Northwest Indiana

2017 Regional Inventory of Community Greenhouse Gas Emissions

Prod ... **onal Planning Commission**
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With assistance from:
ICLEI - Local Governments for Sustainability USA
Indiana University Environmental Resilience Institute

Credits and Acknowledgments

Communities of Cedar Lake, Chesterton, East Chicago, Hammond, Highland, Hobart, Lake Station, La Porte, Merrillville, Munster, Portage, Schererville, Valparaiso, Lake County, La Porte County, Porter County.

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Executive Summary

The communities of this Northwest Indiana participating in the Indiana University Environmental Resilience Institute 2021 Climate Cohort recognize that greenhouse gas (GHG) emissions from human activity are catalyzing profound climate change, the consequences of which pose substantial risks to the future health, well-being and prosperity of the region. Furthermore, these communities have multiple opportunities to benefit by acting quickly to reduce community GHG emissions. By reducing activities that are primary contributors to community GHG emissions, residents can realize cost savings related to transportation and energy use, make their communities healthier places to live and be a part of mitigating the risks associated with climate change and their negative impacts on the livelihoods of those that live in and around the region.

Prior to this cohort, the communities of Gary and Michigan City participated in Indiana University's Environmental Resilience Institute's and ICLEI's 2019 resilience cohort program. Gary and Michigan City's emissions are included in Figure 1. This cohort's communities have participated in Indiana University's Environmental Resilience Institute's and ICLEI's 2021 resilience cohort program. By first conducting the GHG emissions inventory, they will be able to begin their carbon footprint reduction process. This report provides estimates of GHG emissions resulting from activities in Cedar Lake, Chesterton, East Chicago, Hammond, Highland, Hobart, Lake Station, La Porte, Merrillville, Munster, Portage, Schererville, Valparaiso, Lake County, La Porte County, and Porter County. These estimates are for the 2017 calendar year. 2017 was chosen so that our regional inventory would complement previous inventories conducted by Gary and Michigan City.

Key Findings

Region-Wide Emissions

Source Category	Total Emissions (Tons CO2e)
Transportation & Mobile Sources	4,730,000
Solid Waste Management	1,091,200
Water and Wastewater Management	46,900
Commercial Energy Use	2,850,000
Residential Energy Use	3,230,000
Industrial Energy Use	29,630,000
Process & Fugitive	13,440,000
AFOLU NET change	- 115,600
Total	**55,290,900**

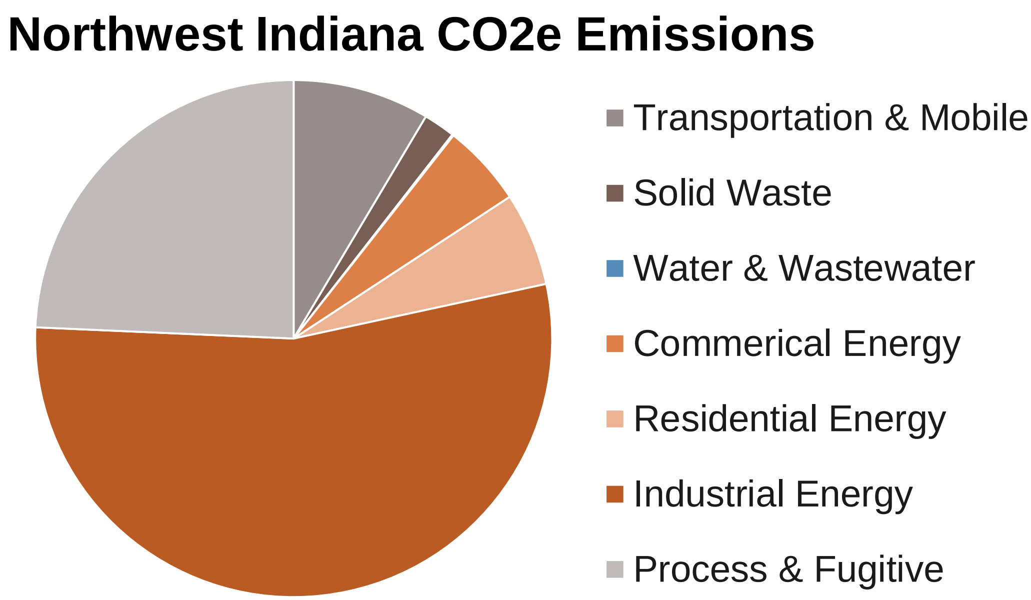

Figure 1. Relative contribution of source categories to Northwest Indiana CO_2e Emissions.

The total Green House Gas (GHG) Carbon Dioxide equivalents (CO_2e) from the three counties in 2017 was 55.3 million metric tons. Figure 1 represents the relative contribution of CO_2e from different source categories. Overall, 80% of those come from industrial energy usage or industrial process & fugitive emissions.

Discussion of Industrial GHG sources will be limited to the regional level for two reasons. Firstly, because in Northwest Indiana jobs and other benefits industries provide are rarely limited to their host communities. Secondly, industrial sources are not the focus of community inventory because of the lack of influence local government or the community has over them. GHG emissions from these sources are influenced by state and federal regulations, energy costs, and global competitiveness. Local governments and community members are better positioned to influence change in the other source categories analyzed in more detail.

Stationary Energy

The primary source of data for residential, commercial, and industrial energy in Northwest Indiana was Northwest Indiana Public Service Company (NIPSCO). The utility company provided total electricity and natural gas for all municipalities in the regional cohort. Electricity emissions were larger than natural gas emissions. NIPSCO is actively working to reduce their emissions[1] and make their electricity generation portfolio more sustainable. Smaller utility services, such as Kankakee Valley REMC, also provided data for the communities they serve.

Residential and commercial energy emissions were calculated with data provided by utility services. Residential emissions also included estimates of propane and kerosene consumption. Usage of these non-utility fuels were estimated by applying United States Census Bureau for 2017. Porter County had the highest per capita residential emissions and La Porte County had the largest commercial emissions.

