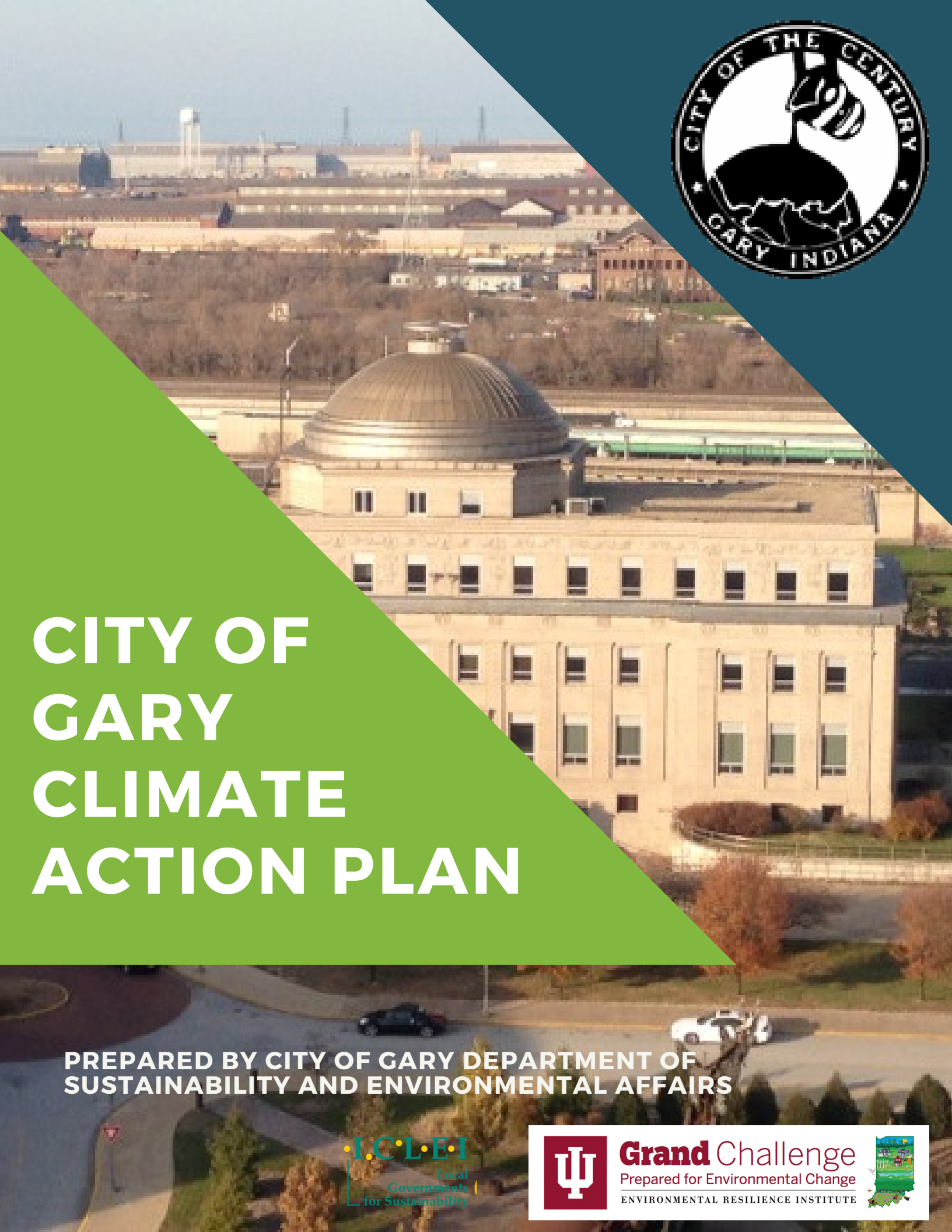


CITY OF GARY CLIMATE ACTION PLAN

PREPARED BY CITY OF GARY DEPARTMENT OF SUSTAINABILITY AND ENVIRONMENTAL AFFAIRS

ICLEI Local Governments for Sustainability

Grand Challenge
Prepared for Environmental Change
ENVIRONMENTAL RESILIENCE INSTITUTE

Table of Contents

Energy Chapter 1:

1. **City of Gary Greenhouse Gas Emissions Inventories**

Since the early 1990s, U.S. cities have developed greenhouse gas (GHG) inventories based on accounting principles created by ICLEI . These standards, known as the US Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions and the Local Government Operations Protocol, create a replicable and credible methodology for calculating and projecting GHG emissions in cities throughout the U.S. In 2019, through its partnership with the Indiana University Environmental Resilience Institute, the City of Gary conducted two sets of emissions inventories to establish a baseline level of emissions.

The community inventory examined nine sources within the community: residential buildings, commercial buildings, industrial facilities and processes, vehicle miles traveled, solid waste, wastewater treatment and facilities, public transit, airport, and rail. The local government operations (LGO) inventory represents a subset of the community inventory and illustrates the emissions generated because of City government actions such as electricity used in the City's buildings and facilities, transportation emissions from the City's vehicle fleet, solid waste generation, and wastewater facilities.

The City of Gary completed a community-wide and local government greenhouse gas inventory in 2019 for the calendar year 2017. The results of each inventory establish our community's baseline emissions. The next update of the inventory is scheduled to take place in [2022? Every 3 years according to the resolution] to measure the city's progress in achieving its emissions reduction goals.

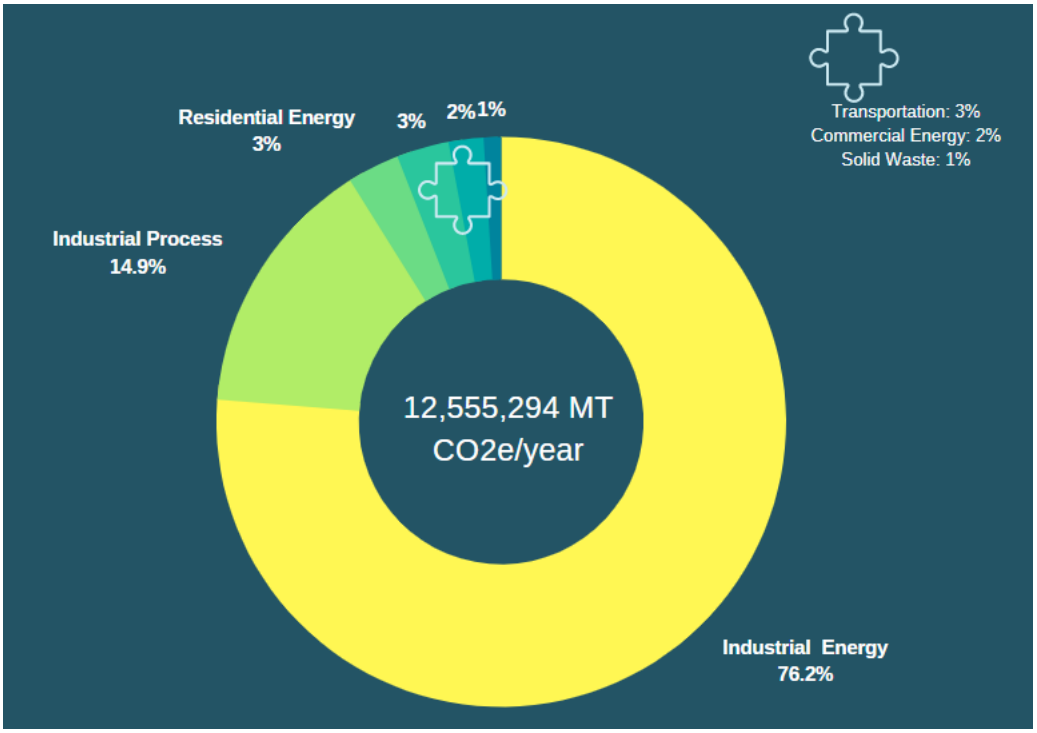
The inventories measured three greenhouse gases: carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O). Results are reported in terms of metric tons of carbon dioxide equivalent (MT CO2e), which is calculated using the global warming potential (GWP) of greenhouse gases to establish a consistent unit.

Results

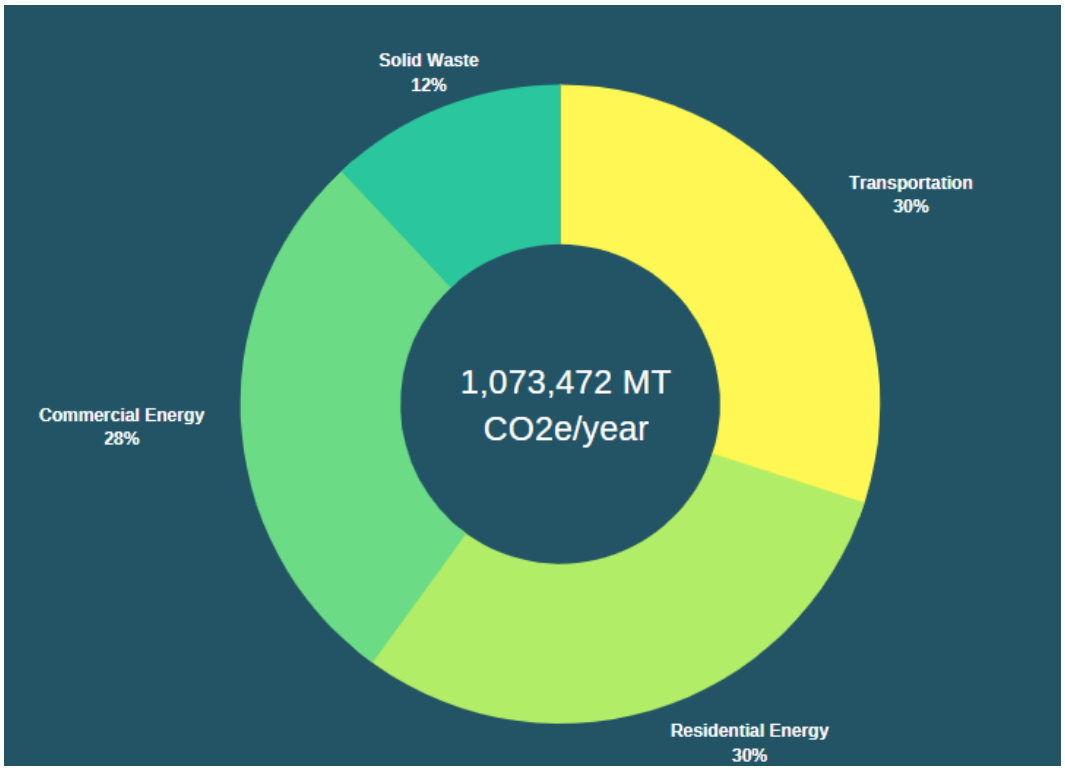
In 2017, the Gary community generated 12,555,294 MT CO2e and City operations generated 93937 MT CO2e. Therefore, City operations make up less than 1% of the community's emissions. The largest sector was industrial emissions, making up over 90% of the community's total emissions.

Excluding industrial emissions and processes, the community generated 1,073,472 MT CO2e in 2017. City operations constituted about 9% of the community's emissions when industry is not included. When industry is removed, transportation, commercial energy, and residential energy each contribute about 30% to community-wide emissions, and solid-waste makes up the remaining 10%.

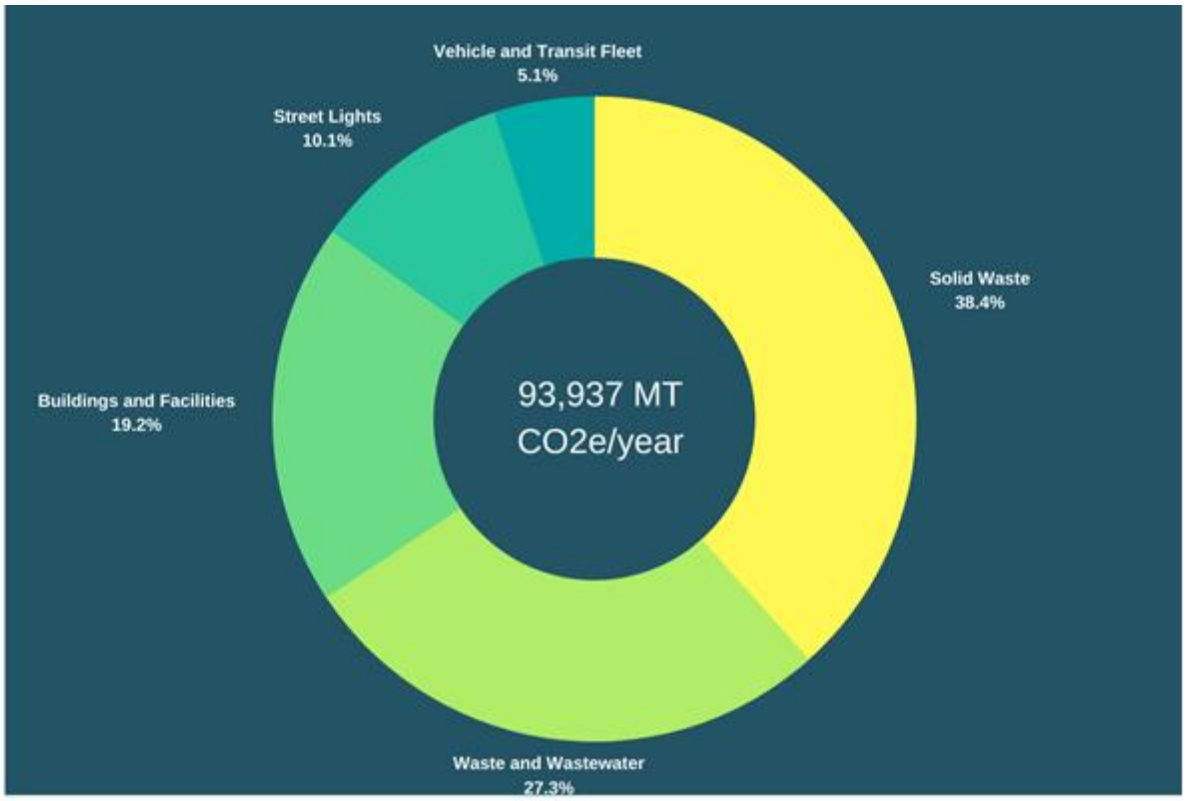
2017 Community-Wide GHG Emissions Pie Chart



2017 Community-Wide Emissions Pie Chart, Excluding Industrial Sources



2017 City Operations GHG Emissions Pie Chart



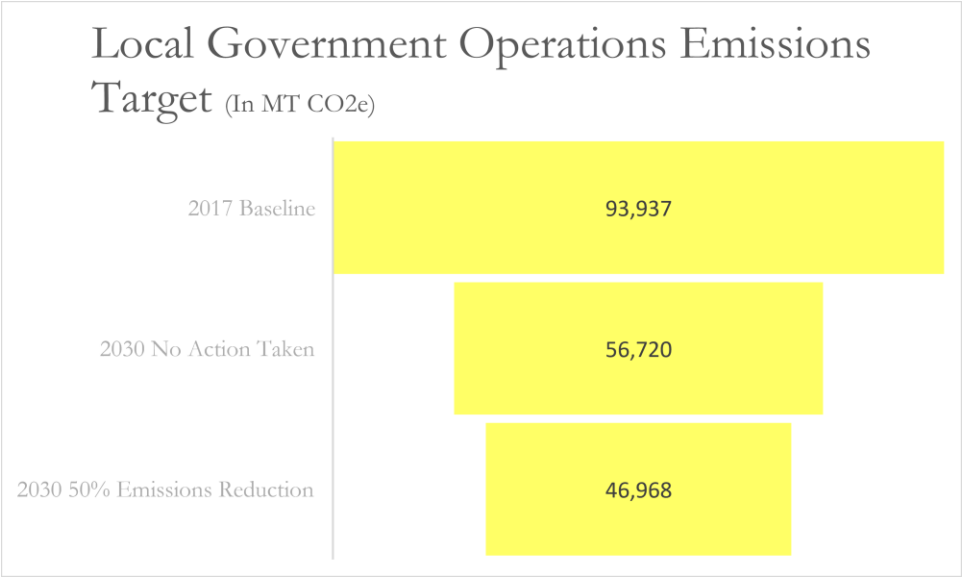
2. Forecasting GHG Emissions

Gary has also completed an emissions forecast based on projections of current data and expected population change. This emissions forecast is based on a business-as-usual scenario, which estimates future emissions levels if no greenhouse gas reduction activities were to take place. The business-as-usual forecast indicates that there will be approximately a 4% reduction in emissions by 2050 if no greenhouse gas reduction initiatives are implemented. At the community-level, emissions are expected to slightly decline due to projections that Gary's population will stay relatively constant over the next 30 years and commitments from Gary's utility company, NIPSCO, to decarbonize the grid that residents and businesses in Gary use for electricity. These NIPSCO energy-efficiency improvements will have more of an impact at the local government operations level, as many categories of operations involve electricity, including buildings and facilities, street lights and traffic signals, and even the transit fleet as the City implements electric buses.

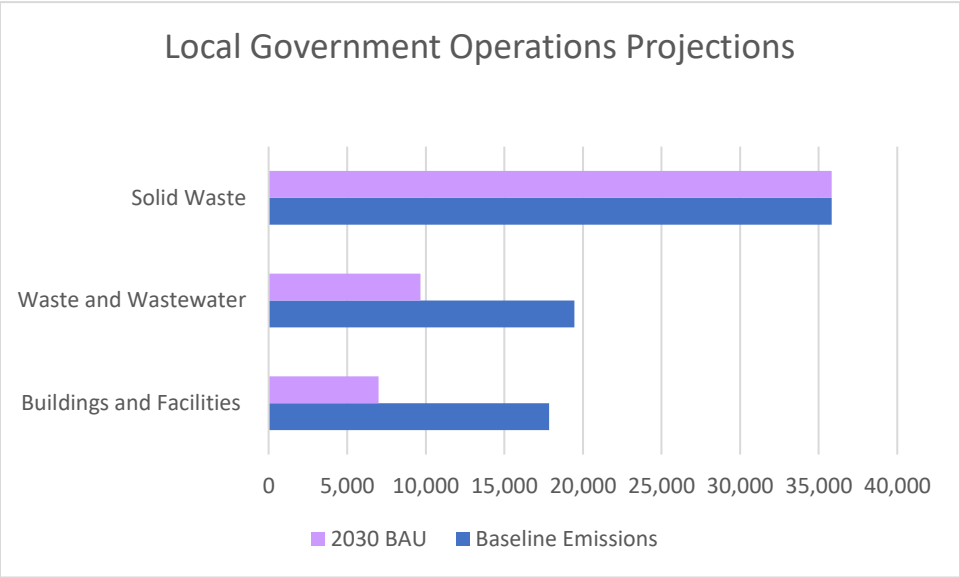
3. Local Government Operations GHG Reduction Target:

Municipal operations in Gary generated 93,937 MT CO_2e in 2017. Municipal operations include city building and facilities operations, street lights and traffic signals, transportation fleets, solid waste treatment, and wastewater treatment. If the City were to take no further action, local government operations are projected to decrease by 40% to 56,720 MT CO_2e in 2030.

