/urban/utc/.
[47] USDA (United States Department of Agriculture Forest Service). Urban Natural Resources Stewardship: Urban Tree Canopy. Retrieved from https://www.nrs.fs.fed.us/urban/utc/.
[48] Duke Energy. 2021. Benefits of Electric Vehicles. Retrieved from https://www.duke-energy.com/energy-education/energy-savings-and-efficiency/electric-vehicles/benefits-of-evs.

charging stations in Indiana, with half of them located in Indianapolis alone.[49] Installing charging stations in Huntington would allow the city to transition to EVs and become a hotspot for non-residents of Huntington to charge their EVs while traveling.

Stormwater Efficiency. In 2021, Huntington scored a 5/10 for preparedness of future heavy rainfall events. The City is currently working on projects to increase the efficiency of stormwater and sewage drains in Huntington. Making the stormwater systems more efficient will help the city be prepared for heavy rainfall events that lead to flooding. In addition, the City is working on floodplain infrastructure development, as well as river improvements such as debris cleanups and the removal of low head dams.

Education. Moving forward into the future, the City of Huntington will continue to be transparent with the public about the challenges the community may face through press releases and reports such as the one you are reading. In addition, Huntington will become better in educating the public on how to reduce individual GHG emissions.

Focusing on projects in these six areas of opportunity could significantly reduce Huntington's GHG emissions and make the city more climate resilient. To continue towards climate resiliency for the city, it is recommended that Huntington completes a GHG emissions inventory every three to five years to assess progress from implemented emission reduction projects.

[49] WFYI. 2021. Indiana Awards Electric Utilities $5.5 Million to Build Electric Vehicle Charging Stations. Retrieved from https://www.wfyi.org/news/articles/indiana-awards-electric-utilities-55-million-to-build-electric-vehicle-charging-stations.

Conclusion[50]

This inventory marks completion of Milestone One of the Five ICLEI Climate Mitigation Milestones and Stage One of the ERI's Climate Action Planning. The next steps are to forecast emissions, set an emissions-reduction target, and build upon the existing projects with a more robust climate action plan that identifies specific quantified strategies that can cumulatively meet that target. The IPCC's most recent literature and study recommend that the world reach carbon neutrality between years 2040 and 2050. It is even more imperative that countries set targets that are ambitious enough to limit the accumulation of carbon 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 ambition necessary to meet the Paris Agreement commitment of keeping warming below 1.5°C. To achieve this goal, the Intergovernmental Panel on Climate Change (IPCC) states that we must reduce global emissions by 50% by 2030 on the way to climate neutrality by 2050. Equitably reducing global emissions by 50% requires that high-emitting, wealthy nations reduce their emissions by more than 50%. Community education and building partnerships will be instrumental components of our climate efforts.

In addition, the City of Huntington will continue to track key energy use and emissions indicators on an on-going basis. It is recommended that communities update their inventories on a regular basis, especially as plans are implemented to ensure measurement and verification of impacts. More regular inventories also allow for "rolling averages" to provide more insight into sustained changes and can help reduce the chance of an anomalous year being incorrectly interpreted. This inventory shows that the three energy sectors, as well as community-wide transportation patterns will be particularly important to focus on. Through these efforts and others, Huntington can achieve additional environmental, economic, and social benefits beyond reducing emissions.

[50] The "Conclusion" section of this inventory was written and produced by ICLEI USA.

Glossary and Acronyms

Activity – The use of energy, materials, and/or services by members of the community that result in the creation of GHG emissions.

Baseline Year – A historic point of comparison that can be used to track changes and improvements overtime. The baseline year represents a calendar year of 12 full months of data.

British Thermal Unit (Btu) – a unit used for the measurement of heat.

Carbon dioxide (CO_2) – A heat-trapping (greenhouse) gas released through human activities such as deforestation and burning fossil fuels.

Carbon dioxide Equivalent (CO_2e) – The number of metric tons of CO_2 emissions with the same global warming potential as 1 metric ton of another greenhouse gas.

Climate Action Plan (CAP) – A detailed document with strategic framework for measuring, planning, and reducing greenhouse gas emissions.

Energy Independence – Independence regarding energy resources, energy supply, and/or energy generation by the energy industry.

Global Warming Potential (GWP) – the total contribution to global warming resulting from the emission of one unit of that gas relative to one unit of the reference gas, carbon dioxide.

Greenhouse Gas (GHG) – A gas that contributes to the greenhouse gas effect by absorbing radiation.

Greenhouse Gas Emissions Inventory – The quantification of greenhouse gas emissions by an entity (e.g., community, government, etc.) over a period of time.

MACES – Mayor's Advisory Council on Environmental Stewardship.

Methane (CH_4) – A heat-trapping (greenhouse) gas released through human activities such as production and transportation of coal, natural gas, and oil, and decay of organic waste in municipal solid waste landfills.

Metric Tons (MT) – A unit of weight equal to 1,000 kilograms.

Municipal – Another term for "city".

Nitrous oxide (N_2O) – A heat-trapping (greenhouse) gas released through human activities such as industrial activities, wastewater treatment, and combustion of fossil fuels and solid waste.

Source – Any physical process inside the jurisdictional boundary that releases GHG emissions into the atmosphere.