Industrial emissions were determined with utility energy service provided by NIPSCO plus data on individual facilities energy generation from other fuel sources included in the data facilities reported to EPA. The EPA's Greenhouse Gas Reporting Program (GHGRP)[2] requires emissions reports from large GHG emission sources across the country, which can be publicly accessed through the EPA's Facility Level Information on Greenhouse Gases Tool (FLIGHT). Natural gas usage by industrial facilities was assumed to be provided by NIPSCO, so these emissions were not included, but many facilities had emissions from operations using distillate fuel oil, coke oven gas, blast furnace gas, and more. Communities in Northwest Indiana recognize the importance of industry in the region, it bolsters the economy, provides a way of life to many residents, and provides valuable materials to the nation. Because of the limited capacity for local government to influence this source category, discussion for the rest of this report will focus on other categories.

Excluding emissions from industrial energy usage and industrial processes, the GHG CO_2e from Northwest Indiana in 2017 was 11.9 million metric tons. The relative contribution of non-industrial categories is shown in Figure 2. Transportation & mobile sources accounted for 42%, residential energy use by 29%, commercial energy use by 25%, 2.9% by solid waste management, and 0.4% by water and wastewater treatment. Approximately 115,000 tons were removed from forests and trees, nearly 1% of this total without industry. Regional GHG Emission reduction planning will focus on the largest three source categories of transportation and Mobile sources, residential energy use, and commercial energy use. Regional effort will also incorporate planning for maximizing carbon removal through forest, urban tree canopy, and land use.

Strategies for solid waste management and water and wastewater management source categories will included in the regional plan primarily as the framework for local community climate action planning.

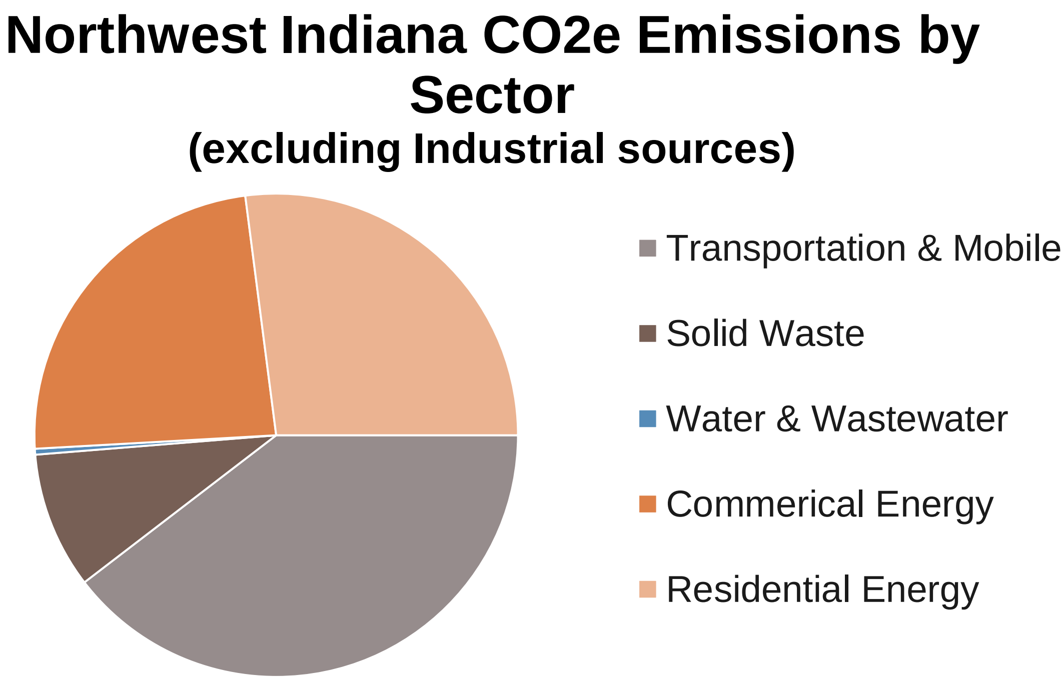

Figure 2. Relative contribution of CO_2e source categories excluding industry for Northwest Indiana

Transportation & Mobile Sources

Daily vehicle miles traveled (VMT) typically contributes greatly to any community's emissions profile, but Northwest Indiana's proximity to Chicago, Lake Michigan, industry, and interstates contribute to unusually high travel and transportation emissions. VNT provided by the Indiana Department of Transportation (INDOT) was multiplied by 340 to reach a regional annual VMT estimate. ICLEI recommends using 340 instead of 365 to estimate annual VMT to account for holidays and weekends that have abnormal amounts of traffic. Gasoline and diesel vehicles produce different amounts of GHG emissions. These differences are captured in the vehicle fleet mix data provided by NIRPC and national defaults for fuel economy and emissions factors. The VMT models and calculations used primarily account for in-boundary traffic. Transboundary trips either start in a community and end somewhere else, start outside of a community and end within the community or only travel straight through a community. Because of this, transboundary trips account for fewer GHG emissions included in each community's inventory than in-boundary trips. In-boundary trips are defined as those that begin and end within one community. This methodology ensures that emissions from transportation & mobile sources are reported solely on travel that each community has influence over.

Beyond on-road transportation, GHG emissions were estimated for off-road vehicles, rail, waterborne transportation and aviation in applicable communities. Off-road emissions are produced by vehicles such as construction equipment, golf carts, ATVs and other recreational vehicles. Their emissions were estimated using the EPA's national emissions inventory[3]. Emissions from rail were calculated by scaling down national emissions from rail companies in Northwest Indiana, based on their national rail mileage and local rail mileage. Local harbors, marinas and yacht clubs were contacted for fuel consumption during 2017. Aviation data was collected from local airports when available; otherwise emissions estimates from the EPA's national emissions inventory were used again. All together this sector generated 4.9 million metric tons of GHG emissions in 2017.