The City of Gary intends to lead by example for local businesses, other cities, and residents to go greener by reducing local government operations emissions by 50% by 2030. This represents an additional 10,000 MT CO_2e reduction in emissions over 10 years beyond the business-as-usual projection.



4. City Government Operations Projections: Top 3 Sources of Emissions

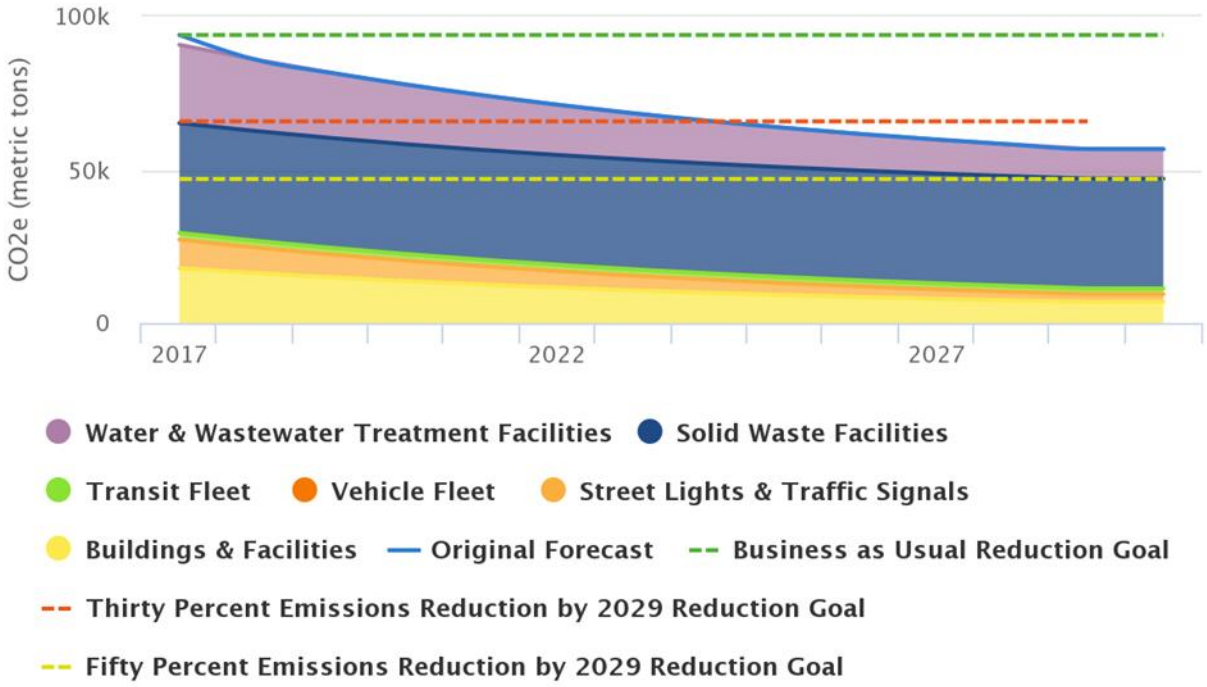


Buildings and facilities emissions are projected to decrease by 60% to 7,000 MT CO_2e by 2030 (2017 baseline is 17,849 MT CO_2e). see Buildings section for applicable recommendations to further reduce electricity use.

Waste and wastewater treatment activities are projected to decrease from 19,462 MT CO_2e to 9,662 MT CO_2e in 2030: a 50% reduction

Solid waste produced 35,819 MT CO_2e in 2017, the largest contributor to municipal GHG emissions**, this is not projected to decline by 2030** unless the City takes action, see Waste section for applicable recommendations to reduce waste emissions

Municipal Projections to 2030:

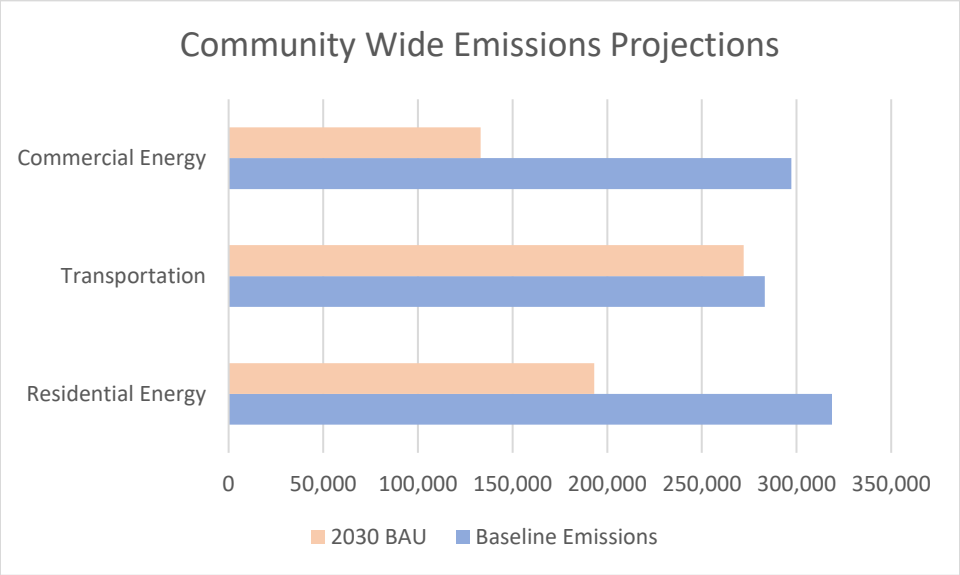


5. Community-Wide Emissions

Industry, Industrial Processes, and transportation are the three largest sources of Gary's greenhouse gas emissions. Gary is unique among cities in Indiana that have conducted GHG inventories, as industry makes up nearly 90% of its community emissions. Because the steel making process relies heavily upon blast furnaces gas and other fuels, there are not projected to be significant reductions in industrial emissions through 2050, if manufacturing continues as usual. To create realistic, actionable targets in this plan, the top three sources of emissions, industry excluded, will also serve as a baseline to measure progress over the next 30 years.

U.S. Steel has committed to reduce GHG emissions intensity by 20% by 2030. This target is an average of all of its plants globally, and does not specify renewable energy or purchased power agreement opportunities in Gary. Ongoing collaboration with industry, government agencies, and the City should be explored and updated in future iterations of this Climate Action Plan.

Projections for Top 3 sources of Community-Wide Emissions (Industry Excluded)



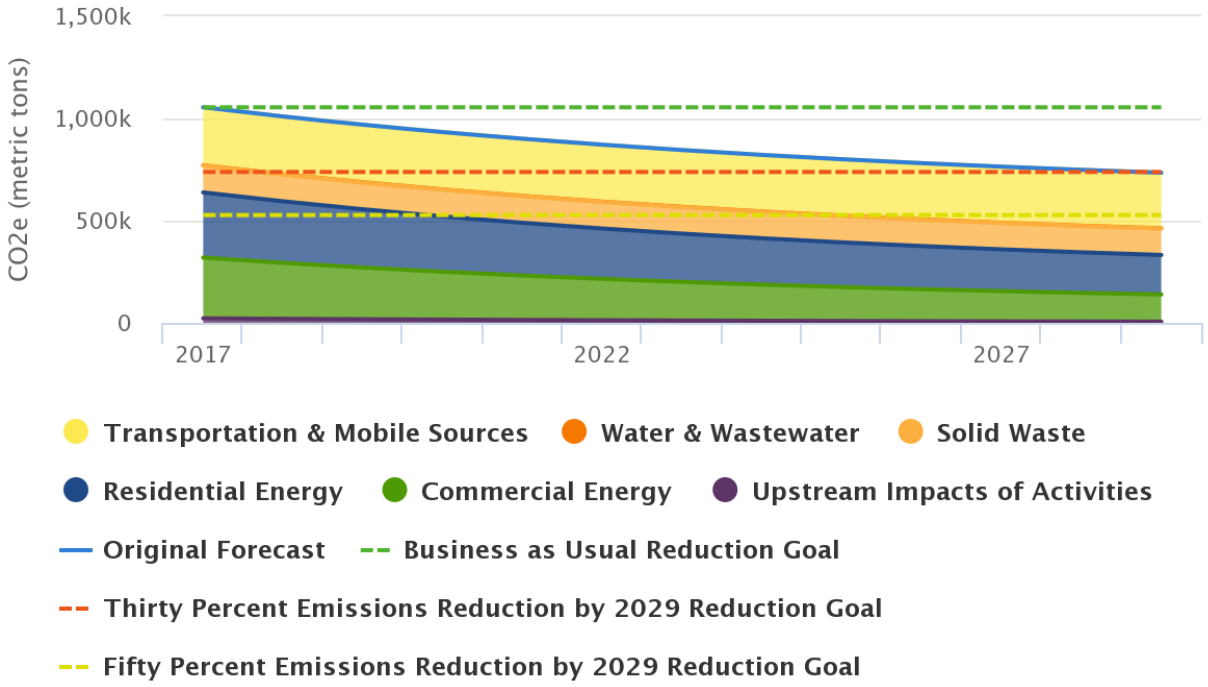
Residential energy, accounting for the natural gas and electricity usage by residents, produced 318,664 MT CO_2e in 2017 and is projected to decrease by 40% to 193,095 MT CO_2e in 2050.

The transportation sector produced 283,312 MT CO_2e in 2017 and is projected to decrease by 4% to 272,159 MT CO_2e by 2050.

Commercial energy, which includes natural gas and electricity usage by non-industrial companies in Gary, produced 297,322 MT CO_2e in 2017 and is projected to decrease by 55% to 133,113 MT CO_2e in 2030.

Not including industry, the community-wide emissions are expected to decrease by 30% due to NIPSCO's decarbonization commitment. This enables Gary to set an ambitious target of reducing its GHG emissions community-wide by 35% by 2030. This target represents a reduction in Gary's GHG emissions by 369,126 *MT* CO_2e by 2030.

6. Community-Wide Emissions Projections to 2030



7. Targets

ICLEI, the Greenhouse Gas Emissions tool used for Gary's inventory, recommends setting science-based targets for emissions reduction. Science-based targets:

1) Are led by the latest climate science
2) Prioritize equity, meaning they consider historical contributions to levels of carbon dioxide in the atmosphere
3) Are robust and comprehensive, taking into account city-wide emissions from various GHGs and sources

50% City Government Operations Emissions Reduction from 2017 baseline by 2030 (17% from city actions)

50 MW of local renewable energy generation by 2030

35% Community Greenhouse Gas Emissions reduction from 2017 baseline by 2030 (Excluding Industrial Sources)

Based on GHG emissions of 1,073,472 MTCO2e for 2017, excluding industry, this commitment requires that the Gary community reduce GHG emissions by approximately 214,694 $MTCO_2e$ by 2030.

How will we achieve these targets?

Promote generation of renewable energy (see Green Economy chapter for specific actions)

Adopt policies, such as building codes, that improve energy efficiency in all sectors (See Built Environment Chapter for specific actions)

Adopt policies and incentivize action across Northwest Indiana for reducing vehicular contribution to air pollution (see Transportation Chapter for more information)

Utilize green infrastructure and waste management best practices to offset emissions (see Natural Economy and Waste Chapters for further details)

Engage and educate building occupants and train the local workforce (See Green Economy for more information)

Sources:

1. https://sciencebasedtargetsnetwork.org/wp-content/uploads/2020/11/SBTs-for-cities-guide-nov-2020.pdf
2. Gary GHG Emissions Inventory – 2019, Prepared by Reena Azlan

Chapter 2: Air Quality

1. State of Air Quality in Gary:

One of the primary regional health impacts of climate change in the United States is a change in air quality. The 2018 State of the Air report from the American Lung Association ranked Chicago and Northwest Indiana in the top 25 most polluted cities in the U.S. for air quality. It is clear from the following figure produced by the MIT Laboratory for Aviation and the Environment that Indiana exhibits an above average concentration of fine particulate matter, a pollutant causing major health problems, compared to the rest of the country.

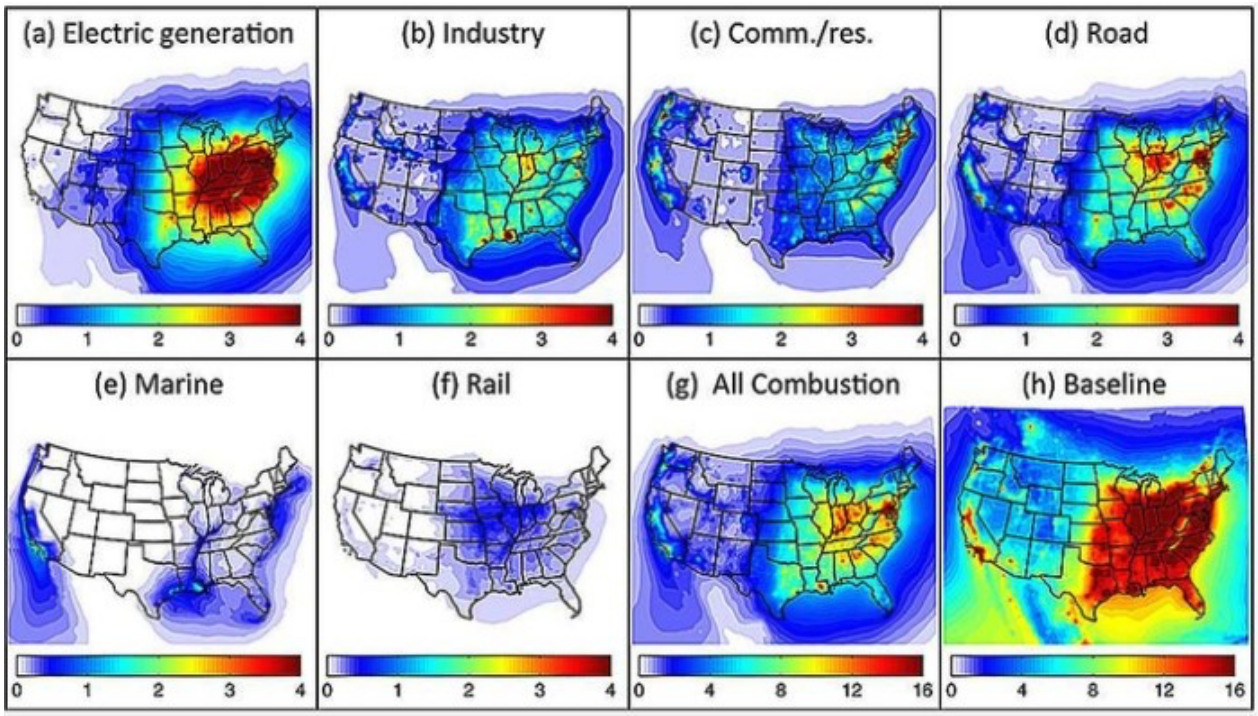
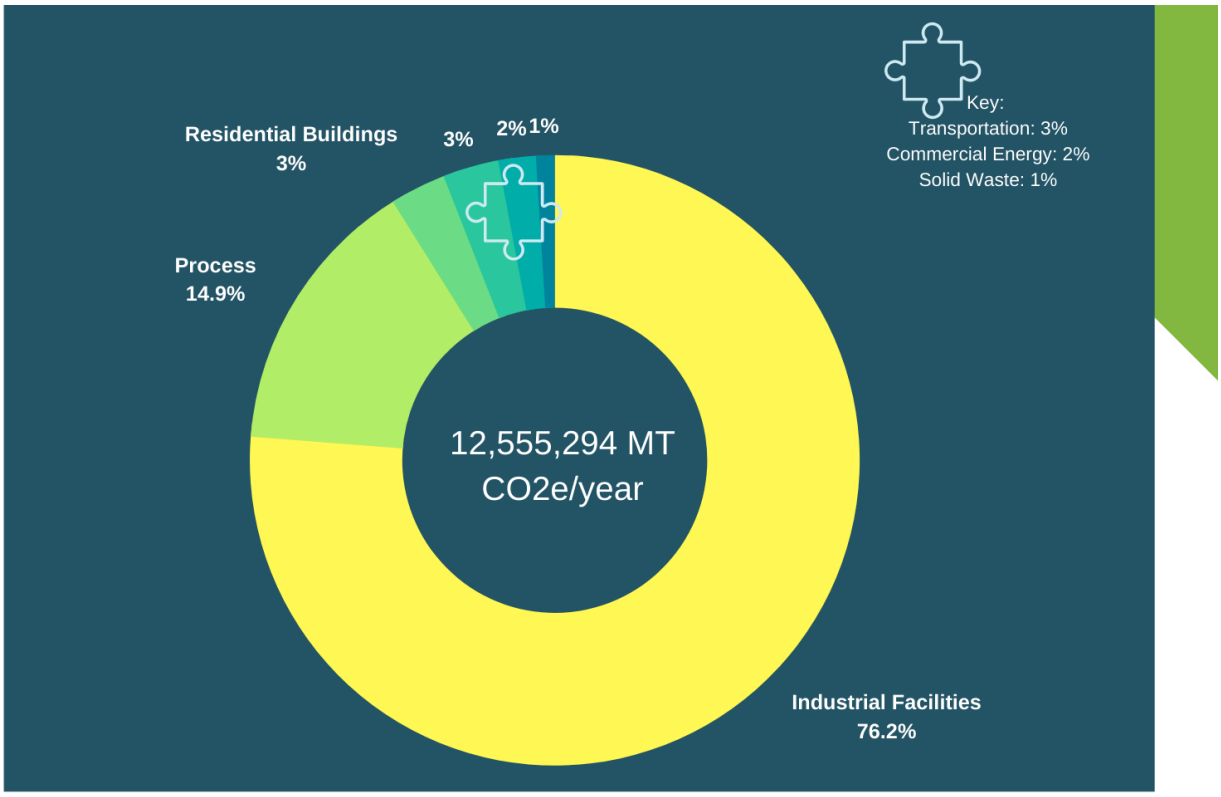


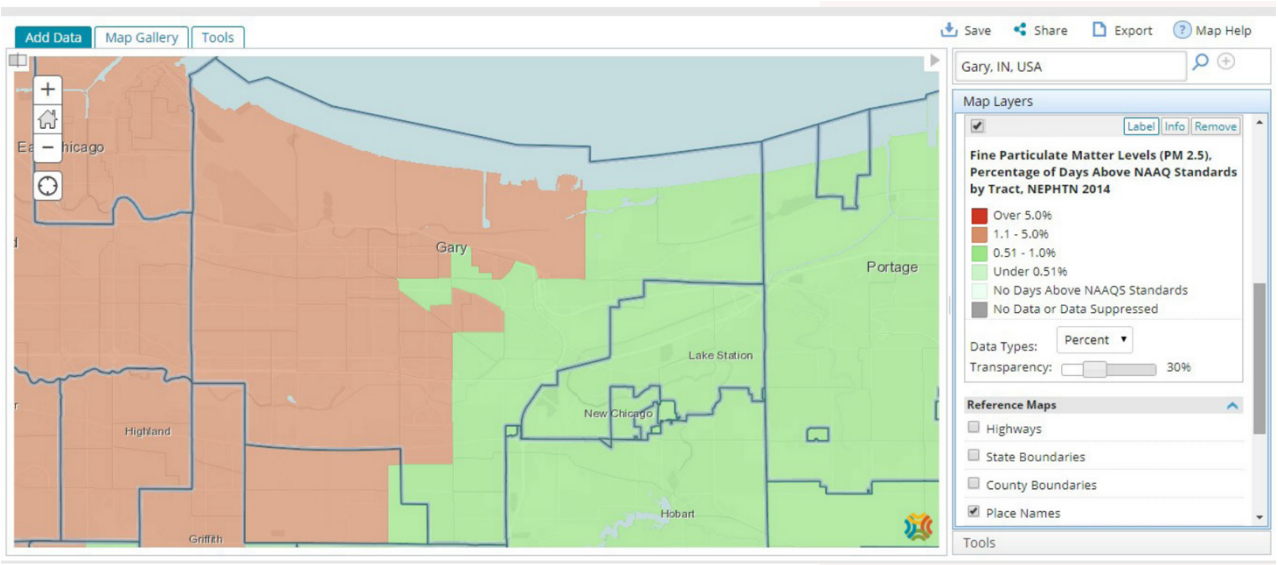
Figure 1. This graphic shows annual average concentration of fine particulate matter, pollutants leading to major health problems, from various sources of emissions including: (a) electric power generation (b) industry (c) commercial and residential sources (d) road transportation €d marine transportation (f) rail transportation (g) sum of all combustion sources and (h) all sources. Graphic Source: Laboratory for Aviation and the Environment. https://news.mit.edu/2013/study-air-pollution-causes-200000-early-deaths-each-year-in-the-us-0829

This is due largely to industry, road transportation, and coal-fired electric generation. This is supported by the results of the 2017 greenhouse gas inventory:



According to the U.S. Environmental Protection Agency's Toxic Release Inventory, industrial pollution is found to be highest in the Midwest, with Indiana leading the nation in toxic pollution emitted per square mile.