Therm (thm) – A unit of measurement of the amount of heat energy in natural gas equivalent to 100,000 Btu or 1.055 × 108 joules.

Vehicle Miles Traveled (VMT) – The number of miles traveled by vehicles over a specific amount of time (daily, monthly, or annual).

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Appendix: Methodology Details

The following tables shows each activities, related data sources, and notes on data gaps and assumptions.

Energy

Table 3: Energy Data Sources

Activity	Data Source	Emissions Factor	Data Gaps/Assumptions
Residential, commercial, and industrial electricity consumption	Duke Energy	Duke Energy	The data provided by Duke Energy reflects energy use of the entire 46750 ZIP Code. Huntington is the only incorporated city in the ZIP code; therefore, the data was not allocated and may be an overestimation.
Residential, commercial, and industrial natural gas consumption	Heartland REMC	RFCW eGRID	The data provided by Heartland REMC may be an over/underestimation of the energy use within city limits. The data provided was an estimation calculated by Heartland REMC.
Residential Distillate Fuel Oil Consumption	EIA CENSUS	Clearpath	The non-utility fuel data is an estimation based on the EIA Census data that was allocated by population for Huntington, IN.
Residential Hydrocarbon Gas Liquids Consumption	EIA CENSUS	Clearpath	The non-utility fuel data is an estimation based on the EIA Census data that was allocated by population for Huntington, IN.
Residential Kerosene Consumption	EIA CENSUS	Clearpath	The non-utility fuel data is an estimation based on the EIA Census data that was allocated by population for Huntington, IN.
Residential Other Fuels (Petroleum) Consumption	EIA CENSUS	Clearpath	The non-utility fuel data is an estimation based on the EIA Census data that was allocated by population for Huntington, IN.

Table 4: Emissions Factors for Electricity Consumption

Emissions Factor	Year	CO_2 (lbs./MWh)	CH_4 (lbs./GWh)	N_2O (lbs./GWh)
Duke Energy	2019	1,863	210	30
RFC West (RFCW) eGRID	2019	1,067.679	99	14

Transportation

Table 5: Transportation Data Sources

Activity	Data Source	Data Gaps/Assumptions
Vehicle miles travelled	INDOT	INDOT reported the daily VMT for Huntington, IN, in 2019. This was multiplied by 340 days to calculate an estimated annual VMT. 340 days was used in place of 365 days to reflect less vehicle traffic on the weekends.
Aviation Travel	Huntington Municipal Airport	The data for aviation came directly from the Huntington Municipal Airport records.
Erie Railroad	2017 CSX Report	The railroad data was allocated for Huntington, IN, using the length of Erie Railroad in Huntington city limits and national CSX data.

For vehicle transportation, it is necessary to apply average miles per gallon and emissions factors for CH_4 and N_2O to each vehicle type. The factors used are shown in Table 6.

Table 6: 2019 MPG and Emissions Factors by Vehicle Type

Fuel	Vehicle type	MPG	CH_4 g/mile	N_2O g/mile
Gasoline	Passenger car	24.37713	0.0183	0.0083
Gasoline	Light truck	17.86788	0.0193	0.0148
Gasoline	Heavy truck	5.371652	0.0785	0.0633
Gasoline	Motorcycle	24.37713	0.0183	0.0083
Diesel	Passenger car	24.37713	0.0005	0.001
Diesel	Light truck	17.86788	0.001	0.0015
Diesel	Heavy truck	6.392486	0.0051	0.0048

Wastewater Treatment

Table 7: Wastewater Data Sources

Activity	Data Source	Data Gaps/Assumptions
Digester Gas Combustion/Flaring	Huntington Wastewater Treatment Facility – F&V Operations	The data was provided directly from the Huntington Water Department and F&V Operations. National fraction for digester gas of CH_4 was used. The exact fraction in the facility may be estimated by hiring an outside contractor to conduct testing at the facility.
Energy Used in Wastewater Facilities	Huntington Wastewater Treatment Facility – F&V Operations	The data was provided directly from the Huntington Water Department and F&V Operations.

Potable Water

Table 8: Potable Water Data Sources

Activity	Data Source	Data Gaps/Assumptions
Energy Used in Potable Water Facilities	Huntington Potable Water Facility – F&V Operations	The data was provided directly from the Huntington Water Department and F&V Operations.

Solid Waste

Table 9: Solid Waste Data Sources

Activity	Data Source	Data Gaps/Assumptions
Waste Generated by Residents and Local Government Facilities	Huntington Landfill	The Huntington Landfill closed in May 2019, the year of the inventory baseline. 2018 landfill data was used to reflect accurate waste generation by the residential and local government facilities within Huntington city limits.
Waste Generated by Commercial and Industrial Facilities	HCUED & EPA	The data was estimated using job CENSUS data from HCUED and national waste generation data from EPA.

Inventory Calculations

The 2019 inventory was calculated following the US Community Protocol and ICLEI's ClearPath software. As discussed in Inventory Methodology, the IPCC 5th Assessment was used for global warming potential (GWP) values to convert methane and nitrous oxide to CO_2 equivalent units. ClearPath's inventory calculators allow for input of the sector activity (i.e., kWh or VMT) and emission factor to calculate the final $MTCO_2e$ emissions.