Water & Wastewater

Water and wastewater operations contributed the smallest amount of GHG emissions but are important to include, because communities often have influence over these facilities. Most facilities were provided electricity and natural gas by NIPSCO, so their emissions were subtracted from the commercial energy sector to prevent double counting. Much of the data for the water and wastewater sector had to be scaled based on population because facility-specific data was only provided for some communities.
Emissions occur at water utilities through the extraction, treatment and distribution of potable water. Wastewater facilities produce emissions through energy use, digester gas, flaring, nitrification/ denitrification, effluent discharge, nitrogen removal and solids disposal. In 2017 Water and Wastewater treatment contributed 46,923 tons of regional GHG Emissions, exclusive of energy purchased from NIPSCO which would have been inventoried in the commercial energy category. 46.9 thousand tons per year, this category does have potential to reduce carbon emissions through digester gas recycling and recovery and is a sector often under local government control.

Solid Waste

Within this regional section of the report only waste that was produced and contained within Lake, Porter and La Porte counties are accounted for. Individual community reports provide information on their solid waste streams. A significant portion of solid waste was transported to landfills outside of each community's jurisdiction. Waste characterization factors for municipal waste were provided by Purdue University Northwest-Hammond's 2012 Municipal Solid Waste Characterization Study. Aspects of solid waste management that contributed to GHG emissions Most sources of waste were municipal but some industrial facilities also produced large amounts of waste that is reported. Differences in facility operations such as composting, methane collection systems, flaring and incineration all contribute varying amounts of greenhouse gas emissions. Regional GHG Emissions from Solid Waste was 1,091,207 metric tons.

Next Steps

Informed by the results of this inventory, in 2022 Northwestern Indiana Regional Planning Commission (NIRPC) plans to develop a Regional Climate Action Plan Framework with input from stakeholders in each source category. This Framework will be incorporated into Regional Long Range Transportation Plan. It can also provide a basis for each municipality to create a local climate action plan to reduce their community GHG emissions and improve their environmental resilience. Each community action plan needs to reflect local priorities, the mix of GHG-producing activities within their boundaries, those they can significantly influence, and the cost and effectiveness of implementing different emission reduction strategies.

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[1] Our Environment - NIPSCO. (2021). Retrieved from https://www.nipsco.com/our-company/about-us/our- environment

[2] Greenhouse Gas Reporting Program (GHGRP). (2021). Retrieved from https://www.epa.gov/ghgreporting

[3] National Emissions Inventory (NEI). (2020) Retrieved from https://www.epa.gov/air-emissions-inventories/ national-emissions-inventory-nei

Climate Change Background

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[4]. Many regions are already experiencing the consequences of global climate change and Northwest Indiana is no exception.

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 its current rate (high confidence). Warming from 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, such as sea level rise, with associated impacts (high confidence). These previous emissions alone are unlikely to cause global warming of 1.5°C (medium confidence). 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 (high confidence). 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 (high confidence).[5]

According to Indiana University's Environmental Resilience Institute Toolkit[6], the Midwest faces implications from a changing climate. Extreme heat, heavy precipitation, flooding, and impacts to agriculture, forestry, public health and transportation are just some of the pressing issues that may become challenges in Northwest Indiana. Staple industries and resources in the Midwest are at risk of reduced productivity. For example, higher average temperatures, increases in extremely hot days, and changes in soil moisture, precipitation and season arrival times can negatively impact crop quality. Figures 3 and 4 from Purdue University's Indiana Climate Change Impacts Assessment[7] illustrate changes in precipitation and heat in Indiana. Access to different resources will become even more difficult as road infrastructure fails to keep up with such rapid temperature changes and increased precipitation.

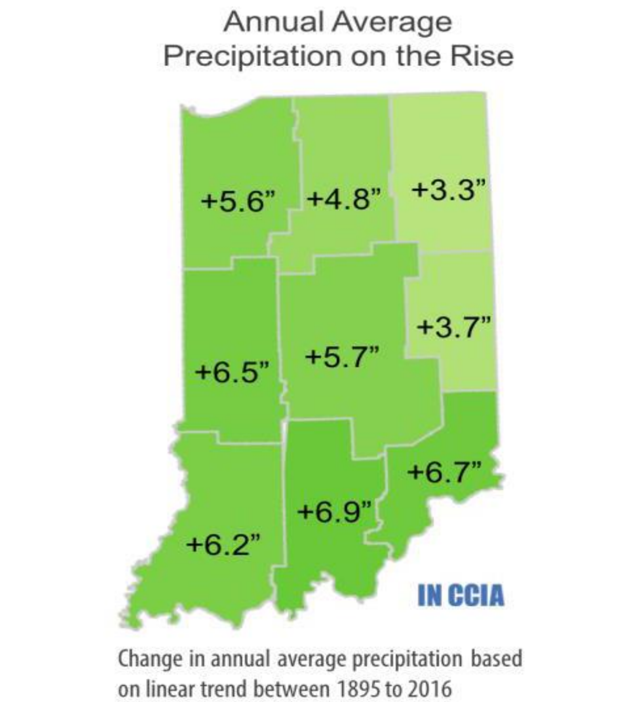

Figure 3. Average Annual Precipitation Rise

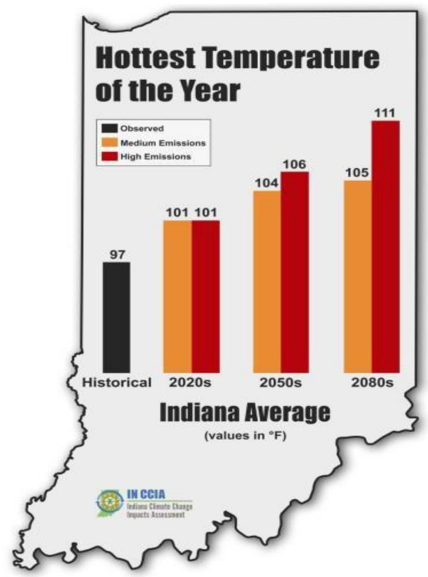

Figure 4. Hottest Temperature of the Year

Many communities in the United States have started to take responsibility for addressing climate change at the local level. Reducing fossil fuel use in the community can have many benefits in addition to reducing greenhouse gas emissions. More efficient use of energy 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 they are more likely to spend at local businesses and add to the local economy. Reducing fossil fuel use improves air quality. Increasing opportunities for walking and bicycling improves residents' health.