Furthermore, Gary in particular displays a large percentage (>5%) of days over air quality standards for fine particular matter (PM 2.5):



Source: Gary Comprehensive Plan (2019) pg. 135.

2. Health Impacts on Hoosiers

Ozone and particulate matter, both pollutants measured in the ranking, can lead to health problems including asthma attacks, shortness of breath, and worsening of lung disease leading to premature death. People who die of air pollution typically die about a decade sooner than they would have otherwise. About 200,000 premature deaths per year are caused by fine-particulate air pollution per year. The largest contributor to premature deaths is emissions from industrial activities and road transportation.

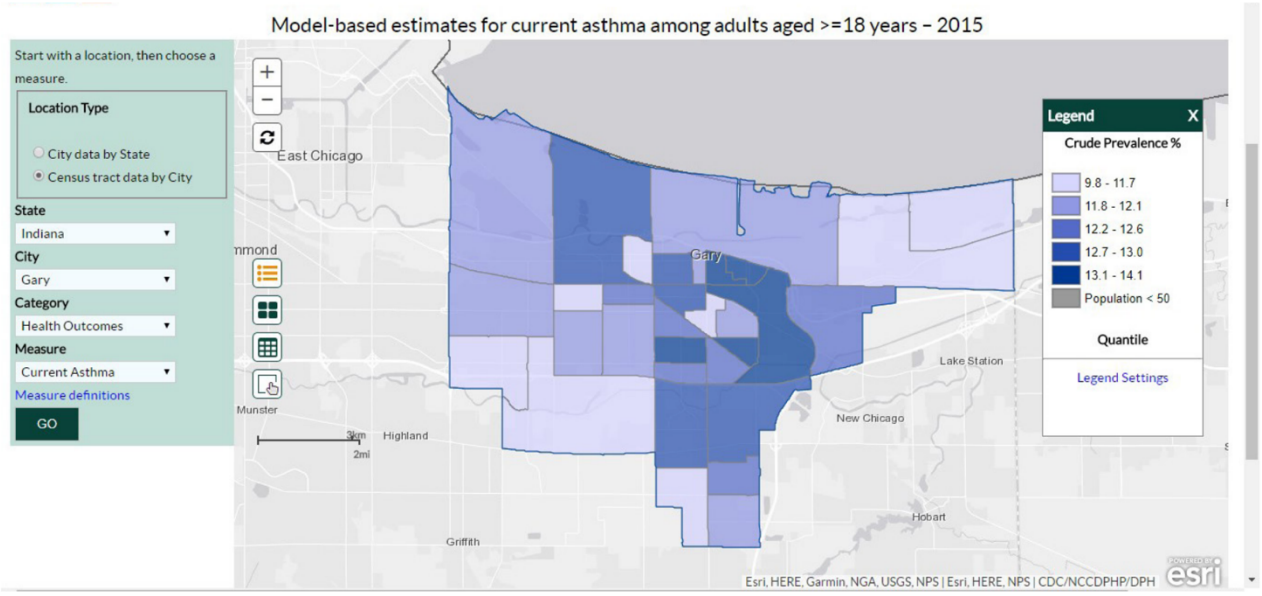
3. Goals

There are two climate-related air quality goals:

(1) Improve air quality by reducing the amount of particulate matter 2.5 (PM2.5) to less than 5%, and reduce the number high ozone days to 5 days by 2025.
(2) Develop a Residential Communication and Education Program concerning public health impacts of air quality.

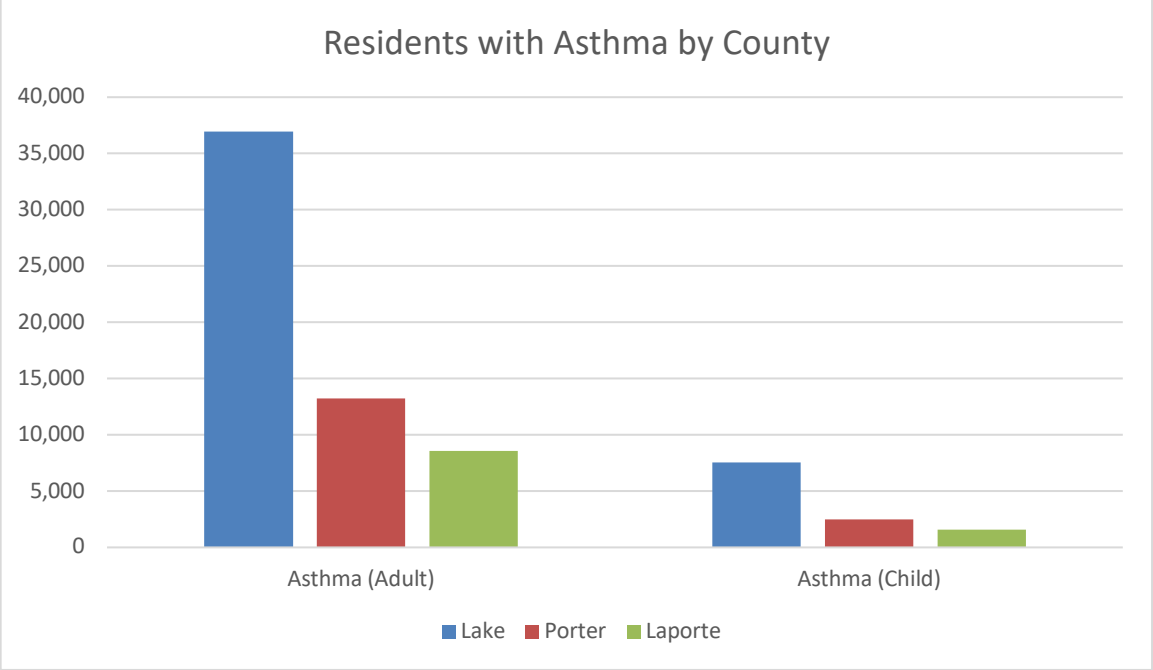
4. Compounding Social Factors and Equity

Health risks of air pollution do not affect all Hoosiers equally. Given the City of Gary's proximity to industrial activity, electricity generation, and heavy transit corridors, residents face greater risk of experiencing negative health impacts of pollution. Exposure to air pollutants puts children and adults with chronic health conditions, like asthma, at higher risk than the general population. The following figure shows the percentage of Gary residents that have asthma:



Source: Gary Comprehensive Plan (2019), pg. 136.

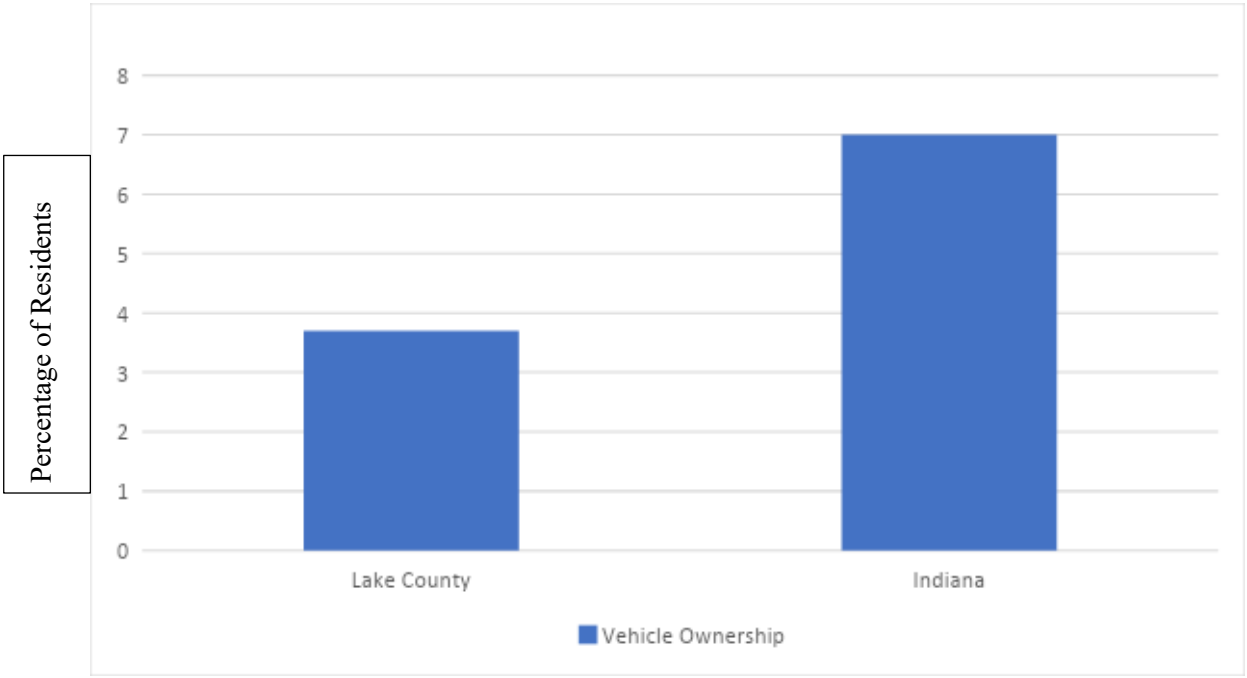
The negative health impacts of pollution on chronically ill residents affect residents in Gary, and Lake County more generally, more than residents in neighboring counties like Porter County and Laporte County:



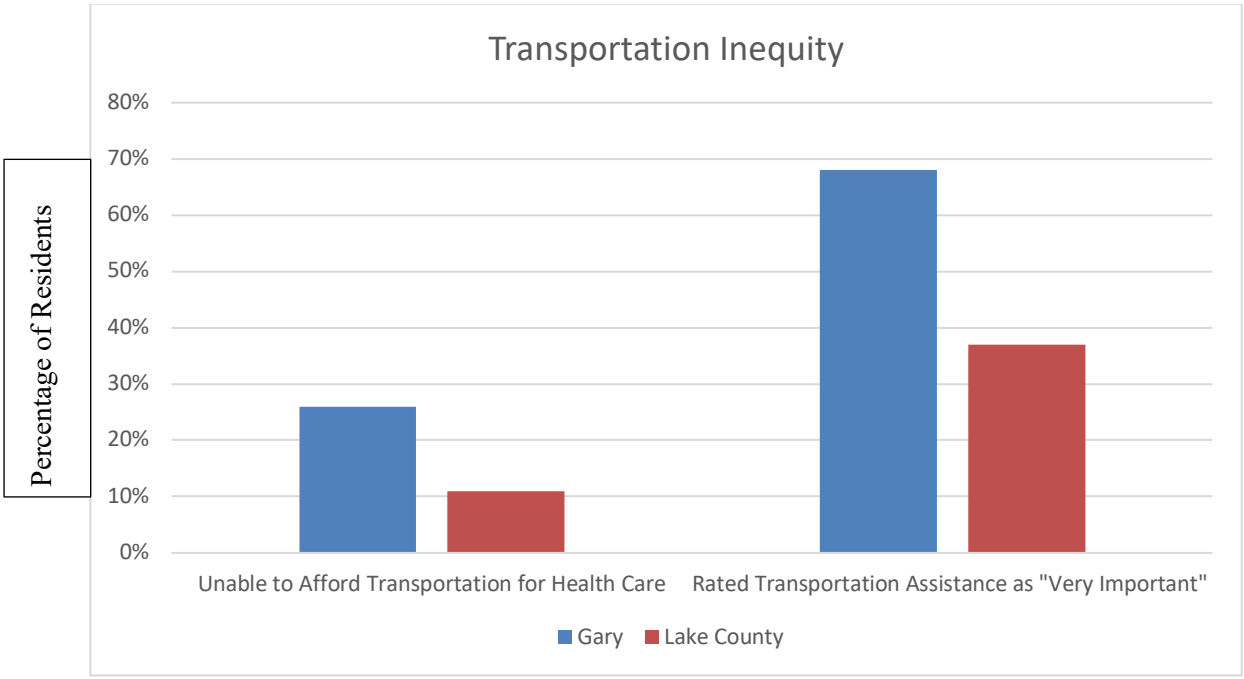
Source: https://www.lung.org/research/sota/city-rankings/states/indiana/lake

Furthermore, a 2019 Community Health Needs Assessment found that the Northlake Campus of Methodist Hospitals is the only hospital in Gary, Indiana. In fact, Lake County is designated as a health professions shortage area, with a shortage of healthcare providers (both primary and mental health care) or long waits to see a health care provider. More specifically, the City of Gary is designated as a Medically Underserved Area, that has too few primary care providers relative to its population, high rates of infant mortality, poverty and elderly population. This is largely due to the low income population.

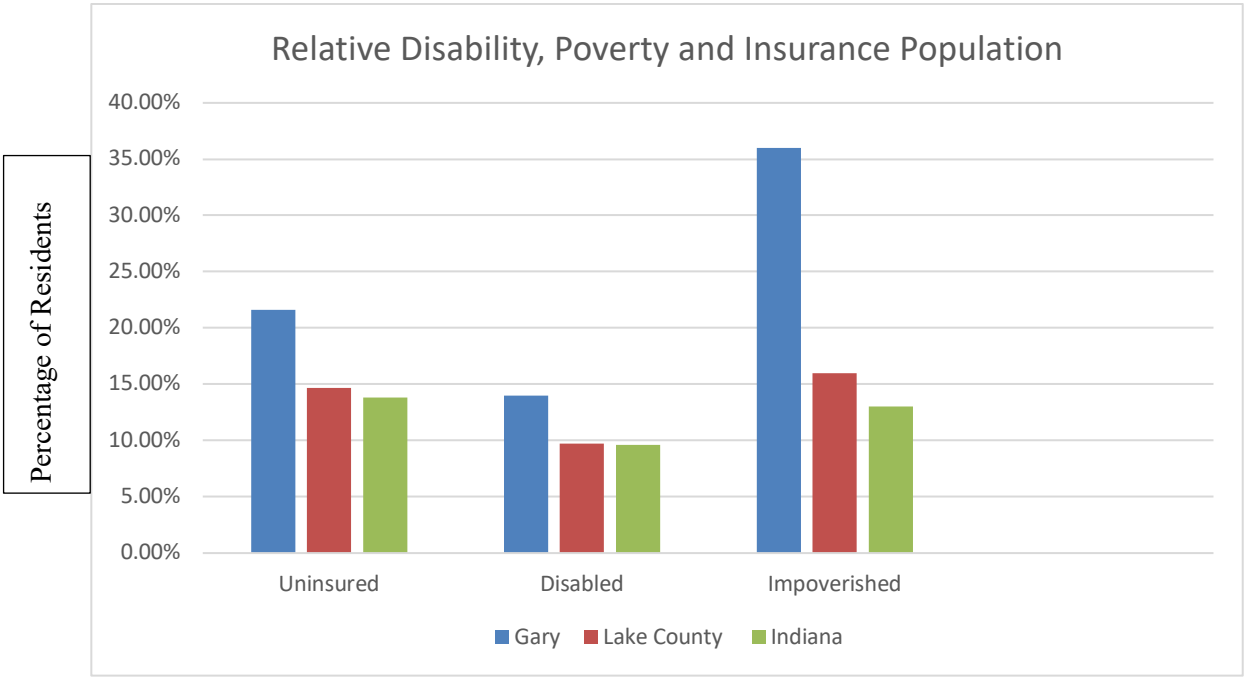
Limited access to healthcare in the City is compounded by limited access to transportation, making residents even more susceptible to increasing climate-related health risks.



Vehicle ownership is directly related to the ability to access essential local services such as pharmacies, doctor's offices and hospitals and 8.7% of Lake County residents, compared to 7% of Indiana residents, do not own a vehicle. The residents of Gary are particularly vulnerable to health access challenges given both the reduced vehicle ownership rates and high poverty rates which impact the ability of residents to afford transportation for health care purposes. 26% of Gary residents, compared to 11% of Lake County residents, reported that they were unable to secure transportation for health-related travel such as doctor appointments and follow up care. 68% of participants in a survey conducted by Methodist Hospitals rated transportation assistance as a "very important" community resource compared to 37% of Lake County residents, a major discrepancy.



Such limited access to healthcare means that residents are both at a higher risk of bearing the health impacts of climate change and face greater challenges seeking treatment for the health impacts they experience. This inequity in health care is exacerbated by the higher proportion of Gary residents living without health insurance and living with a disability, compared to the rest of the county and state (2019 CHNA Report):



Further, such negative health impacts will disproportionately impact Black and Hispanic Hoosiers who, respectively, comprise 81% and 6% of Gary's population. Such impacts will also affect low-income Hoosiers. The median income in the city of Gary is well below the rest of the state with more than 1/3 (36%) of Gary residents living in poverty compared to 16% of Lake County residents and 13% of Indiana residents.

Poverty and low-income status are correlated with negative health outcomes such as shorter life expectancy, higher infant mortality rates and higher death rates. One way in which poverty directly impacts Gary residents is the inability of many residents to afford needed healthcare. For example, in a survey carried out by Methodist Hospitals, 30% of Gary residents indicated that they had needed a prescription in the past year but could not afford to fill the prescription. The limited number of health care providers in Gary coupled with both the relatively larger number of residents who live in poverty and do not have health insurance or cannot afford or access healthcare makes the climate change impacts on health care especially severe.