Greenhouse Gas Inventory as a Step Toward Carbon Reduction

Facing the climate crisis requires the concerted efforts of local governments, their partners and 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 bring in the necessary level of ambition and outline how to achieve net-zero emissions by 2050 at the latest. In planning for climate neutrality, Northwest Indiana must identify priority sectors for action, while considering climate justice, inclusiveness, job creation and many other factors.

To complete this inventory, the sixteen communities in Northwest Indiana utilized tools and guidelines from Local Governments for Sustainability (ICLEI), which provides authoritative direction for greenhouse gas emissions accounting and defines climate neutrality as follows:
The targeted reduction of greenhouse gas (GHG) emissions and GHG avoidance across the community in all sectors to an absolute net-zero emission level at the latest by 2050. In parallel to 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, the communities of Northwest Indiana will need to set clear goals and act rapidly following a holistic and integrated approach. Climate action is an opportunity for our communities 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.

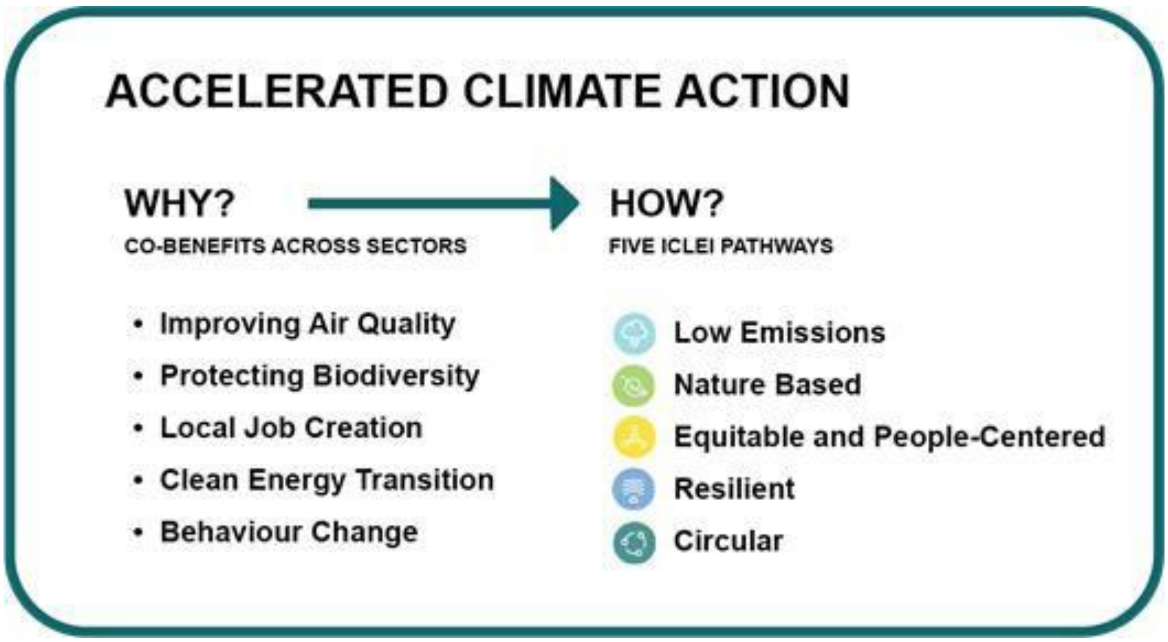

Figure 5. ICLEI Pathways to Maximizing Co-benefits

ICLEI Climate Mitigation Milestones
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 6:

1. Conduct an inventory and forecast of local greenhouse gas emissions;
2. Establish a greenhouse gas emissions Science Based Target;
3. Develop a climate action plan for achieving the emissions reduction target;
4. Implement the climate action plan; and,
5. Monitor and report on progress.

Figure 6. ICLEI Climate Mitigation Milestones

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 Northwest.

Indiana.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/

[4] 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.

[5] Tailor Your Search: ERIT: Environmental Resilience Institute Part of the Prepared for Environment Grand Challenge: Indiana University. (2021). Retrieved from Tailor Your Search: ERIT: Environmental Resilience Institute Part of the Prepared for Environmental Change Grand Challenge: Indiana University (iu.edu)

[6] Indiana's Past & Future Climate: A Report from the Indiana Climate Change Impact Assessment. (2018). Retrieved from Indiana's Past & Future Climate: A Report from the Indiana Climate Change Impacts Assessment –Indiana Climate Change Impacts Assessment (purdue.edu)

Inventory Methodology

Greenhouse Gas Inventory as a Step Toward Carbon Neutrality

The first step toward achieving tangible greenhouse gas emissions reductions requires identifying baseline emissions levels, sources and activities generating emissions in a community. This report presents emissions from the communities of Cedar Lake, Chesterton, East Chicago, Hammond, Highland, Hobart, Lake Station, City of La Porte, Merrillville, Munster, Portage, Valparaiso, Schererville. County wide emissions are reported for Lake County, La Porte County and Porter County.

As local governments continue to join the climate protection movement, the need for a standardized approach to quantify GHG emissions has proven essential. This inventory uses the approach and methods provided by the Global Protocol for Community-Scale Emissions (GPC)[8].

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) values, calculated using the Global Warming Potentials (GWP) for methane and nitrous oxide from the IPCC 5th Assessment Report.

Table 1. Major Green House Gas Warming Potential

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

Community Emissions Protocol (GPC)

This report was compiled according to the Global Protocol for Community-Scale Green House Gas Emission Inventories (GPC). GPC is the official protocol specified by the Global Covenant of Mayors, which defines what emissions must be reported and how. In addition, this inventory draws on methods from the U.S. Community Protocol[9] which provides more detailed methodology specific to U.S. communities. Inventory calculations were performed using ICLEI's ClearPath[10] tool.

The community inventories in this report included 2017 total emissions from the following sectors: Stationary Energy, Transportation, Solid Waste, Water and Wastewater. Additionally, emissions are reported from Industrial Processes and Product Use (IPPU). Where applicable, Agriculture, Forestry and Other Land Use (AFOLU), are included as a NET emission value to reflect that these land uses may both emit and remove Carbon Dioxide from the atmosphere.

Carbon dioxide is produced from burning fossil fuels such as coal, gasoline, diesel and natural gas and represented the vast majority (99.5%) of the region's emissions. Nitrous oxide emissions were primarily from grid electricity (from fuel combusted to create electricity) and gasoline used for passenger and diesel vehicles. Methane accounted for the smallest percentage of region-wide emissions and resulted primarily from grid electricity, gasoline used for passenger vehicles, solid waste generation, flaring of digester gas and leakage from local natural gas distribution systems.

Quantifying Greenhouse Gas Emissions

Scopes

Communities contribute to greenhouse gas emissions in many ways. Three central categorizations of emissions are used in the GPC community inventory: Scope 1, emissions that occur physically within a community's jurisdiction, Scope 2, emissions which may or may not cross jurisdictional boundaries and Scope 3, emissions that occur outside of the city. Figure 7 from the GPC GHG Protocol for Cities depicts the differences between scopes.

Scope 1: GHG emissions from sources located within the community boundary.

Scope 2: GHG emissions occurring as a consequence of the use of grid-supplied electricity, heat, steam and/or cooling within the community boundary.

Scope 3: All other GHG emissions that occur outside the city boundary as a result of activities taking place within the community boundary.

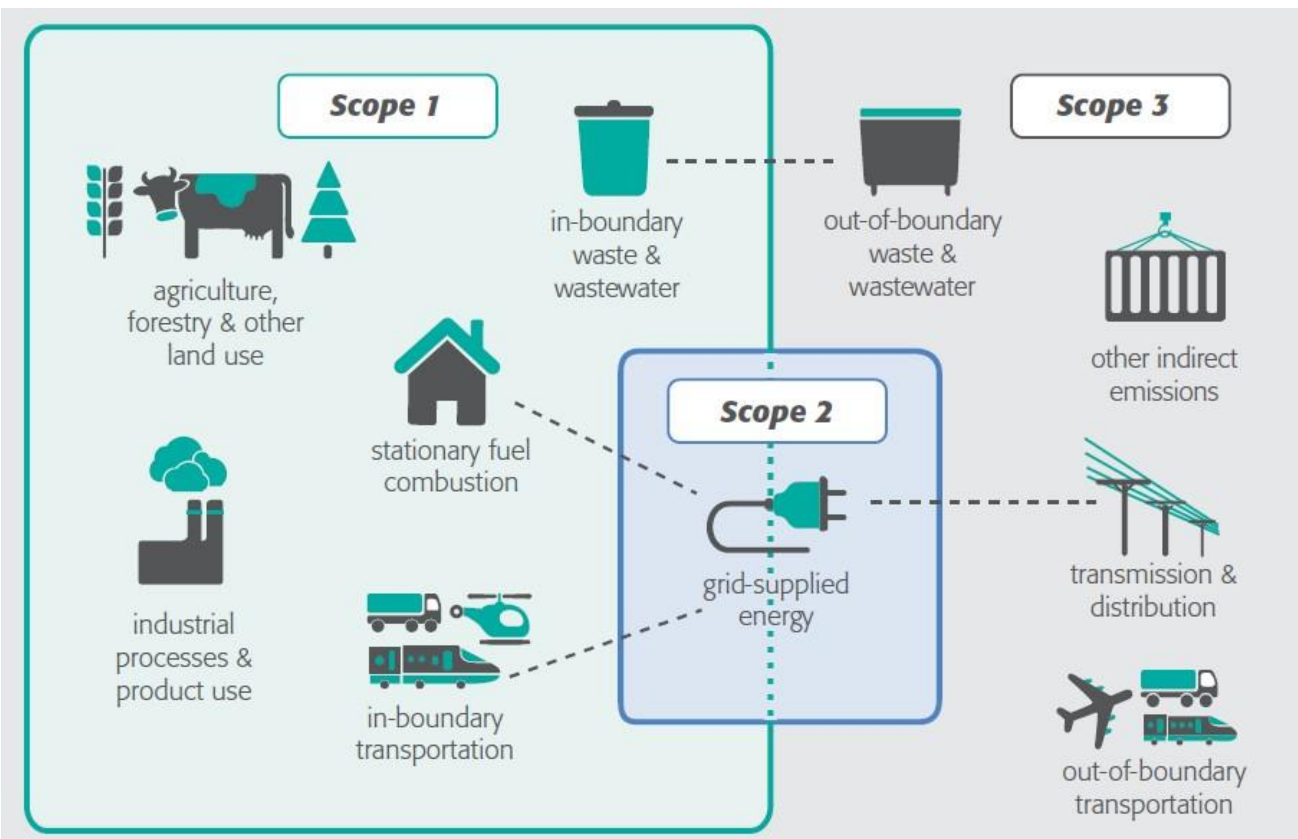

Figure 7. Community Inventory Scope Categories

By reporting on these three different scopes of emissions, local governments can develop and promote a deeper understanding of GHG emissions associated with their communities. To aggregate county inventories into the Northwest Indiana region-wide inventory, All Scope 1 emissions from each community are totaled. This calculation prevents double counting of emissions between communities.