This is why it is critical to take climate action: reducing emissions from power plants and factories has the co-benefits of reducing the rate of global warming and reducing the number of air pollution related illnesses and hospitalizations. The Indiana Climate Change Impacts Assessment (2018) reports that Indiana ranks in the top 12 states with the highest potential number of lives saved if emissions-reduction measures are put into place. Given the disproportionate impact of poor air quality on low income and black residents, improved air quality has the potential to significantly improve and save the lives of the most marginalized and vulnerable amongst us.

5. City Accomplishments: Taking Climate Action

City of Gary ordinances enable the city to issue air pollution permits and regulate the amount of air pollution produced within city limits

Code 1960, §§ 8-1304.1, 8-1304.2; Code 1989, § 90.20; Ord. No. 3765; Ord. No. 4232; Ord. No. 6415B, § 1, 12-19-1989
No person shall construct, install, reconstruct or alter any process for burning, refuse burning, or control equipment pertaining thereto that may be a source of air contaminants in the city without a permit.

The City of Gary is a member of IDEM's Partners for Clean Air (PCA), a coalition of Northwest Indiana businesses, industries, local governments, and community groups committed to improving overall air quality and public health through voluntary actions. Benefits of membership of the Partners for Clean Air program include recognition as an environmental leader and Air Quality Action Day notifications.

Air Quality Action Days are days in which ground level ozone and particulate matter are predicted to reach unhealthy levels. The Air Quality Action Season for Indiana ozone concerns begins May 1 and ends September 30 of each year while PM 2.5 action days can occur year-round. Fine particulate matter is known as PM2.5 because it refers to microscopic dust, soot, liquid droplets, and smoke particles that are 2.5 micrometers or smaller.

Currently, the American Lung Association assigns Lake County an ozone grade of D, with a weighted average of 3.2 high ozone days. This is a significant decrease from an annual weighted average of 10 high ozone days in 2010, 25 high ozone days in 2005 and 35 high ozone days in 2001. From 2001-2019, Lake County has reduced its high ozone days by about 33 days— a major accomplishment.

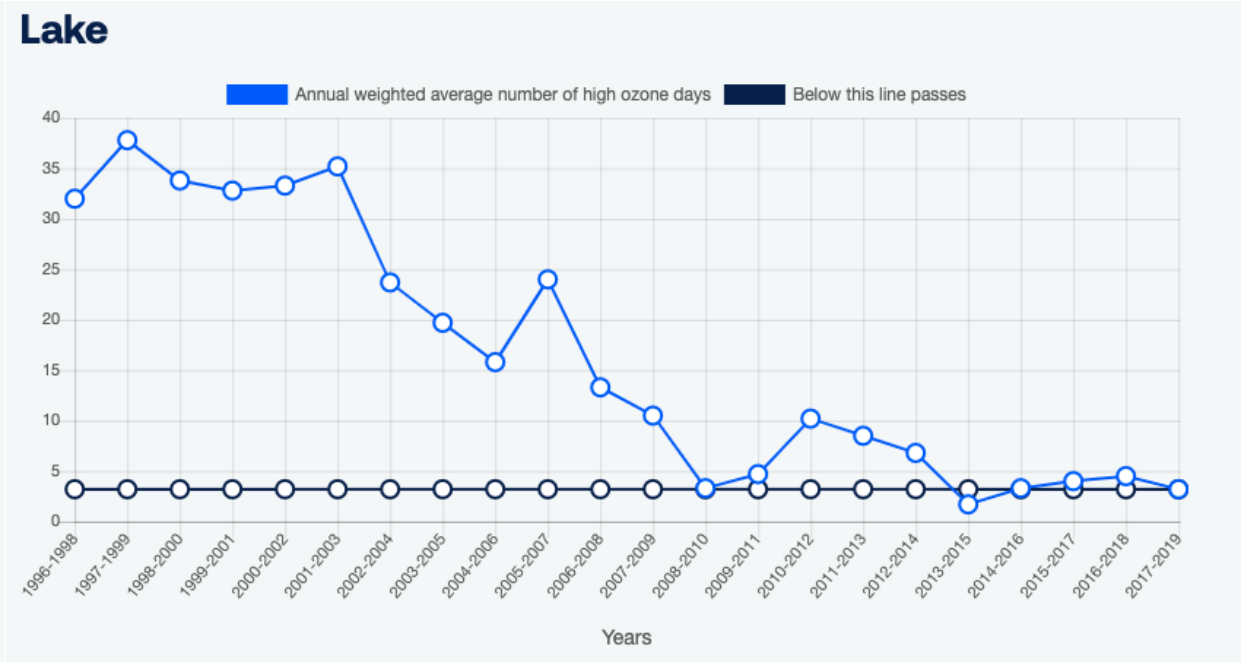


Figure: Scatter plot depicting the gradual decrease in weighted average number of high ozone days in Lake County. Source: American Lung Association

Ground level ozone is generated by chemical reactions due to pollutants emitted by industrial facilities, electric utilities and road vehicles. It can cause coughing, difficulty breathing, pain while breathing, inflamed and damaged airways, and more frequent asthma attacks. It is particularly harmful for asthmatic residents. This is significant because a large proportion of Gary residents have asthma (both adult and pediatric) and subject to large quantities of pollutants due to industrial facilities, electricity generation and road traffic.

6. Climate Action Targets and Recommendations:

Based on the foregoing data, as well as our review of environmental monitoring resources available in Northwest Indiana, the Green Gary Advisory Board recommends that the City of Gary take the following actions.

1) *Work with regional partners to reduce the number of days of high (red and orange) ozone levels from 9 days to 5 days by 2025.*

Lake County had 0 designated maroon or purple ozone days in which the air quality was "Hazardous" (>200 parts per billion) or "Very Unhealthy" (106-200 ppb). However, Lake County did have 1 red ozone day in which the air quality was "Unhealthy" (86-105 ppb) and 8 orange ozone days in which the air quality was "Unhealthy for Sensitive Groups" (71-85 ppb).

A target goal for the city of Gary is to work with regional partners in the NWI and Chicago-land area to reduce the number of red and orange ozone days from 9 total days to 5 days by 2025 which would be a 11% decrease in days out of ozone compliance per year. The key to meeting these targets is to adopt policies and incentivize citizen action for reducing vehicular contribution to air pollution. Some examples include the electrification of city fleet vehicles, incentivizing carpooling, and adopting emission testing requirements. A further discussion of these strategies can be found in the "Transportation" section.

2) *Develop a Residential Communication and Education Program*

The focus of this program is to notify and educate the public about impaired air quality. The city will notify residents about potentially dangerous quality to facilitate residents' decision making and ability to modify behavior and activities accordingly. This can be done using a number of available resources: USEPA Air Quality Index, EnviroFlash, or SmogWatch. This will be implemented in coordination with the established government, industry and organization partners made through Partners for Clean Air to encourage partners to reduce air pollution accordingly and to issue health advisories and warnings. A key part of the plan will be to educate residents about the health impacts of poor air quality and provide public health recommendations about what to do on poor air quality/high air pollution days. The goal is to familiarize residents and regional partners with adaptation strategies for poor air quality (https://eri.iu.edu/erit/strategies/air-quality-by-action.html) and encourage their adoption.

Local air quality information is available on weather applications that can be accessed through mobile devices. For example, Apple mobile phones have a weather application that is installed by default on the device and provides air quality information from the AQI (US Air Quality Index).

Furthermore, BreezoMeeter is a website that provides real-time and street-level air quality information.

One valuable resource is the EPA AIRNow website and application which provides air quality information with about an hour lag. It identifies the major pollutant, rates current levels of each pollutant (e.g. "good"), and provides a recommendation on the basis of that forecast ("reduce your activity level").

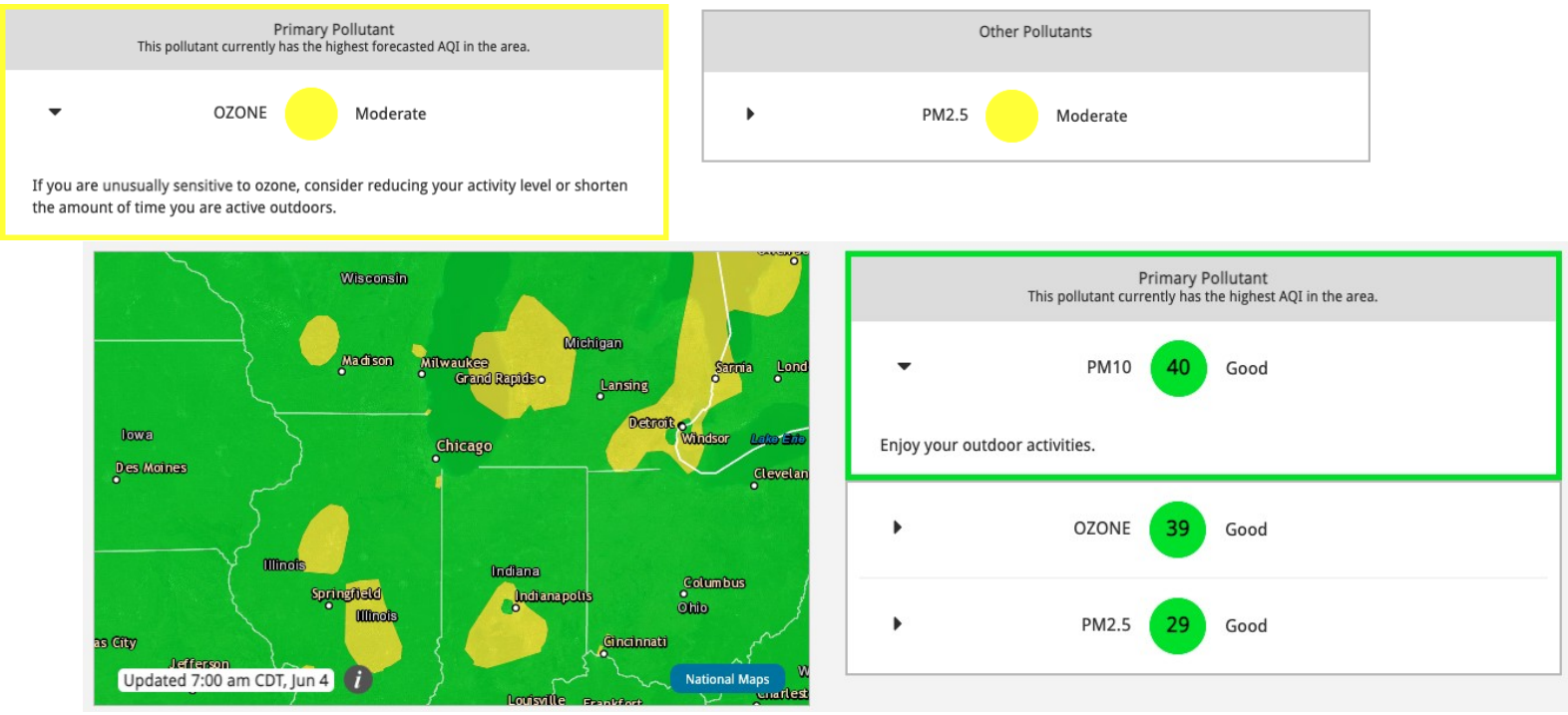


Figure: AIRNow map of air quality for Gary, IN

Figure: AIRNow website recommendations based on measured pollutant levels.

Such tools can be improved by increased real-time air quality monitoring at neighborhood level

which would (1) provide more local information about air quality and (2) counter the hour in lag-time between air quality measurements and information on the current EPA AirNow website/application. The City of Gary should also explore developing a collaboration with other government agencies, universities, and institutions to fund and install an array of sensors for monitoring air quality similar to the City of Chicago's "Array of Things" which uses light post mounted monitors. Coordinate with the US EPA Air Quality System to share data. Specifically, we recommend that IDEM establish more air monitoring sites along the I-80I-94 corridor in compliance with site-specific requirements to ensure the data meets quality control acceptance to establish attainment status

The challenge is to teach chronically ill and sensitive residents how to use and interpret such resources and information for decision making. This requires outreach and public education on the part of health care professionals and community organizations to those with chronic illnesses and their caretakers. This information can be used to guide residents' voluntary actions to limit their exposure by not conducting outdoor activities during peak ozone times. It can also guide residents' and local government's actions to limit their own emissions by, for example, avoiding the use of gasoline-powered landscaping vehicles.

One underutilized resource is the EPA's EnviroFlash, a partnership between the US EPA and local air quality agencies, which provides a subscription-based air quality alert system to notify residents of air quality alerts and recommended precautions based on available local data. There is currently one air quality monitor providing forecasts for the Hammond-Gary region. So, EnviroFlash can be used by Gary residents. (Notifications will then be sent to participants' email or cell phone and tailored to participants' selected preferences for frequency and type of notifications.

The EnviroFlash Toolkit is a particularly useful resource, providing a variety of promotional and educational materials such as public service announcements, a fact sheet, etc. These resources can be personalized for use by the City of Gary and distributed at various health care and community center.

3) Partners:

The following organizations are potential partners in the implementation of the aforementioned recommendations and the pursuit of improved air quality for the residents of Gary, IN:

Minority Health Coalition
Gary Community Health Network
Methodist Northlake Hospital
St. Mary Hospital
Franciscan Health
Lake County Tobacco Prevention Coalition
Northwest Indiana Health Cooperative

4) Sources:

IDEM OAQ: Air Quality Action Day (AQAD) Advisories (in.gov)
Most Polluted Cities | State of the Air
Hoosiers' Health in a Changing Climate: A Report from the Indiana Climate Change Impacts Assessment – Indiana Climate Change Impacts Assessment (purdue.edu)
BreezoMeter
American Lung Association | State of the Air | Lake County
https://methodisthospitals.org/about-us/community-health-needs-assessment/
http://www.enviroflash.info/
https://www.epa.gov/aqs
https://apps.idem.in.gov/smogwatch/Current.aspx
https://www.airnow.gov/
https://eri.iu.edu/erit/strategies/air-quality-by-action.html
https://eri.iu.edu/erit/strategies/public-health-air-quality.html

Chapter 3: Built Environment

1. Buildings Contribute to Climate Change

Building codes are mechanism for ensuring that buildings are built in such a way as to protect the health and safety of occupants by describing electrical and plumbing requirements, fire prevention, and (most important for our purposes) energy efficiency. Local municipalities usually adopt and adapt model codes which they update every few years.

Buildings have a major impact on greenhouse gas (GHG) emissions worldwide. In fact, buildings generate nearly 40% of annual global GHG emissions and nearly 50% of urban greenhouse gas emissions. This includes all aspects of buildings' lifecycles: from construction, to heating, cooling, and keeping the lights on, and to demolition. In the City of Gary, buildings created 30 percent of GHG emissions in 2017 when industrial activities are excluded from the calculations. Furthermore, updated energy codes can have immense benefits, reducing a building's energy consumption by up to 70%. Therefore, there is great potential to reduce the built environment's contributions to carbon emissions city-wide.

2. Goals

There are three climate-related built environment goals:

(1) Reduce the energy burden on low-income residents.
(2) Adapt building code to prepare for projected local climate change impacts.
(3) Rehabilitated eligible blighted buildings according to new and improved building code/energy efficiency standards.
(4) Reduce emissions from residential and municipal buildings to <1% of total emissions.

3. Background

a. NWI Climate Projections

The Indiana Climate Change Impacts Assessment projects that Indiana's changing climate will include higher temperatures, longer heat waves, and more extremely hot days which will affect the health of Hoosiers, particularly those without access to cooling technologies. As such, injuries and deaths due to extreme heat are projected to increase. In particular, the annual number of temperature-related deaths in Indiana is expected to increase and even double. The most at-risk will be children, the elderly, members of low-income households and those with pre-existing conditions. Cities, like Gary, will be especially vulnerable to health risks since urban areas create "heat islands" where temperature impacts are intensified. Given the high number of residents who live below the poverty line and for whom utility and energy costs are a substantial burden, Gary needs to start planning early for mitigating the impacts of climate change in Indiana, especially heat.

b. Existing Building Code

The Gary Municipal Code generally defers to the state-wide code for fire safety and building laws, IC 22-13-2-2:

> "**Sec. 105-52. - Incorporation of rules by reference.**
>
> (a) Building rules promulgated pursuant to IC 22-13-2-2 are hereby adopted."

There are a few adopted ordinances that place further restrictions than state-wide code and are environment-friendly and climate-aware:

> **Sec. 105-110. - Multifamily structure recycling plan.**
>
> Persons or entities applying for building permits for multifamily structures, including but not limited to duplexes, fourplexes and other such structures, shall provide as part of their submission, a plan describing how the solid waste for the occupants of such structures will be managed, including reduction, reuse and recycling steps taken to reduce their waste stream.
>
> (Ord. No. 7701, 3-15-2005)
>
> **Sec. 105-112. - Review of application.**
>
> Prior to the issuance of any building permit, the building commissioner shall:
>
> 1. Review all building permit applications to determine full compliance with provisions of this article.
> 2. Review all building permit applications for new construction or substantial improvements to determine whether proposed building sites will be reasonably safe from flooding.
> 3. Review building permit applications for major repairs with the floodplain area having special flood hazards to determine that the proposed repair uses construction materials and utility equipment that are resistant to flood damage and uses construction methods and practices that will minimize flood damage.
> 4. Review building permit applications for new construction or substantial improvements within the floodplain area having special flood hazards to assure that the proposed construction (including prefabricated and mobile homes) is protected against flood damage, is designed (or modified) and anchored to prevent flotation, collapse, or lateral movement of the structure, flood damage, and uses construction methods and practices that will minimize flood damage.
>
> (Code 1989, § 151.11; Ord. No. 6228, 2-2-1988)

However, buildings at the state-level are considerably weaker than is needed for climate impacts mitigation and adaptation. Indiana amended energy efficiency provisions of 2018 IECC to render the efficiency of the adopted 2018 code to be roughly equivalent to the 2009 IECC. The amended version of IECC is 20% less energy efficient than the model 2018 IECC.

Table 1. Major Indiana amendments to 2018 IECC

Code Measure (Section)	2020 Indiana Residential Code Requirement (Code Section)	2018 IRC Model Code Requirement (Code Section)
Table 1102.1.2		
Fenestration U-factor	0.35 (CZ 4&5)	0.32 (CZ 4) 0.30 (CZ 5)
Skylight U-factor	0.60	0.55
Ceiling R-value	38	49
Wood Frame Wall R-value	15 (CZ 4) 20 or 13+5 (CZ 5)	20 or 13+5 (CZ 4&5)
Mass Wall R-value	5/10 (CZ 4)	8/13 (CZ 4)
Floor R-value	19 (CZ 4)	30 (CZ 4)
Basement Wall R-value	10/13 (CZ 5)	15/19 (CZ 5)
Crawl Space R-value	10/13 (CZ 5)	15/19 (CZ 5)
Other Requirements		
Air Leakage Testing (1102.4.1.2)	Building or dwelling unit must be visually inspected for verification of compliance, or may be tested and verified of having an air leakage rate of ≤ 5 ACH50	Building or dwelling unit must be tested and verified of having an air leakage rate of ≤ 3 ACH50
Building framing cavities (1103.3.5)	Building framing cavities shall not be used as supply ducts or plenums.	Building framing cavities shall not be used as supply or return ducts or plenums.

See Indiana 2018 Standards Here: https://www.efficientwindows.org/wp-content/uploads/codes2018/Indiana2018.pdf

Specific amendments to IECC standards have direct links to specific consequences for residents. "For example, no longer requiring a blower door test has a direct connection to underventilation, which leads to moisture, mold and health issues for building occupants." (https://www.mwalliance.org/sites/default/files/meea-research/is_the_same_code_actually_the_same_code.pdf?current=/taxonomy/term/11)

The adoption of energy codes will have long-lasting impacts. For example, the figure below illustrates the difference in cumulative energy savings in Indiana based on whether the amended code is adopted or the model 2018 code which could have been adopted. The difference is about 30,000,000 MMBTU, enough energy to power 250,000 Indiana homes for 1 year.

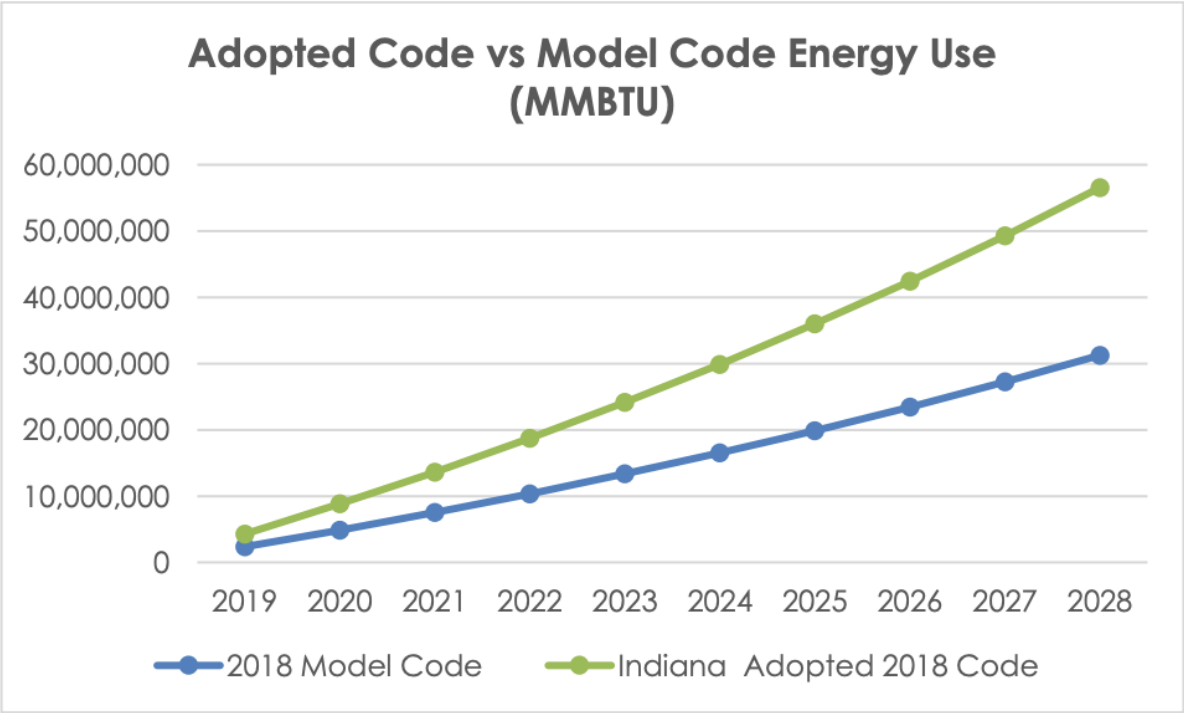


Figure 2. Projected Energy Use - MMBTU (2019-2028)

Given the weakened building codes adopted at the state level, it is in the interests of the city and its residents to adopt stronger building codes (e.g. Appendix CC of the IECC) that enforce a higher standard of safety and adequately prepare the city for climate change impacts.

4. Equity and Resilience

One major social consequence of energy efficient building codes is to reduce the burden of energy costs for low-income households. Energy use and costs are known to impact affordability for low-income families. Consider that Americans currently spend over $200 million annually on energy bills. The US Department of Housing and Urban Development found that low-income households face a utility bill burden that is four times larger than that of other households, who pay (on average) 4% of their income on utilities.

High utility costs force households to make dire choices between heating and cooling and other life necessities, such as health care, food and medicine. The US Department of Agriculture found that low-income households experience very low food security during heating and cooling seasons when energy bills are very high. This leads to a measurable impact on public health. A pediatric study in Boston, MA found an increase in extremely low-weight children (between 6-24 months old) in the 3 months after the coldest months relative to the rest of the year. Families are forced to choose between heat in the coldest months and food which affects children's ability to grow.

Furthermore, high utility costs are the second leading cause of homelessness in the US. For example, in the city of St. Paul, MN, 26% of evictions were due to utility cut offs. Finally, when families are

unable to pay their utility bills, they are forced to use unsafe heating sources like ovens and burners which are fire hazards.

One way of reducing the energy burden for low-income residents is to start updating building codes to require cheaper and more efficient energy provision for residents and businesses. Efficient buildings are cooler in the summer even without air conditioning or other cooling technologies. In doing so, Gary will prepare for tomorrow's changed climate while also combatting existing inequities of the energy burden on its residents, many of whom are or will otherwise be forced to choose between cooling technologies and food, health care or medicine. By making buildings more efficient and effectively reducing utility costs, especially for low-income residents, Gary can also make progress to reducing homelessness in Indiana, which was up 4.1% in 2019.

5. Challenges: Urban Blight in Gary

a. Background

Urban blight is the prevalence of substandard housing (residential spaces that do not meet health and safety requirements), abandoned and decrepit buildings in a city that has experienced a large-scale population decrease as Gary, IN experienced post-industrialization and after the crash of the steel industry. Gary, IN has lost over half of its population (178,000) since 1960. Some businesses have moved out or shut down. Today the city has thousands of neglected or abandoned buildings.

The Gary-Harris Initiative (a partnership of the University of Chicago's Harris School of Public policy and the City of Gary) was formed to update data on how many blighted buildings there were, the condition they were in, their location, etc. With 200 volunteers, the initiative was able to survey 58,235 properties and over 2000 acres across the city and to identify target areas for improvement, deconstruction or demolition as well as to understand the geographic concentration of blighted buildings which helps focus the city's efforts on specific areas where buildings need to be boarded up.

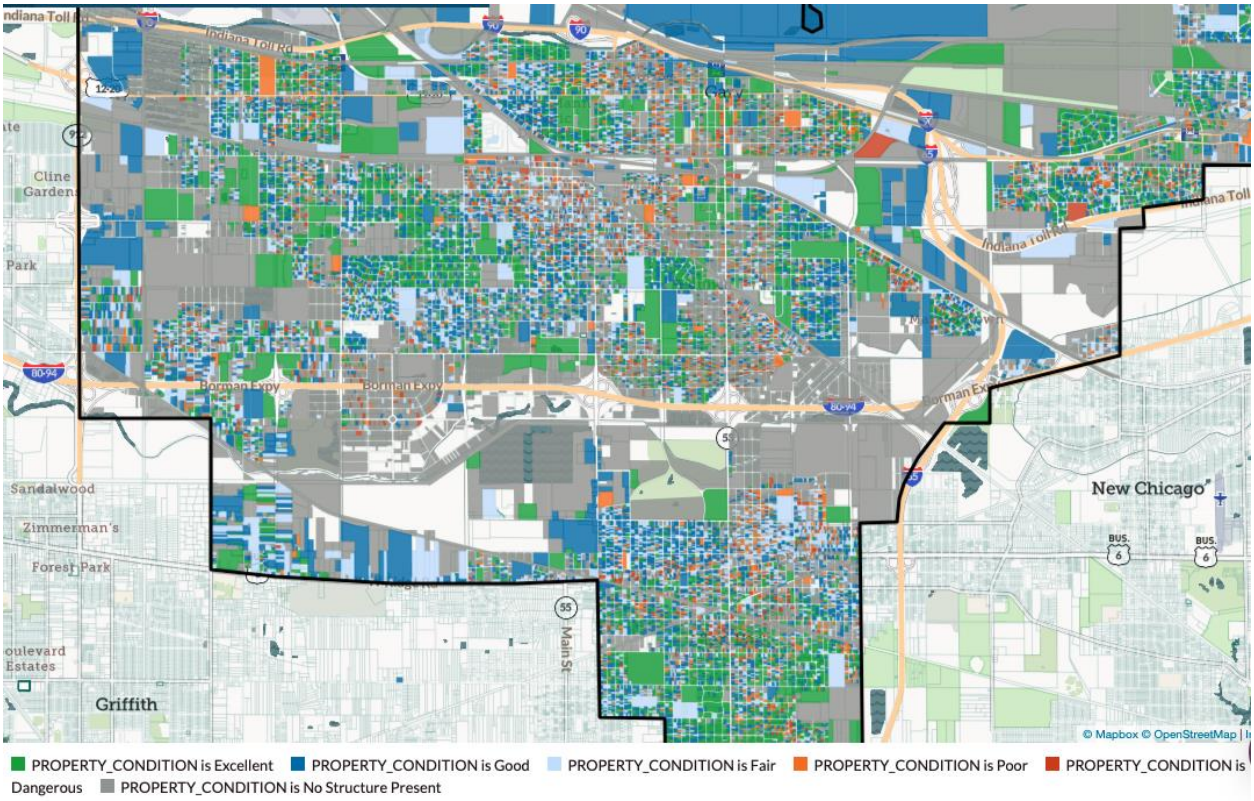


Figure: Map showing property conditions of blighted buildings in Gary, IN. Source: https://gary-redevelopment.landgrid.com/m/gary-parcel-survey-property-condition#b=none&t=property&p=/us/in/lake/calumet/22367

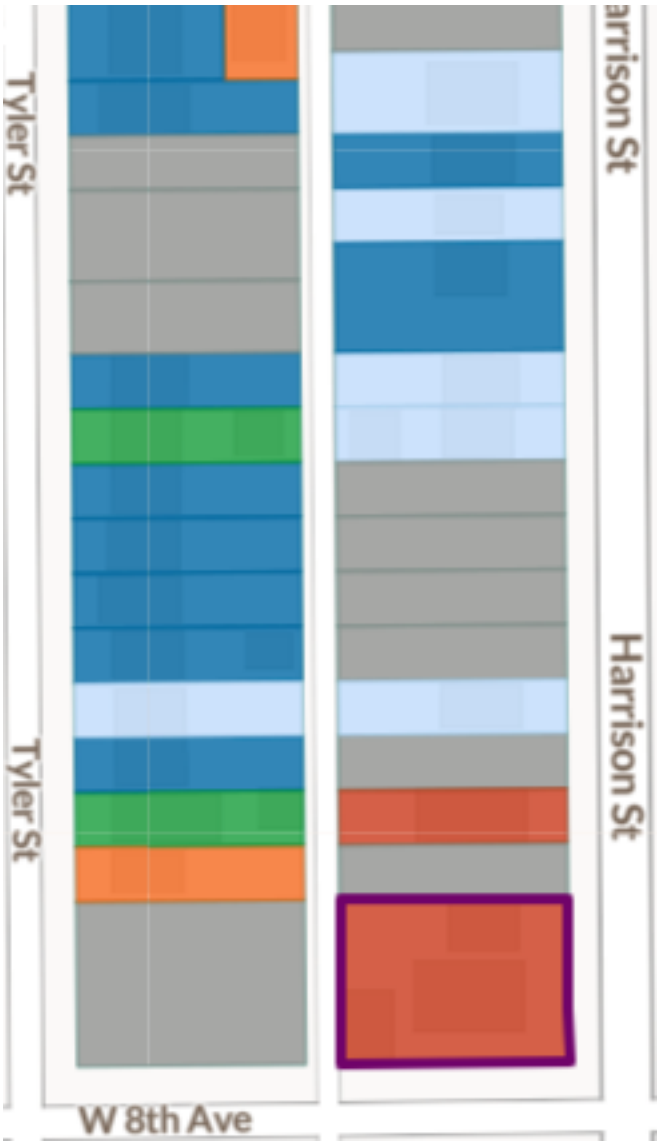
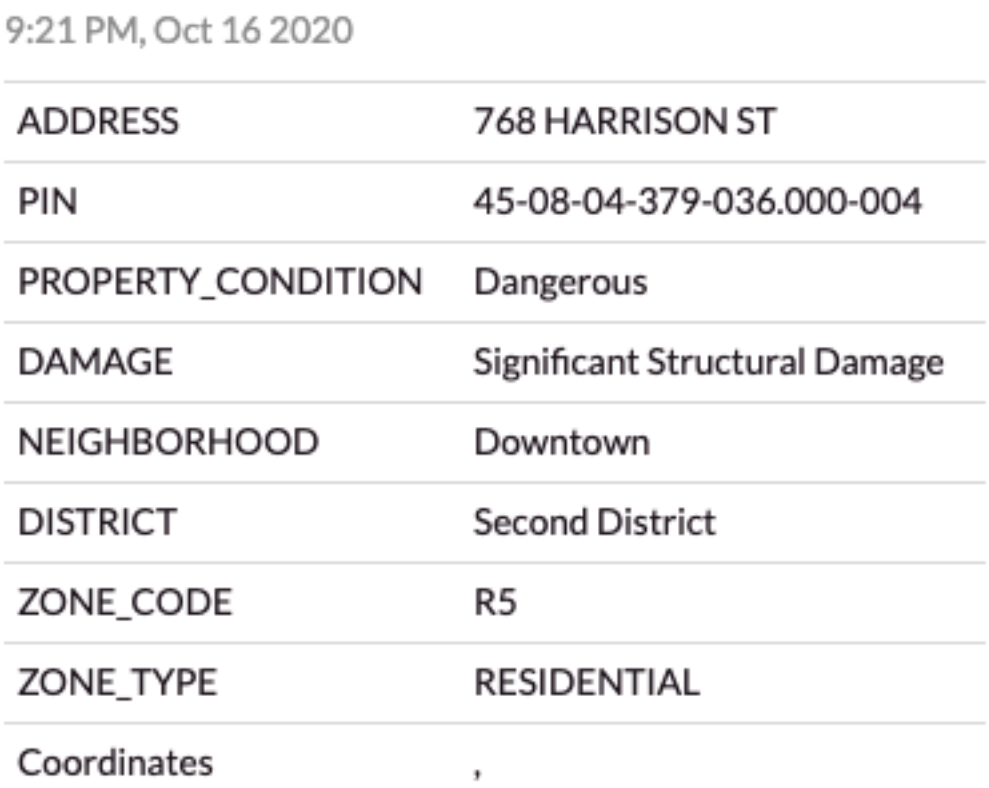


Figure: Image of individual property condition at intersection of Harrison St. and W 8th Avenue. Source: https://gary-redevelopment.landgrid.com/m/gary-parcel-survey-property-condition#b=none&t=property&p=/us/in/lake/calumet/22367



9:21 PM, Oct 16 2020

ADDRESS	768 HARRISON ST
PIN	45-08-04-379-036.000-004
PROPERTY_CONDITION	Dangerous
DAMAGE	Significant Structural Damage
NEIGHBORHOOD	Downtown
DISTRICT	Second District
ZONE_CODE	R5
ZONE_TYPE	RESIDENTIAL
Coordinates	,

Figure: Classification and description of property located at 768 Harrison St. (shown in figure above).

b. Reasons and Impacts

One reason for urban blight is the lack of strictly enforced municipal building codes and harsh penalties for violations of such codes to deter property owners from neglecting their properties. As Mayor Freeman-Wilson stated in 2015: "There is an opportunity to look at ordinances and even state statutes that have an impact on how property is handled by property owners, how it's disposed of, and how you are able to hold owners accountable."

Blight is both an economic and public health and safety issue. It is an economic crime because it causes municipalities to lose a significant amount of property tax and lower property values throughout the neighborhoods in which they are located. Importantly, urban blight can drive a cycle of disinvestment where the presence of blighted buildings inhibits or justifies the lack of future investment. This can lead to further population loss and more blighted buildings, as well as losses in economic and tax bases to support the local economy and government.

More importantly, blight is a public health issue for residents with substandard or inadequate housing disproportionately and negatively impacting poor and low-income individuals, people of color, and people with disabilities and chronic medical conditions. For example, poor children living in dilapidated urban housing exhibit dangerously high blood lead levels that hinder their development and hurt their health (Bashir 2002). As a result, the Centers for Disease Control and Prevention have identified housing as a key determinant of health.

A study from Columbia University Mailman School of Public Health found that addressing urban blight also increases resident's physical safety. Neighborhoods that experienced a blight cleanup were found to exhibit at least a 9% decrease in crimes that often take place in vacant lots like drug trade, gun assaults, and robbery. The poorest and most violent areas of Philadelphia were also the most littered areas of the city and small changes like trash removal or a new lawn was found to be an effective and simple intervention for gun violence, crime and fear.

The following table from a study on the public health impacts of urban blight details the variety of impacts that result from substandard and abandoned homes on individual residents and neighborhoods as a whole.