Base Year

The inventory process requires the selection of a base year with which to compare current emissions. These communities' inventories utilize 2017 as their baseline year because Gary and Michigan City completed their initial GHG emissions inventories in 2017. Using the same year as these other inventories allows for better comparison of emissions between communities and will serve as the regional benchmark for future emission reductions.

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 emissions factors. To calculate emissions accordingly, the basic equation below is used:

Activity Data x Emission Factor = Emissions

Most emissions sources in this inventory are quantified using calculation-based methodologies. Activity data refer to the relevant measurement of energy use or other greenhouse gas generated processes such as fuel consumption by fuel type, metered annual electricity consumption and annual vehicle miles traveled. Direct measurements were used when necessary, most often for emissions reports from industrial facilities. More detailed information for emissions activities and factors for each community inventory is provided in the Appendices.

Known emission factors 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.

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[7] GHG Protocol for Cities: An Accounting and Reporting Standard for Cities. (n.d.) Retrieved from https:// ghgprotocol.org/greenhouse-gas-protocol-accounting-reporting-standard-cities

[8] U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions. (2021). Retrieved from https://icleiusa.org/us-community-protocol/

[9] ClearPath- ICLEI USA. (2021). Retrieved from https://icleiusa.org/clearpath/

Conclusions

This inventory marks the completion of Milestone One of the Five ICLEI Climate Mitigation Milestones. Next steps are to forecast emissions, set an emissions-reduction target and build upon existing strategies toward a more robust climate action plan, including specific quantified strategies to achieve target reductions.

The Intergovernmental Panel on Climate Change (IPCC) states that 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 high-emitting, wealthy nations to 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. Community education, involvement and partnerships will be instrumental to achieve a science-based target.

In addition, Northwest Indiana will continue to track key energy use and emissions indicators on an on-going basis. It is recommended that communities update their inventories regularly 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 focus on stationary energy and community wide transportation patterns will be particularly important. Through these efforts and others, Northwest Indiana can achieve environmental, economic, and social benefits beyond reducing emissions.

Appendix
Detailed Reports

Table 1 NWI Regional GHG Inventory

		Gases (Metric Tons)				Data Quality		Emissions Factor (kg/MMBtu)		
Scope	GHG Emissions Source	CO2	CH4	N2O	CO2e	Activity Data	Unit	CO2	CH4	N2O
	Residential Energy									
1	NIPSCO Natural Gas	1278766.21	120.59	2.41	1282781.95	24118563	MMBtu	53.02	0.005	0.0001
1	Bottled, Tank, or LP Gas	36132.36	6.24	0.62	36472.22	573711.7	MMBtu	62.98	0.0109	1.09E-03
1	Kerosene	5029.89	0.74	0.05	5063.83	66886.87	MMBtu	75.20	0.0111	7.41E-04
2	NIPSCO Electricity	1890786.45	168.73	26.36	1902497.09		MMBtu	0.24	2.13E-11	3.32E-11
2	Kankakee Valley REMC	3192.37	0.24	0.04	3208.70		MMBtu	0.19	1.44E-05	2.13E-06
1	2017 ACS Wood Home Heating Fuel Households	Biogenic 10438.81	35.17	0.47	1108.54	111288	MMBtu	Biogenic 93.8	0.316	0.0042
	Commercial Energy									
2	NIPSCO Electricity	2218234.91	197.95	30.93	2231973.61	9308792.90	MMBtu	0.24	2.13E-11	3.32E-11
2	Kankakee Valley REMC	2682.78	0.20	0.03	2696.50	14215.52	MMBtu	0.19	1.44E-05	2.13E-06
1	NIPSCO Natural Gas	611818.59	57.70	1.15	613739.89		MMBtu	53.02	0.005	0.0001

		Gases (Metric Tons)				Data Quality		Emissions Factor (kg/MMBtu)		
Scope	GHG Emissions Source	CO2	CH4	N2O	CO2e	Activity Data	Unit	CO2	CH4	N2O
	Industrial Energy									
2	NIPSCO Electricity	6702855.25	598.14	93.46	6744369.6	28128441.74	MMBtu	0.24	2.13E-11	3.32E-11
1	NIPSCO Natural Gas	4208730.75	79.38	7.94	4213056.97		MMBtu	53.02	0.005	0.0001
1	Indiana Harbor Coke Company - Propane	31.6		0.13	31.6	Emissions Previously Calculated in EPA FLIGHT Database				
1	Ironside Energy, LLC (C) - Blast Furnace Gas	328672.6	0.03	2.92	328708.685	Emissions Previously Calculated in EPA FLIGHT Database				
1	US Steel Gary Works - Blast Furnace Gas	6740064.4	0.65	0.22	6740856.4	Emissions Previously Calculated in EPA FLIGHT Database				
1	US Steel Gary Works - Residual Fuel Oil No.6	33265.7	1.11		33355.08	Emissions Previously Calculated in EPA FLIGHT Database				
1	Bailly Generating Station - Distillate Fuel Oil No.2	2		1.25	2	Emissions Previously Calculated in EPA FLIGHT Database				

1	ArcelorMittal Burns Harbor LLC Subpart C Blast Furnace Gas	2873926.9	0.26	1.55	2874265.43	Emissions Previously Calculated in EPA FLIGHT Database
1	ArcelorMittal Burns Harbor LLC Subpart C Coke Oven Gas	626341.7	7.43	1.15	626960.49	Emissions Previously Calculated in EPA FLIGHT Database
1	ArcelorMittal USA Indiana Harbor LLC Subpart C Blast Furnace Gas	2858092.2	0.25		2858403.95	Emissions Previously Calculated in EPA FLIGHT Database
1	ArcelorMittal USA Indiana Harbor LLC Subpart C Distillate Fuel Oil No.2	10.2		26.87	10.2	Emissions Previously Calculated in EPA FLIGHT Database
1	BP Whiting Business Unit Subpart C Fuel Gas	2203227.3	134.39		2214110.77	Emissions Previously Calculated in EPA FLIGHT Database
1	BP Whiting Business Unit - Subpart C Distillate Fuel Oil No.2	12.7		0.00	12.7	Emissions Previously Calculated in EPA FLIGHT Database