Impact of Blight on Health

Conditions	Health impacts and outcomes
Living in substandard housing	
General household disrepair (e.g., broken windows, pests, leaks) Substandard conditions and/or foreclosed homes	Psychological behavior dysfunctions (Bashir 2002; Burdette, Hill, and Hale 2011) Lower literacy scores for pre-K children, higher risks of child maltreatment, residential instability, and elevated blood lead levels (Coulton, Fischer, et al. 2016)
Cold and damp interiors	Asthma, aches and pains, "nerves," diarrhea, headaches, and fever. Children in particular are affected. (Krieger et al. 2000; Rauh, Chew, and Garfinkel 2002; Shaw 2004)
Cockroach and rodent infestation	Asthma (Rauh, Chew, and Garfinkel 2002; Sharfstein et al. 2001)
Lead paint and pipes	Neurological damage and impaired development, reduced IQ, negative cognitive and behavioral effects, (e.g., hyperactivity, increased aggression, learning disabilities, and behavioral problems) (Bashir 2002; Sharfstein et al. 2001; Shaw 2004)
Incorrect installation of heating and cooking appliances, poor ventilation, and the use of cooking stoves for heating	Exposure to carbon monoxide can cause headaches, nausea, dizziness, and convulsions; in higher doses, it can be fatal (Shaw 2004)
Radon (radioactive gas)	Cancer (Shaw 2004)
Noncompliant with Americans with Disabilities Act design or construction elements (e.g., stairs and doorways)	Exclude or enhance the ability of a person with disabilities to participate in the community (US Department of Health and Human Services 2009)
Living near vacant homes, abandoned buildings, and vacant lots	
Substandard housing and/or foreclosed homes Vacant lots and abandoned buildings	Lower literacy scopes for pre-K children (Coulton, Fischer, et al. 2016) Violence, higher rates of chronic illness, stunted brain and physical development in children, mass retreat into unhealthy eating and exercise habits, breakdown of social networks and capital (Branas, Rubin, and Guo 2012; Garvin, Cannuscio, and Branas 2013; Morrissey 2016)
Boarded-up housing	Sexually transmitted diseases (e.g., gonorrhea), premature mortality, diabetes, homicide, and suicide (Cohen et al. 2003)

Source:
https://www.urban.org/sites/default/files/publication/89491/2017.04.03_urban_blight_and_public_health_vprn_report_finalized.pdf

It is clear that urban blight has significant impacts on residents of neighborhoods in which blighted buildings are located. Some of these impacts include stunted development of children, increased violence, and suicide.

c. Recommendations

With existing data, it is now possible to both understand the scope of blight in Gary and to strategize effectively to deal with the different types of blighted structures. Blighted structures are classified according to property condition from "Excellent" to "Dangerous" and "No Structure Present". In order to effectively eliminate blight in communities, we will need a variety of strategies that are flexible and depend on individual property condition, as well as the community's needs and opportunities. Reclaiming a vacant lot in Detroit is very different than reclaiming a vacant lot in Phoenix or Gary, despite the shared nation-wide factors that led to their vacancy. Furthermore, while the ideal option is to return a vacant building bag to its previous use as a home-owned residence or business, this is not always possible. Local factors like a weak housing market, tight credit, and population loss may call for other solutions like demolition or the conversion of the site to an alternative use like a solar farm. The condition of the property itself will also dictate the possible options or strategies available for blight management and elimination. While some (like "Dangerous") properties may need to be demolished, others may be eligible for deconstruction or improvement. Furthermore, some strategies may be preventative (like increased code enforcement or foreclosure prevention programs) while other strategies facilitate reclamation and the conversion of these properties to productive use, e.g., vacant lot greening. Yet other strategies focus on financial assistance for homeowners and incentives for homebuyers, e.g., Pay for success (PFS) programs. Nonetheless, the common aim of all these strategies is the same: to improve the quality of life for the remaining residents.

i. Improvement

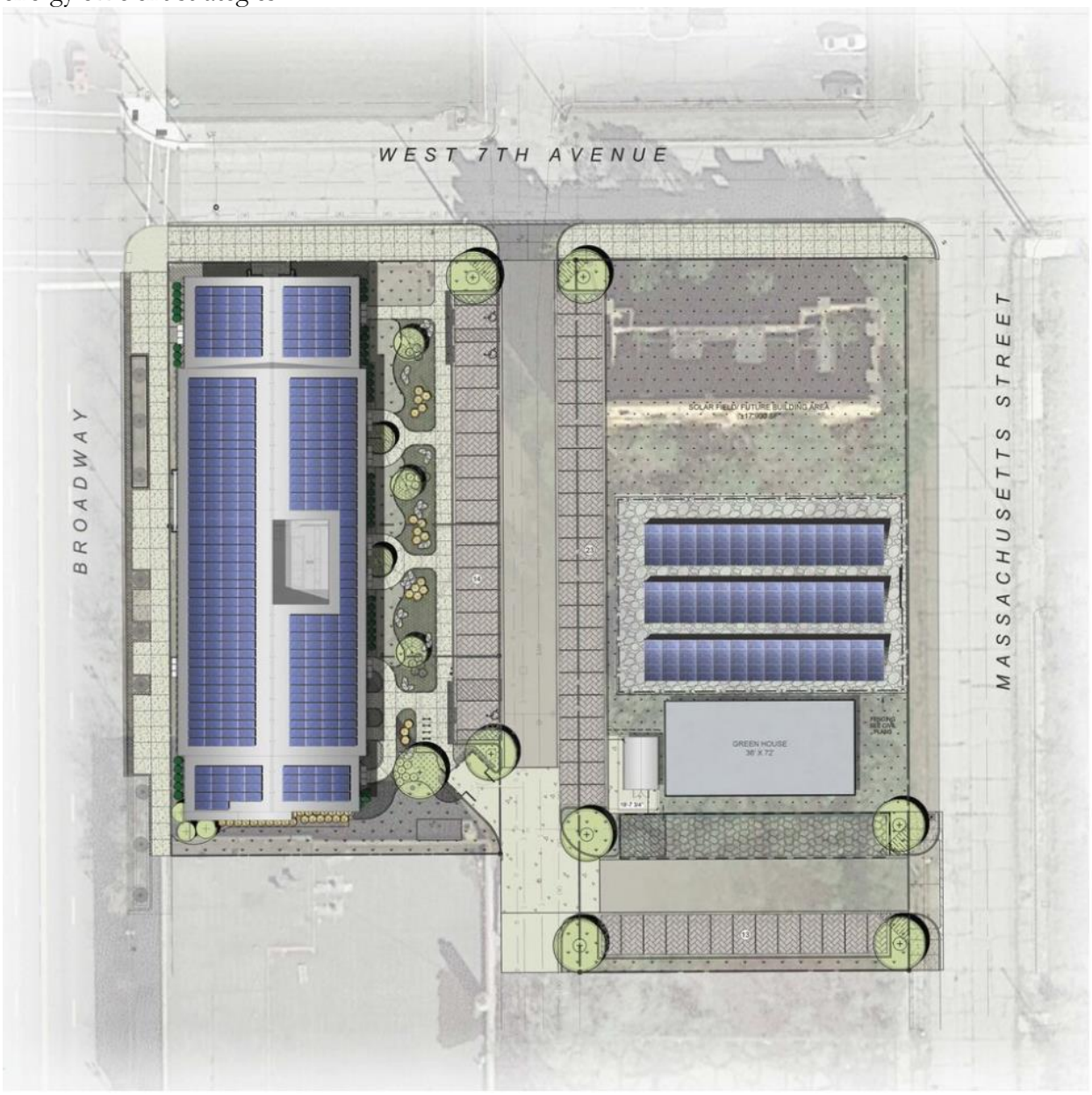
Vacant buildings can be full of promise. While some buildings may be beyond repair, others are habitable or eligible for improvement and renovation efforts to rebuild their human and economic value. In strong or emerging markets, there is sufficient incentive for private investors to purchase, rehabilitate and resell formerly vacant properties. Alternatively, non-profit organizations of public subsidies may partner with private sector groups to Similarly, many strategies to reoccupy vacant homes relies on an influx of owners or renters who come for employment opportunities and, either by necessity or desire, repair the home. Commercial revitalization will also attract and retain residents. For these properties, a primary goal should be to renovate them to be electrification-ready, energy efficient, and to possibly generate part or all of their own energy. For example, a vacant lot in downtown Gary, IN is being turned into an environmentally-friendly affordable housing complex called Broadway Lofts:

Source: Google Streetview

Source: Farr Associates

This building is envisioned as a transit-oriented mixed-use development that will have a Women, Infants and Children (WIC) clinic for Northwest Indiana Community Action on the ground floor and 38 apartment units above. Importantly, the site will also have a transportation hub with connections to the bus rapid transit network, a bike share and car share as well as a fresh-produce greenhouse. Furthermore, this building is being planned to achieve net zero energy with a

combination of on-site renewable energy source (solar panels) and reduced energy use through energy efficient strategies.



Source: Farr Associates

Source: Farr Associates

These strategies, like air-tight construction and high-performance windows, will qualify the building for Passive House (PHIUS+) certification. Taken together, Broadway Lofts improves quality of life and reduces cost of living for low-income residents. This project is financed by and part of Indiana's Moving Forward 3.0 initiative which was first started by the Indiana Housing and Community Development Authority. In partnership with developers (Miller Valentine Group) and designers (Farr Associates), Broadway Lofts reimagines affordable housing and serves as an excellent model for other rehabilitation and redevelopment projects on vacant lots.

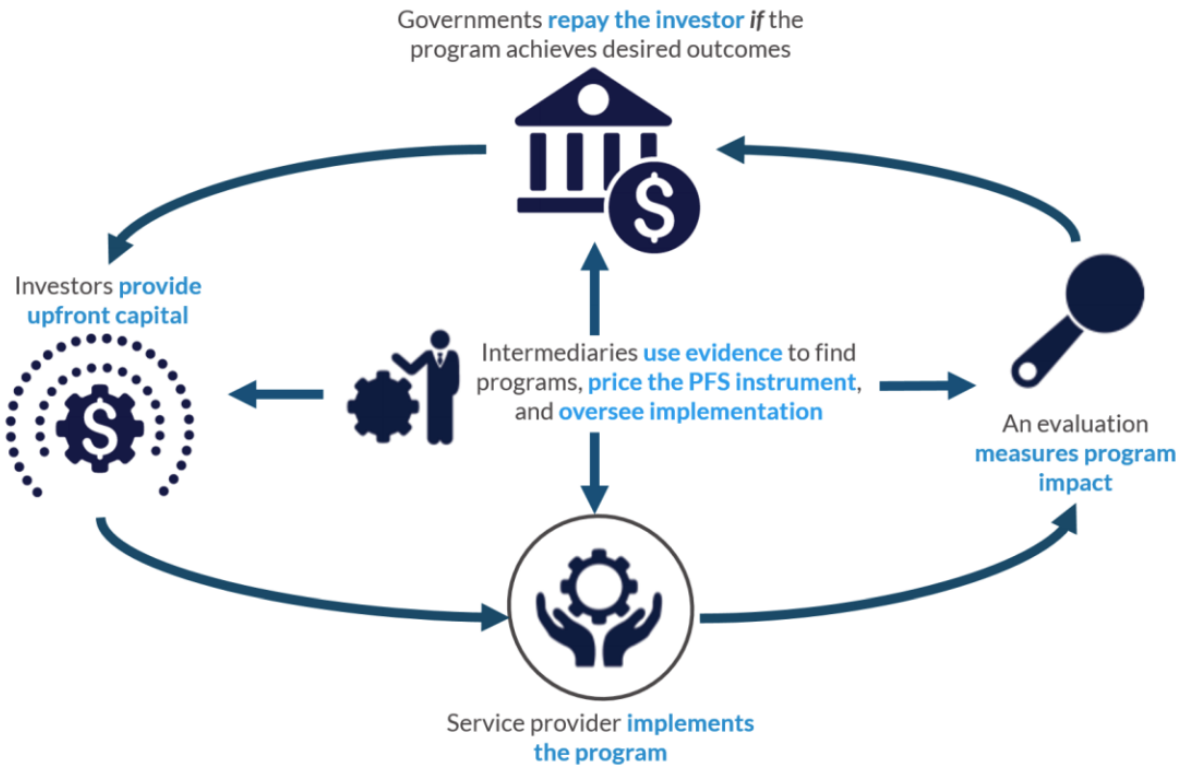
One problem for home-owners is that they cannot afford to make the repairs needed. We recommend that the City partners with local lenders to make money available for homeowners to make necessary repairs and updates in energy efficiency, prioritizing those updates which:

(1) target critical health/safety concerns, especially as it pertains to air quality, e.g. ventilation for asthmatic residents,
(2) can ameliorate the vulnerability of a property to flooding and/or extreme heat (the greatest projected climate impacts in this area) and
(3) target properties belonging to low-income and multi-family residences so as to maximize the impact of the repairs and climate resilience

For properties whose cost of rehabilitation exceed its expected market value after rehabilitation, the property can be repurposed for community-oriented services like a community garden, community solar project, etc. We especially encourage the repurposing of vacant lots for community solar farms which can help reduce the energy use, and utilities, of the collective neighborhood or community as well as hold potential for generating revenue by selling excess power generated to either a utility company or other regional energy consumers.

Finally, we recommend exploring the potential of Pay For Success (PFS) programs for addressing urban blight in Gary when rehabilitation/redevelopment poses a challenge of high up-front costs and risk. PFS is a financing program where investors provide the initial capital for nonprofit service-providers to carry out a program and governments only pay for a program when it achieves desired results.

Pay for Success Process



Source:
https://www.urban.org/sites/default/files/publication/100464/pfs_and_blighted_properties_0.pdf

With respect to vacant and dilapidated buildings, access to this sort of initial capital may be worth the cost for the city. While a city may only have funds to pay for 20% of the cost to rehabilitate its vacant properties, investor capital can be used to provide some of the shortfall and extend the repayment over time. More information can be found at:
https://www.urban.org/sites/default/files/publication/100464/pfs_and_blighted_properties_0.pdf

If this financing method is a viable option for Gary, IN for addressing urban blight, then the rehabilitation or redevelopment of properties to include on-site renewable energy generation like solar panels which could provide a source of revenue to pay back the initial capital and interest upon completion. One advantage of this sort of program is it delays payment when addressing a problem, like urban blight, outstrips available funds. It also mitigates risk because the payment is conditional on the measurable success of the program or well-defined outcomes and goals.

This form of financing may become more needed as federal government funding to struggling homeowners, for neighborhood stabilization, and demolition programs (e.g., Hardest Hit Fund) were scheduled to sunset in 2020. Converting eligible buildings or vacant lots into climate friendly redevelopment, like the Broadway Lofts, may be the type of project for which this type of financing is appropriate given projected returns on investment. This is especially because blighted buildings and properties can incur significant costs for cities. For example, Immergluck (2015) estimate that the City of Atlanta incurred between $1.6-$2.6 million dollars in direct service costs and lost $2.7 million in lost property tax revenue because of declining property value. So, the short term benefits

of addressing blight and the long-term potential benefits (cost-saving, loss prevention, and increased revenue) of climate-friendly redevelopment may be substantial enough to justify the costs involved.

j. Deconstruction

Deconstruction is an excellent way to convert the materials generated in demolition projects from wastes to resources. Deconstruction is the disassembly of a building or structure in order to recover materials that still have economic value. Materials salvaged from deconstructing a building can either be sold as is or recycled. The practice also creates more jobs than traditional demolition methods. The Delta Institute's assessed market potential for deconstruction projects in Gary is expected to be between $3-7 million. Piloting deconstruction has been a success in the City on a small scale. While deconstructing dilapidated tax delinquent properties remains a legal conundrum, the city possesses many properties that would be appropriate for deconstruction.

k. Demolition

Some severely dilapidated and vacant buildings may still require demolition. Demolition creates massive amounts of waste; according to the US EPA, it contributes to over 90% of the largest component of all landfilled waste, construction and demolition (C&D) debris. In Gary, demolition is largely done to eliminate extremely blighted, derelict buildings.

Figure: Demolition of blighted building on Broadway St. in Gary, IN on November 5, 2020. Source: https://www.chicagotribune.com/suburbs/post-tribune/ct-ptb-gary-downtown-demolition-st-1107-20201106-fsap77u64zfzhkdfehmbq2ypry-story.html

However, increasing numbers of buildings in stable condition are torn down to make room for newer, more modern construction. Preferencing new construction from the ground up, instead of altering existing infrastructure to suit new needs, stimulates the demand for new construction materials, which puts stress on the supply of natural resources required for their manufacture. Minimizing the amount of material sent to landfills from a demolition project and minimizing the demand for primary materials helps conserve the natural resources for which there is a growing demand. Diverting C&D waste from landfills by reusing or recycling these materials conserves resources (both materials and space) and can create economic opportunities within the city.

Existing municipal code prescribes a demolition recycling plan:

- **Sec. 105-111. - Demolition recycling plan.**

  Individuals, businesses or other entities, or any other applicant, upon being permitted to demolish any structure, be it residential, business or otherwise or retaining any renewal thereof, shall provide as part of its submission a plan describing how material will be managed, including reduction, reuse and recycling steps taken to reduce its waste stream.

  (Ord. No. 7703, 3-15-2005)

6. Opportunity: Building Codes as Climate Policy

a. Opportunity

Building codes are a powerful, yet often underutilized, form of climate policy whose potential can be maximized by local governments like the City of Gary. Building codes can reduce energy costs and cut major sources of pollution. For example, building codes that govern energy use, like insulation requirements, can save city residents and businesses money while also reducing emissions due to heating and cooling a building. The US Department of Energy reports that today's building energy codes have provided over 30% of saving for residents and consumers compared to energy codes from a decade ago. This effectively translates into $60 billion dollars saved by US homes and businesses. Looking forward, building energy codes are projected to save residents and commercial businesses another $126 billion in energy costs by 2040. Crucially, updates in building energy codes can reduce energy use and avoid GHG emissions that are equivalent to 245 large coal-fired plants.

State and local governments can maximize such benefits for their residents and businesses by updating their energy codes to reflect a commitment to supporting an electrified and decarbonized future. For example, building codes that adopt an all-electric code requirement for new construction and major retrofits can promote the move to net zero emissions by reducing emissions from gas- and oil- fired appliances. In doing so, policymakers can effectively cut consumer costs, significantly reduce harmful pollution, and promote a transition to renewable energy and electrification.

Building codes impact buildings that will be around for decades. One way to ensure that new buildings are prepared for a carbon-free future is to adopt strong building code provisions which require a higher energy efficiency threshold and support electrification by reducing costs of building (and transportation) electrification.

b. Recommendations

1. Adopt a stretch energy code (locally mandated code that is an alternative, more aggressive, compliance path to the base code and achieves higher energy efficiency, enforces a higher standard of safety and adequately prepare the city for climate change impacts, e.g., Appendix CC of the IECC. The most direct way to do so would be to adopt the unamended model 2018 or 2021 IECC code. Resources and sample policies are available here: https://www.iccsafe.org/advocacy/energy-efficiency-resources-model-policies/
2. The city of Gary can adopt a Zero Code standard for zero carbon new buildings requiring on-site or off-site renewable energy to power a building (http://zero-code.org/resources/)
3. Increase the number of environmentally certified buildings in Gary (start with city government buildings or public buildings)
4. Revise building code for new construction to include electrification-ready requirements which allow homeowners to switch appliances to run on electricity (instead of natural gas) if they prefer. This supports future electric vehicles as well.

7. Accomplishments

Residential Housing Deconstruction Pilot Project

In 2016, 12 residential properties were deconstructed during a pilot program in partnership with the Delta Institute. A set of local contractors were trained in deconstruction techniques and the City learned how to prepare bid specifications for deconstruction contracts. Three participants in the training were private contractors and one was a COG Demolitions employee. The Delta Institute conducted a city-wide assessment of properties fit for future deconstruction along with a full assessment of the market potential and barriers to deconstruction in Gary.

Decay Devils

The Decay Devils is a community organization based in Northwest Indiana whose mission is the historic building preservation and restoration. Two goals follow from this mission: (1) reinstate a sense of beauty and pride in cities where vacant and decaying historic buildings are located and (2) to create multiple revenue streams from refurbished and restored buildings to further the restoration and preservation of other historical sites.

Steel City Salvage

Steel City Salvage is a salvaged building material warehouse co-created by the Delta Institute and the City of Gary 2016. It is currently managed by the Delta Institute. Materials from the deconstruction pilot program were donated to Steel City Salvage, which also accepts donations from the public. The public interest to donate and quality of materials donated exceeds that of any other market the Delta Institute is familiar with, suggesting the potential for a large local market for salvaged materials.