1	BP Whiting Business Unit Subpart C Motor Gasoline	129.2	0.01	0.01	129.745	Emissions Previously Calculated in EPA FLIGHT Database
1	Cargill Inc Subpart C - Other Biomass Gases	1037.3	0.06	2.38	1042.425	Emissions Previously Calculated in EPA FLIGHT Database
1	Carmeuse Lime Buffington Harbor Subpart C Bituminous	139217.2	16.34	0.80	140305.42	Emissions Previously Calculated in EPA FLIGHT Database
1	Carmeuse Lime Buffington Harbor Subpart C Engineered Alt Fuel	20560	6.07		20941.96	Emissions Previously Calculated in EPA FLIGHT Database
1	Mittal Steel USA Indiana Harbor East - Subpart C Distillate Fuel Oil No2.	19.5		0.18	19.5	Emissions Previously Calculated in EPA FLIGHT Database
1	Mittal Steel USA Indiana Harbor East - Subpart C Used Oil	22070.5	0.89	1.45	22142.855	Emissions Previously Calculated in EPA FLIGHT Database

1	Mittal Steel USA Indiana Harbor East - Subpart C Blast Furnace Gas	2677991	0.32	0.11	2678383.68	Emissions Previously Calculated in EPA FLIGHT Database
1	Safety-Kleen Systems Subpart C Distillate Fuel Oil No 2	130140.2	0.53		130183.395	Emissions Previously Calculated in EPA FLIGHT Database

Data Quality

Emissions Factor (kg/MMBtu)

		Gases (Metric Tons)				Data Quality		Emissions Factor (kg/MMBtu)		
Scope	GHG Emissions Source	CO2	CH4	N2O	CO2e	Activity Data	Unit	CO2	CH4	N2O
	Transportation and Mobile Source Emissions									
1	Gary Chicago International Airport - AVGAS	1833.6	0.08	0.02	1839.9	26478.22	MMBTU	8.31	0.36	0.07
1	Griffith-Merrilville Airport -	133.1	0.01	0.00	133.5	1921.51	MMBTU	8.31	0.36	0.07

	AVGAS									
1	Gary Chicago International Airport - Jet Fuel	5019.8	0.21	0.04	5036.7	61782.52	MMBTU	9.75	0.41	0.08
1	Porter County Municipal Airport - Jet Fuel	1641.5	0.07	0.01	1647.0	20203.39	MMBTU	9.75	0.41	0.08
1	Porter County Municipal Airport 2017 - AVGAS Emissions Inventory	979.7	0.04	0.01	983.1	14147.70	MMBTU	8.31	0.36	0.07
1	Griffith-Merrilville Airport - Jet Fuel	65.0	0.00	0.00	65.3	800.45	MMBTU	9.75	0.41	0.08
1	LaPorte Municipal Airport - Jet Fuel	146.8	0.01	0.00	147.3	1806.60	MMBTU	9.75	0.41	0.08
1	Michigan City Municipal	103.7	0.00	0.00	104.1	1497.48	MMBTU	8.31	0.36	0.07

	Airport - AVGAS									
1	Michigan City Municipal Airport - Jet Fuel	50.7	0.00	0.00	50.9	623.81	MMBTU	9.75	0.41	0.08
1	3 county EPA Non-road Gasoline	98879.7	72.39	0.00	100906.5	Emissions Previously Calculated by EPA				
1	3 county EPA Non-road Diesel	395202.3	7.71	0.00	395418.1	Emissions Previously Calculated by EPA				
1	3 county EPA Non-road Other (CNG)	54745.8	31.50	0.00	55627.8	Emissions Previously Calculated by EPA				
1	Lake County ON-Road – Gasoline	2100294.6	107.77	63.20	2120059.7	5585940764	VMT	0.07024	1.85E-08	1.08E-08
1	Porter County ON-Road – Gasoline	683516.8	35.07	20.57	689949.1	1817880455	VMT	0.07024	1.85E-08	1.08E-08
1	LaPorte County ON-	495270.3	25.35	14.95	499942.5	1312924067	VMT	0.07024	1.84E-08	1.08E-08

	Road Gasoline										
1	Porter County ON-Road – Diesel	130723.6	0.41	0.38	130836.3	79698308.05	VMT	0.07393	2.14E-10	2.02E-10
1	LaPorte County ON-Road – Diesel	112626.4	0.35	0.33	112723.5	68664975.39	VMT	0.07393	2.53E-10	2.39E-10
1	Lake County ON-Road - Diesel	401684.4	1.25	1.18	402030.8	244895106.6	VMT	0.07393	2.14E-10	2.02E-10
1	3 county Amtrak	29.1	0.00	0.00	29.3	393.1	MMBTU	0.07393	0.07377	2.02E-10
1	3 County Rail - 2017 Class I CN, CSX,and NS	144686.8	11.34	3.68	145980.7	1956960.2	MMBTU	0.07393	0.07377	2.02E-10
1	3 County Class II Rail estimated	65381.9	5.12	1.66	65966.6	884322.3	MMBTU	0.07393	0.07377	2.02E-10
1	Hammond Marina Gasoline	1228.3	0.09	0.03	1238.9	139896	gallons	0.07027	5.12E-06	1.76E-06
1	Hammond	1194.4	0.09	0.03	1204.9	116987	gallons	0.07396	5.36E-06	1.88E-06