Gary Church Ruins

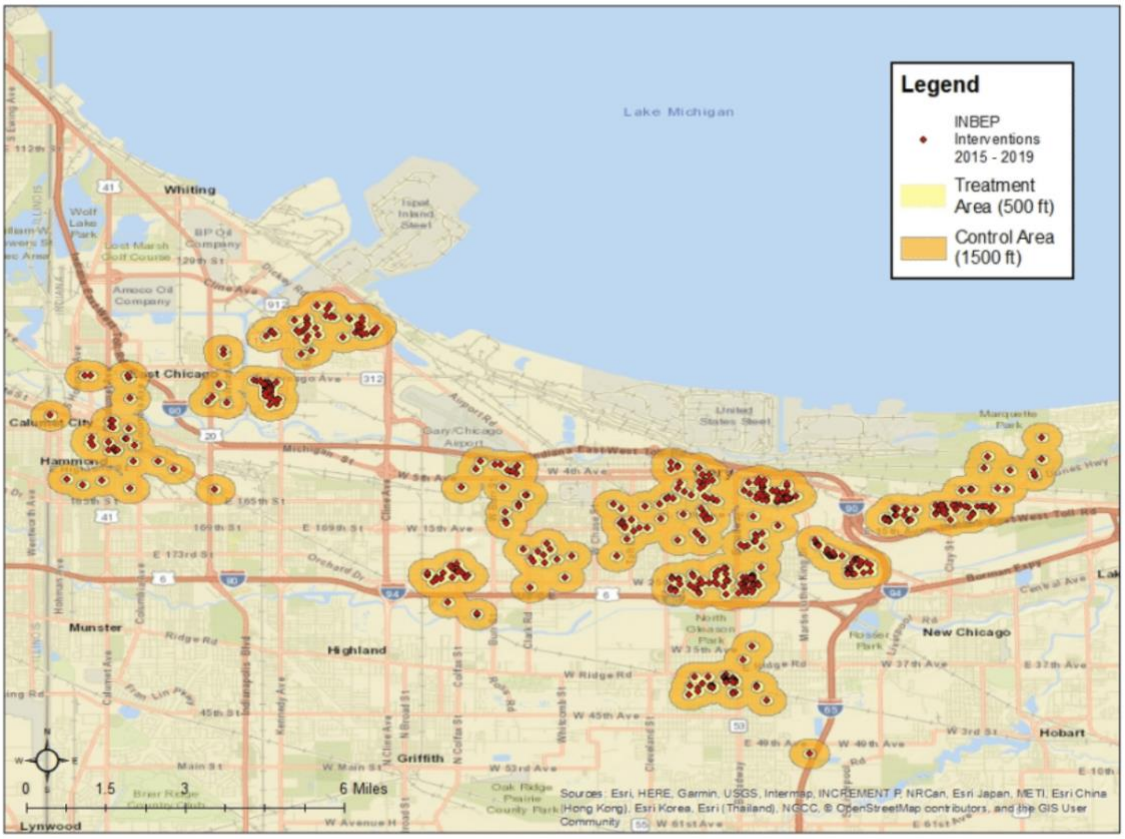
In 2017, The John S. and James L. Knight Foundation awarded the Redevelopment Comission $163,333 to implement plans for the Gary Church Ruins Garden at 577 Washington St, the site of historic Methodist Church. With this funding the City will clear rubble from the nine-story sanctuary, remove asbestos, and stabilize the vaulted pillars and limestone facade, making them structurally sound and safe for visitors. Future improvements needed to complete the project are projected to cost several million dollars. This is an ongoing project for the City.

Blight Elimination

In February 2013, the city launched a 311 website and mobile application by which residents can report property issues and request city services. There have been 6,547 311 requests in 2015 (last update). Residents can then follow up and add additional information or update the status of the property after filing a request.

Fall 2014, Gary was awarded $6.6 million for demolition through the Hardest Hit Fund Blight Elimination Program which was the largest in the state. These funds were allocated for the demolition of 379 vacant and abandoned homes. A total of 569 Indiana Blight Elimination Program (INBEP) intervention treatments were implemented in Lake County.

Map 1. Lake County INBEP Interventions Q1 2014 to Q4 2019



Source: Based on data provided by the Indiana Housing Community Development Authority, Indiana Blight Elimination Program Greening Report, January 2020.

Participation in the Hardest Hit Fund was from 2014-2019 and an impact report of the Indiana Blight Elimination Program (INBEP) was conducted for Division 1 (Lake County: East Chicago, Gary, and Hammond; Marion County: Indianapolis and Lawrence). The study found that blight elimination efforts paid off as single family home sale prices increased by +226.89% for homes within the INBEP treatment area and increased by +1662% for homes outside the INBEP area.

Table 1. Division One: Mean Single-family Home Sale Prices - Percent Change (Post INBEP Intervention treatment)

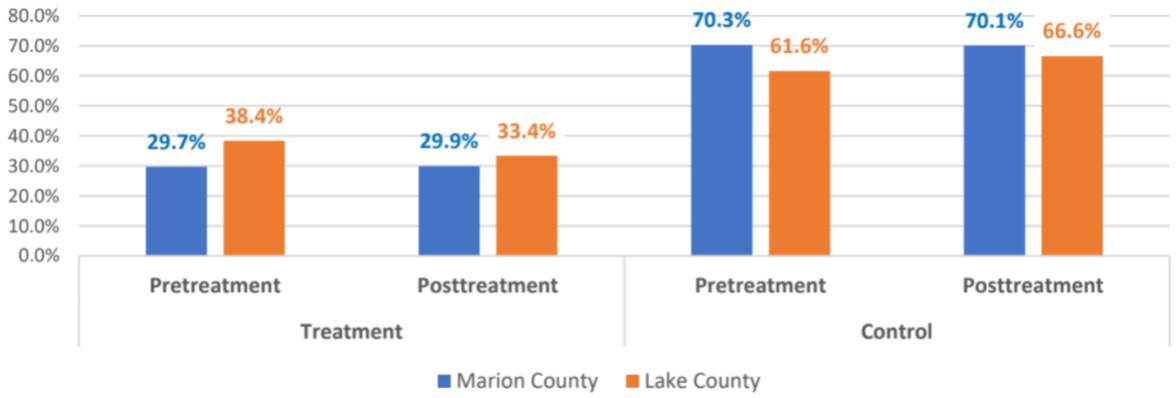
Mean Property Sale Price Division One	Mean Property Sale Price Within INBEP Intervention Treatment area	Mean Property Sale Price Outside INBEP Intervention Treatment area (Control area)
	$50,863	$68,413
Percent Overall	**Percent Change Within INBEP Intervention Treatment area**	**Percent Change Outside INBEP Intervention Treatment area (Control area)**
18.2%	226.8%	166.2%

Source: Estimations based on sales data provided by the Indiana Department of Local Government Finance, Sales Disclosure dataset (2010 to 2019), RealtyTrac ATTOM Recorder datasets (2008 to 2019) and the Indiana Housing Community Development Authority, Indiana Blight Elimination Program Greening Report, January 2020.

This demonstrates the widespread increase in property values for homes located within and outside areas that were subject to blight elimination efforts. Importantly, the trend before the implementation of INBEP was for decreased average home sale prices while the trend after the INBEP program was an upwards trajectory of home sale prices.

Another significant impact is the substantial drop in the number of foreclosures in the INBEP intervention treatment area (-53.5%) and in areas around the treatment area (-39.1%). At the county level, Lake County exhibited a 5% decrease in foreclosures after INBEP interventions were implemented:

Figure 6. Division One: Chi-Squared Analysis Outcomes by Division Pre- & Post-INBEP Intervention treatment

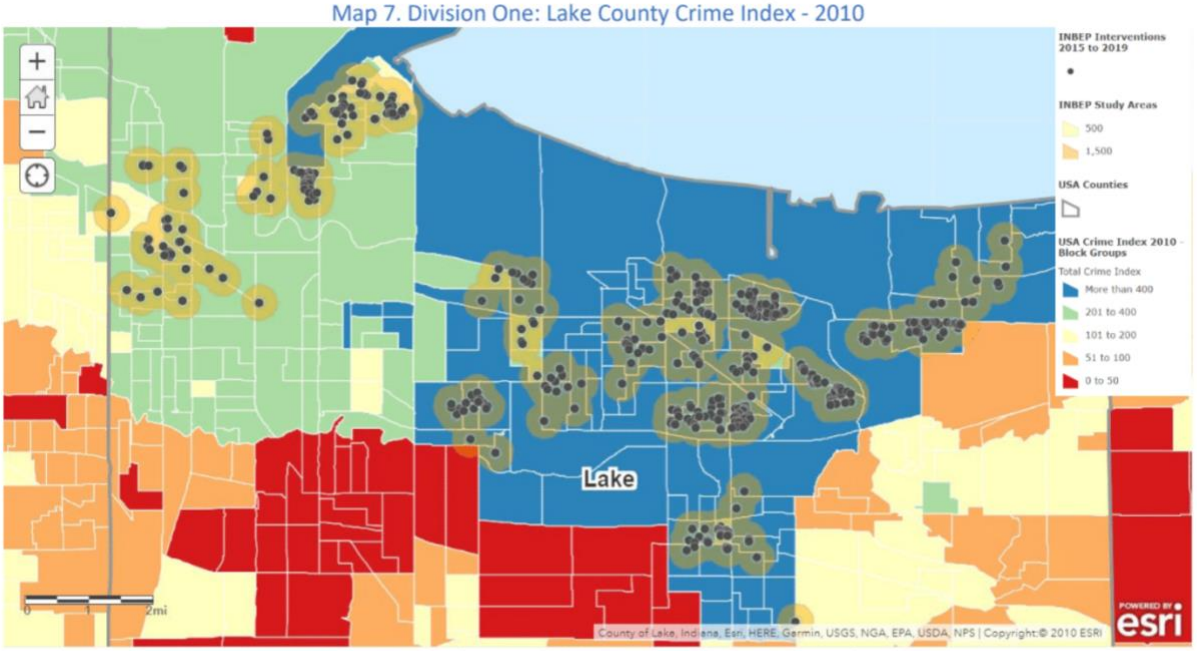


Source: Foreclosure analysis estimations based on data provided by the RealtyTrac ATTOM Data Solutions: Indiana Foreclosure and Recorder datasets, 2010 - 2019.

This is important because foreclosures because residential and commercial foreclosures are at a high risk of becoming vacant or abandoned because the costs of foreclosure are high and the property value is low. Abandoned properties place a great deal of financial stress on local governments and neighborhoods. Property owners are unlikely to pay taxes on properties that have been abandoned. Also foreclosed and abandoned buildings require a disproportionately greater amount of expenditure (code enforcement) and services (police and fire) given their propensity to be sites of arson or violence.

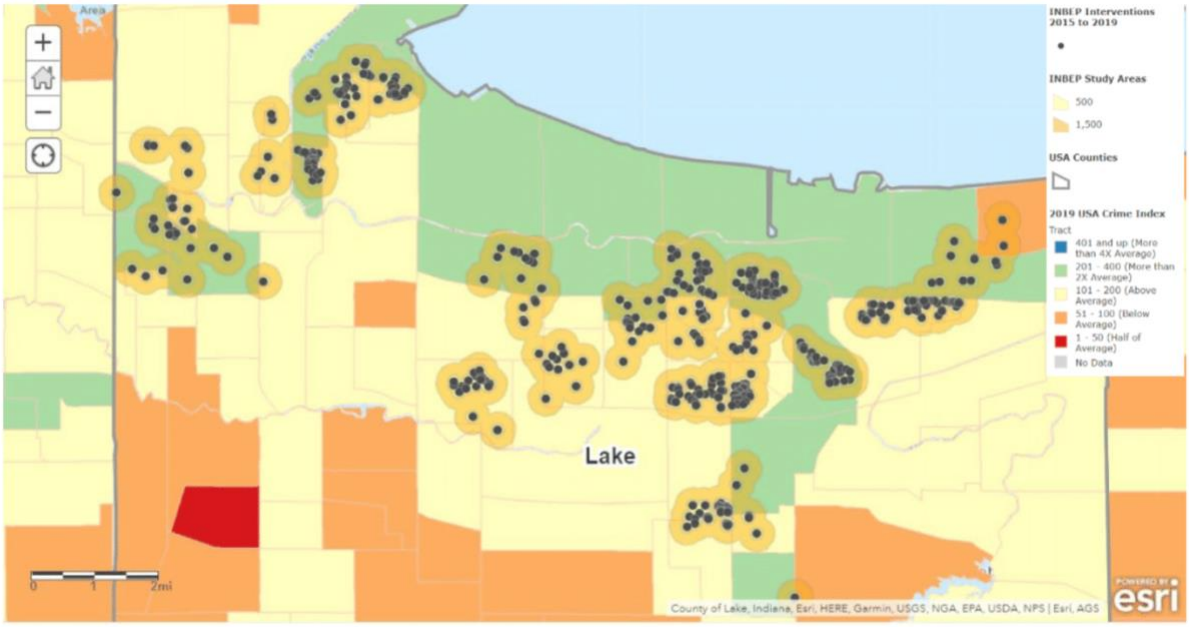
Most crucially, an examination of the Crime Risk Index (a method of analyzing crime risk geographically and across time based on reported crime incidences per census block) shows that the average crime risk score decreased in areas that were subject to the INBEP treatment intervention. See the figures below for a comparison of crime risk in Lake County between 2010 (pre-INBEP) and 2019 (post-INBEP).

Map 7. Division One: Lake County Crime Index - 2010



Source: ESRI ArcMap Online, Applied Geographic Solutions Crime Indexes, 2010.

Map 8. Division One: Lake County Crime Index - 2019



Source: ESRI ArcMap Online, Applied Geographic Solutions Crime Indexes, 2019.

As is visible from these two figures, whereas the general the Crime Index shows Gary to exhibit " More Than 4x Average" crime rate (blue color) in 2010, the same areas are reduced to either "More Than 2x Average" (green color) or just "More Than Average" (yellow color) after the INBEP interventions which is a major reduction in crime risk. It is clear that blight elimination does reduce crime risk and this is a significant public health improvement for residents.

Finally, there have been 1398 code enforcement tickets which address residents' concerns about properties and lots that are privately owned. Property owners are given 30 days to address the issue or face further penalties. Greater enforcement of existing municipal code governing buildings is a key means of holding property owners accountable. There were 307 demolitions 2015-2016. Also, based on data by the US Postal Service regarding vacant addresses (used to track undeliverable mail), the average number of vacant residential properties have decreased by 5.6%. These are all major accomplishments for the City of Gary which, for decades, has struggled with urban blight.

8. More Recommendations:

1. Increase public outreach on energy efficiency and weatherization in addition to outreach on regulations; provide outreach materials to contractors and homeowners on the benefits of energy efficiency and programs to support building upgrades. For example, for low-income homeowners, the Indiana Weatherization Assistance Program (WAP) can help homeowners make their homes more energy efficient, thus reducing their utility bills permanently. Alternatively, the city can host a "Healthy Homes" workshop to educate residents about the economic and public health advantages of improved energy efficiency, ventilation, insulation, etc.
2. Require educational training for builders to obtain licenses and improve compliance with international construction codes
3. Incentivize green building with an expedited permitting process for sustainably designed and green building projects, or propose monetary incentives for projects that include green building measures; advocate for including green building measures in eligible forms of development
4. Set building efficiency goals, aspire to upgrade a percentage of municipal buildings to achieve a green building standard such as Energy Star, LEED, Green Globes, etc. set a goal for all new municipal buildings to meet certain green building standards
5. Request and complete framework and strategy for deconstruction and building materials reuse, mentioned in the Delta Institute's Deconstruction and Reuse Guide
6. Consider a 2030 District, which is a community of private sector partners who collectively agree to take steps toward meeting certain energy, water, and emissions reductions targets, thereby improving their efficiency and softening their impact on the environment
7. Explore possibility of providing city buildings with their own energy generation sources that are local (energy storage, microgrid development) or offsite renewable power source
8. Develop, distribute, and promote a water efficiency and climate resiliency best practices guide for improved water efficiency in residential, commercial, and industrial properties.

Explore the development of an award/recognition program for residents/businesses with greatest water conservation achievements through use of the guide

9. Retrofit water appliances to be more efficient (i.e. showers, toilets, etc.)

9. Sources

https://www.chicagotribune.com/suburbs/post-tribune/ct-ptb-gary-downtown-demolition-st-1107-20201106-fsap77u64zfzhkdfehmbq2ypry-story.html
Why The Building Sector? – Architecture 2030
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http://garycounts.org/
https://www.mwalliance.org/sites/default/files/meea-research/is_the_same_code_actually_the_same_code.pdf?current=/taxonomy/term/11
http://garycityclerk.com/gary-municipal-code/code/
https://www.urban.org/sites/default/files/publication/100464/pfs_and_blighted_properties_0.pdf

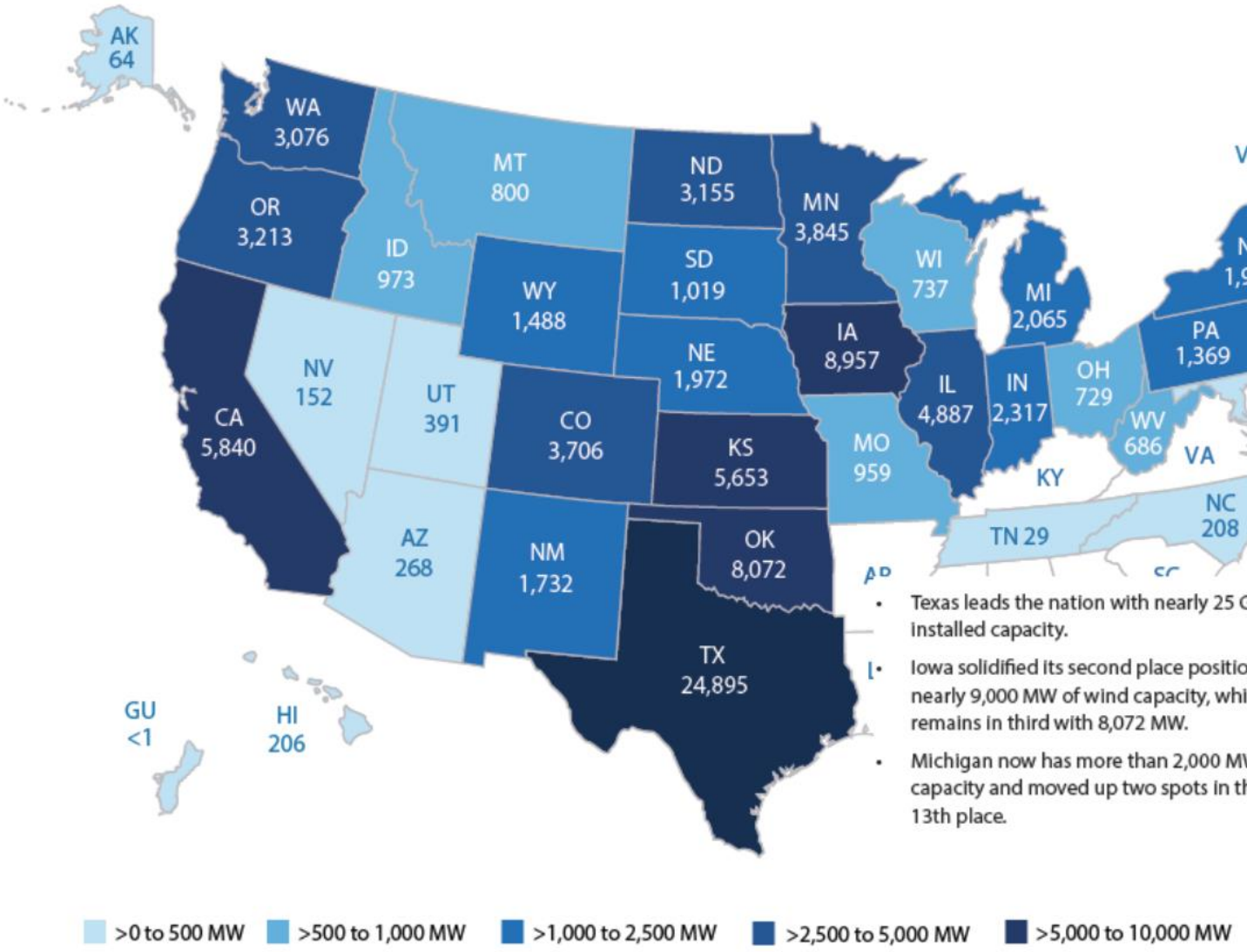
Section 5: Economic Vitality

1. Background: The Green Economy and Renewable Energy

The UNEP defines a Green Economy as an economic model which improves human well-being and social equality while simultaneously reducing environmental risks and ecological scarcities. The broader aim is development which preserves, improves, and—where needed—rebuilds natural resources and capital for the economic and public benefit of all human beings, especially low-income residents. More specifically, this aim breaks down into strategies for attracting investment and development efforts that are committed to reducing carbon emissions, improving energy efficiency, and preserving unique natural habitats and the biodiversity found therein.