	Marina Diesel									
1	East Chicago Marina Gasoline - estimated	155.0	0.01	0.00	156.3	17654	gallons	0.07027	5.12E-06	1.76E-06
1	East Chicago Marina Diesel - estimated	121.7	0.01	0.00	122.7	11916	gallons	0.07396	5.36E-06	1.88E-06
1	Portage Marina - Diesel - estimated	247.5	0.02	0.01	249.7	28193	gallons	0.07027	5.12E-06	1.76E-06
1	Portage Marina - Gasoline - estimated	247.5	0.02	0.01	249.7	28193	gallons	0.07027	5.12E-06	1.76E-06
1	Michigan City Port Authority Marinas-gas	646.7	0.05	0.02	652.3	73659	gallons	0.07027	5.12E-06	1.76E-06
1	Michigan City Marina - diesel	341.3	0.02	0.01	344.3	33426	gallons	0.07396	5.36E-06	1.88E-06

		Gases (Metric Tons)				Data Quality		Emissions Factor (kg/MMBtu)		
Scope	GHG Emissions Source	CO2	CH4	N2O	CO2e	Activity Data	Unit	CO2	CH4	N2O
	Solid Waste Management Emissions									
1	NWI Local Gvt Composting facilities		31.29	11.48	3918.25	56274	Tons Waste			
1	Gary Biowaste Composting		0.02	0.01	2.98	72	Tons Waste			
3	NWI Compost tons from NWI via Wst Mngmt.		3.45	1.27	431.97	6204	Tons Waste			
1	Lake County Construction & Demolition Landfill		6.17	2.26	772.45	11094	Tons Waste			
3	NWI Flaring of Landfill Gas -		98.90		2769.23					
3	NWI Combusting of Landfill Gas -		1.15	0.23	92.35					
1	Deercroft Disposal Facility		5560.00		155680.00	5560	Tons CH4	Direct Report to EPA		
1	NWI Emissions from the Gary Landfill		1032.91		28921.48	1032.91	Tons CH4	Direct Report to EPA		
1	US Steel Gary Works - Industrial Landfill Emissions - EPA Subpart TT		3687.01		103236.28	3687.01	Tons CH4	Direct Report to EPA		

3	NWI Solid Waste Processing associated with landfilling				22963.05	1400186	Tons Waste	0.0164		
3	LaPorte County Municipal Solid Waste Generated to Out of Boundary Landfills		6760.73		189300.55	36555.55	Tons Waste		0.0648	
3	Porter County Municipal Solid Waste Generated		6760.73		189300.55	36555.55	Tons Waste		0.0648	
3	Lake County Municipal Solid Waste Generated		14064.91		393817.49	955468.3	Tons Waste		0.0648	

		Gases (Metric Tons)				Data Quality		Emissions Factor (kg/MMBtu)		
Scope	GHG Emissions Source	CO2	CH4	N2O	CO2e	Activity Data	Unit	CO2	CH4	N2O
	Water and Wastewater Management Emissions									
1	NWI Combustion of Digester Gas - Energy Recovered		0.043	0.009	3.48	20315570.25	scf/yr	Biogenic 52.07	0.003	0. 00063
1	NWI Combustion of Digester Gas estimated from Illinois pop served		0.120	0.024	9.65	56270415	scf/yr	Biogenic 52.07	0.003	0.00063
1	Combustion of Digester Gas - Non Energy Recovery - Inboundary		0.298	0.059	23.87	139235491.5	scf/yr	Biogenic 52.07	0.003	0.00063
1	(IO/IE) Indiana American Water - All	19021.56	1.717	0.220	19127.81	135310.93	Water Supply equivalent MMBTU			
1	(IO/IE) Michigan City Water Works	2221.78	0.198	0.031	2235.54	9323.69	Water Supply equivalent MMBTU			
1	(IO/IE) NWI Municipal Groundwater PWS	5256.64	0.470	0.072	5288.85	23710.21	Water Supply equivalent MMBTU			

1	(IO/IE) Small Private PWS - 30-8000 Population	1735.79	0.155	0.024	1746.43	7843.57	Water Supply equivalent MMBTU			
1	(IO/IE) Hammond Water Works out boundary pop	8295.81	0.749	0.096	8342.15	59012.91	Water Supply equivalent MMBTU			
1	(IO/IE) 2017 Hammond Water Works in boundary pop		0.796	0.102	8872.38	62763.75	Water Supply equivalent MMBTU			
1	Process N2O Emissions WWTreatment - Hammond Out boundary pop		1.348	1.348	357.23					
1	Process N20 emissions from WW Treatment pretreatment multiplier 1.25		3.106	3.106	823.07					
1	Total N loading from Municipal POTWs in-boundary pop		0.277	0.277	73.34	96.52	Kg N/day			
1	Total N loading from POTWs out boundary.pop		0.072	0.072	19.07	25.1	Kg N/day			

		Gases (Metric Tons)				Data Quality		Emissions Factor (kg/MMBtu)		
Scope	GHG Emissions Source	CO2	CH4	N2O	CO2e	Activity Data	Unit	CO2	CH4	N2O
	Agriculture, Forests, Other Land Use									
1	Undisturbed Forest				-100472.19	67431	hectares	Calculated in LEARN		
1	Non-Forest to Forest				-6135	1041	hectares	Calculated in LEARN		
1	Forest to Settlement				742.6	28.33	hectares	Calculated in LEARN		
1	Forest to Grassland				238.9	14.3	hectares	Calculated in LEARN		
1	Forest to Other				87.52	4	hectares	Calculated in LEARN		
1	Forest – Insect Disturbance				3405.6	440	hectares	Calculated in LEARN		
1	Forest to Wetland				137.7	7.7	hectares	Calculated in LEARN		
1	Trees Outside of Forest				-28174		hectares	Calculated in LEARN		
1	Sheep & Goat Manure		0.7		19.6	1472	head		0.7	
1	Horse Manure		5.6		156.8	2170	head		5.6	
1	Hogs Manure		487.1		13638.8	33592	head		487.1	
1	Beef & Cattle Manure		23.75		665	6007	head		23.75	
1	Poultry Manure		2.6		72.8	5111	head		0.5	