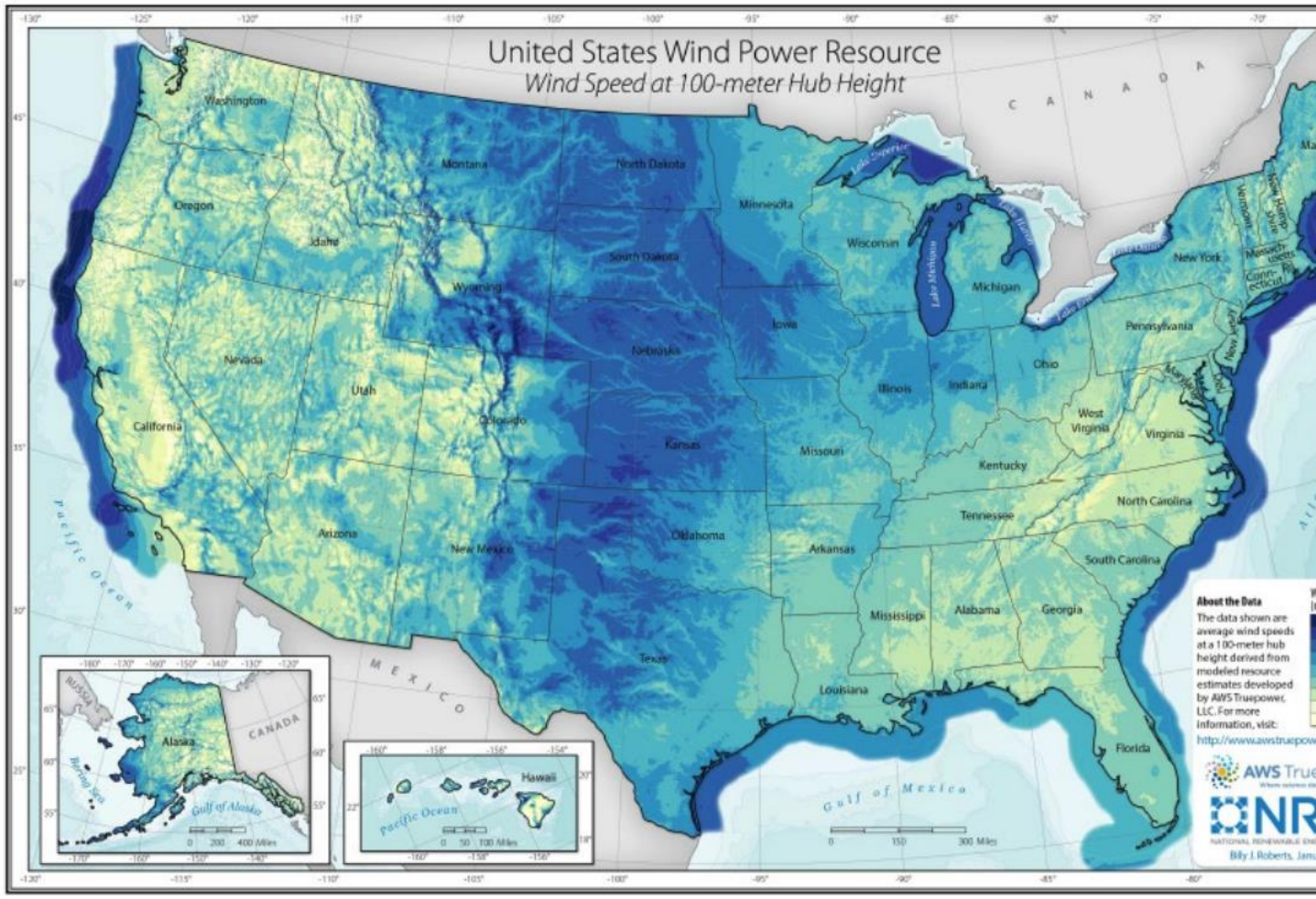
With respect to Gary, IN, there has been a huge push for economic redevelopment and revitalization in an effort to reverse the trend of declining populations, disinvestment, and abandonment. Gary is also home to some historic and valuable ecosystems like the dune and swale habitat. That will be addressed further in a later chapter, "Natural Environment". In this chapter, we will focus on renewable energy projects which hold great potential for economic development while also reducing emissions and improving energy efficiency across the city. In doing so, we hope to lay the groundwork for not just redeveloping the City of Gary, but also establishing a Green Economy which marries economic and environmental goals for the benefit of local residents and the broader NWI region.

Renewable energy sources are either inexhaustible (like geothermal energy) or constantly being resupplied (like solar power). Traditionally, advocates for renewable energy have focused on showing the indirect economic benefits of renewables rather than the direct economic benefits of renewables which are easier to quantify. Some direct benefits include job creation which can be measured by checking employment numbers at existing facilities and total national employment for the renewable energy sector. Northwest Indiana, in particular, has great potential for becoming a major solar energy provider as it currently has 25-50% more potential for solar energy development than Germany which is the current world leader in solar electricity generation. There is also significant potential for wind energy projects which, nationally, generate 39% of renewable electricity. The following figure shows wind power capacity by state as of 2019:



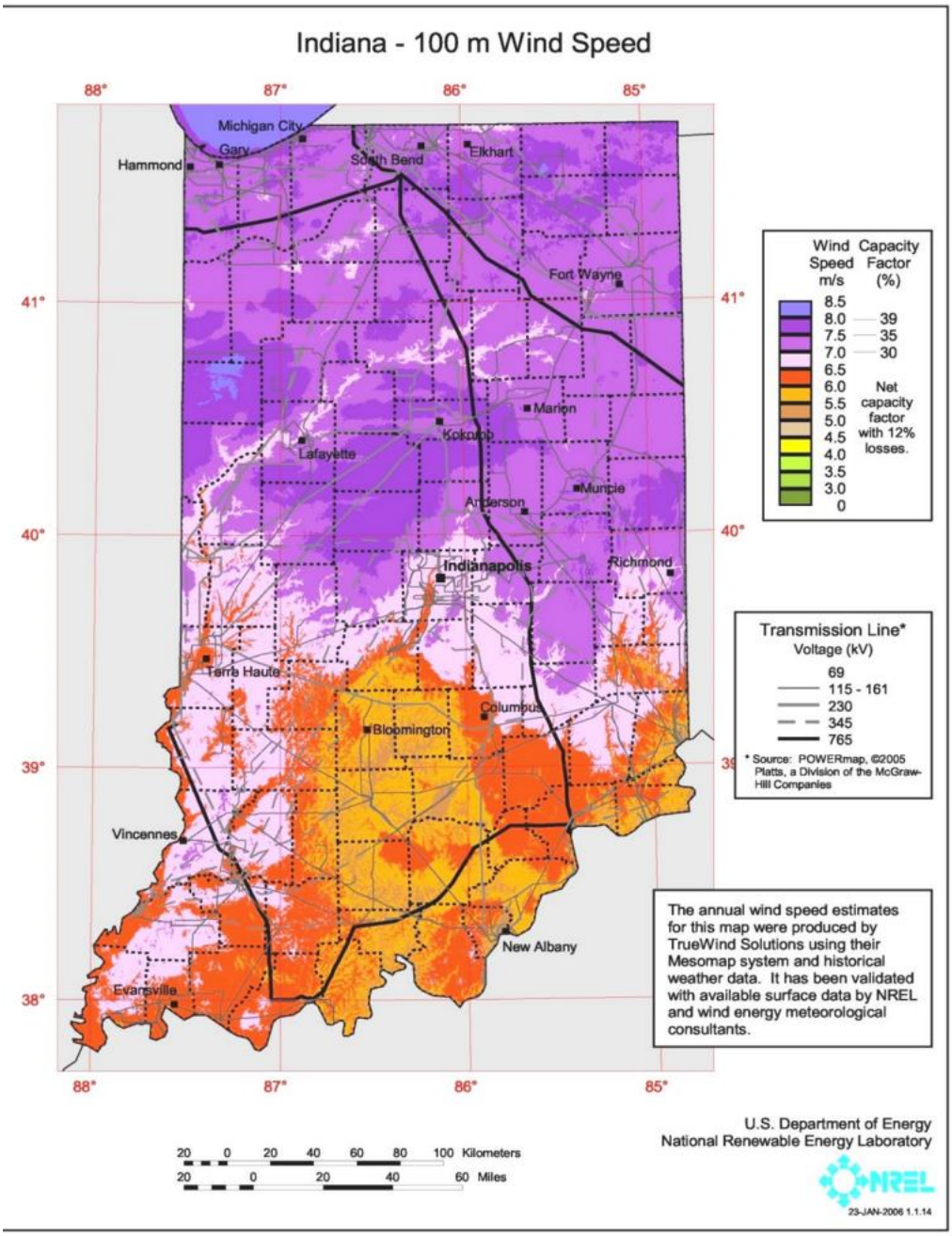
Source:
https://www.purdue.edu/discoverypark/sufg/docs/publications/2019_RenewablesReport.pdf

Indiana's location on Lake Michigan makes it an ideal location for wind energy projects given the abundance of U.S. wind resource in the Great Lakes as well as along the US coast lines:



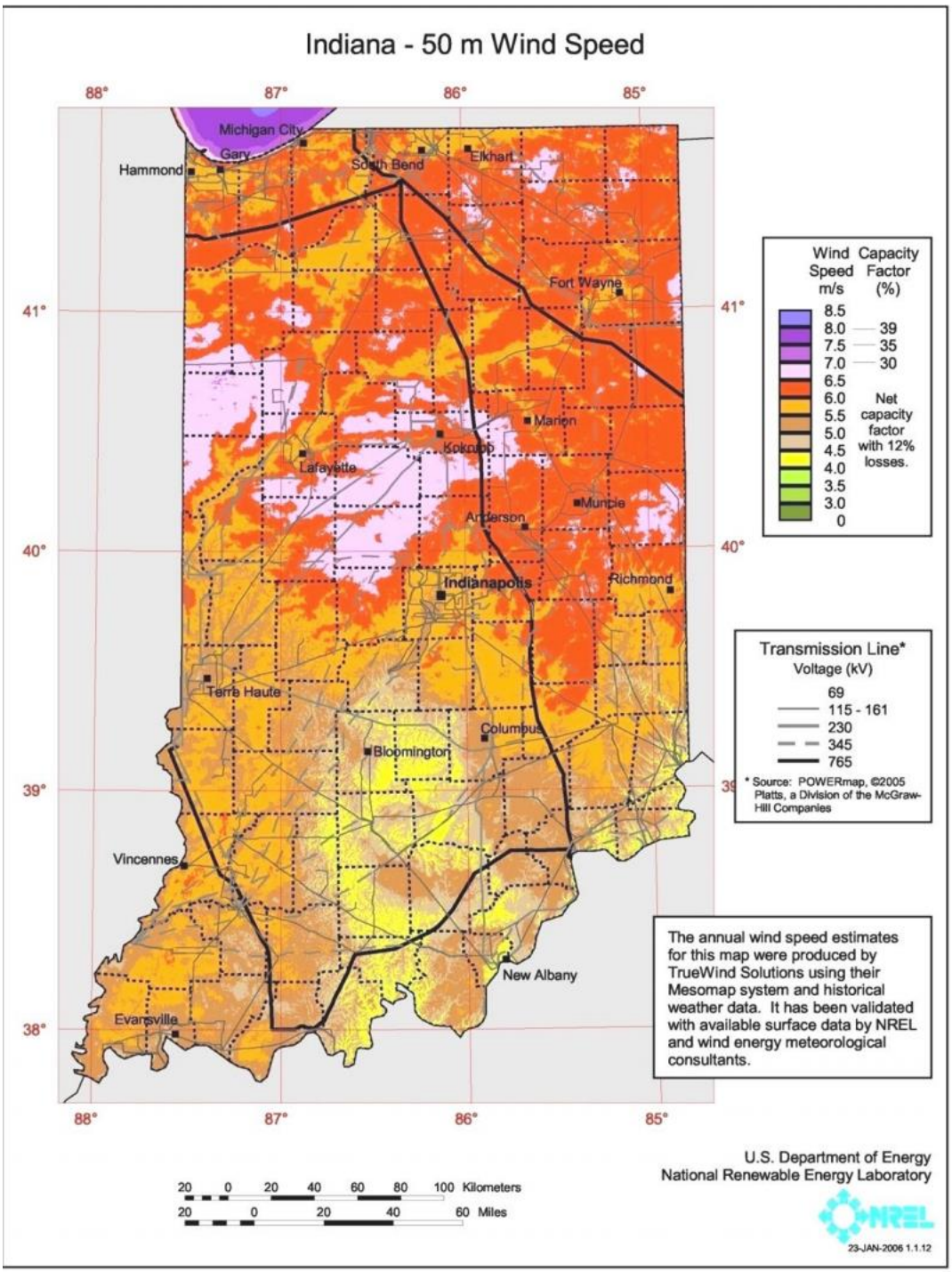
Source:
https://www.purdue.edu/discoverypark/sufg/docs/publications/2019_RenewablesReport.pdf

More specifically, the City of Gary is a site of significant wind energy resources:



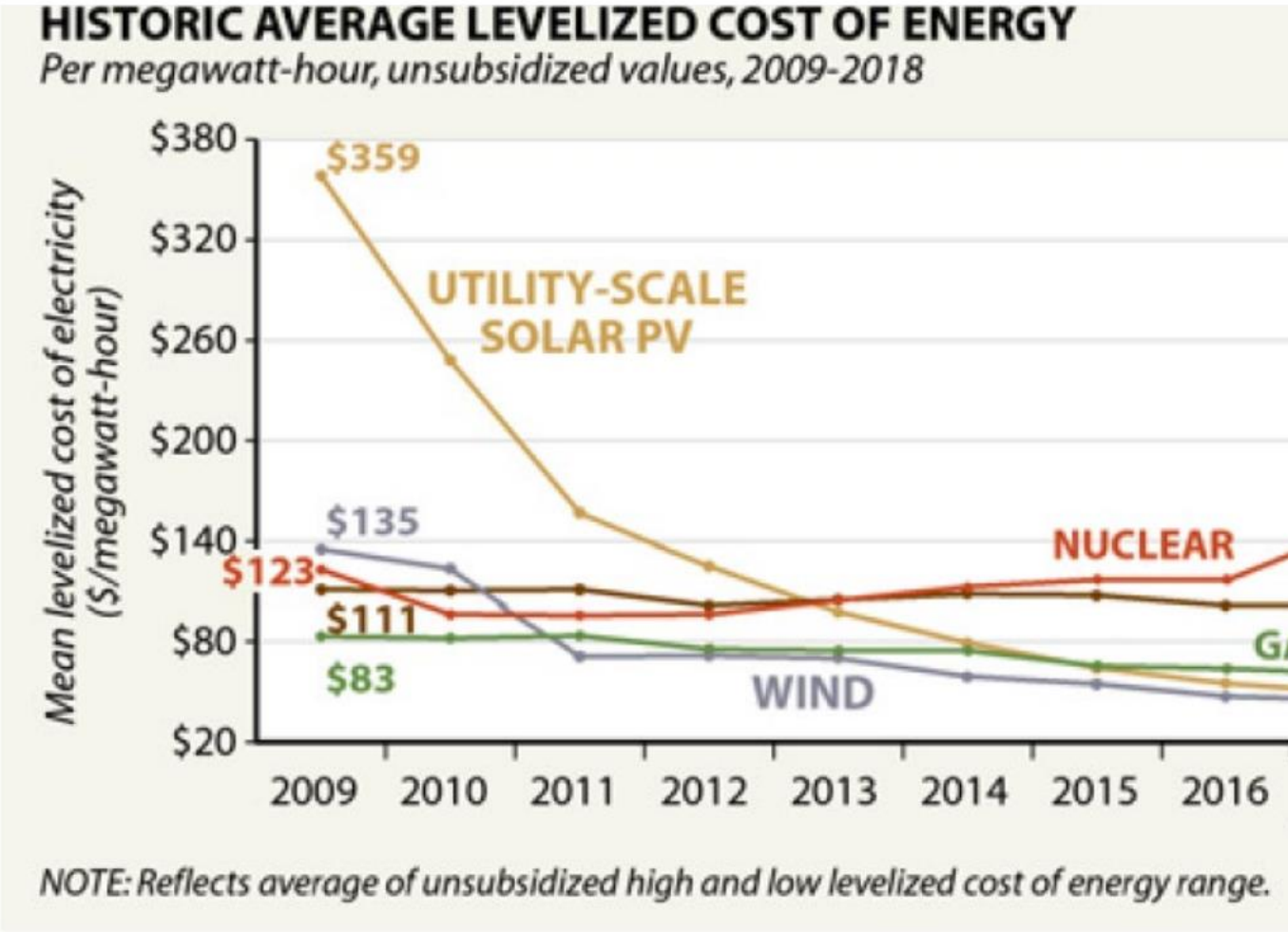
Source:
https://www.purdue.edu/discoverypark/sufg/docs/publications/2019_RenewablesReport.pdf

Being located along the Lake Michigan coastline, Gary has annual wind speeds of up to 8 m/s and Lake Michigan has wind speeds of up to 8.5 m/s at a height of 100 m. This natural resource is even more significant at 50 meters:



Source:
https://www.purdue.edu/discoverypark/sufg/docs/publications/2019_RenewablesReport.pdf

It is clear from the above map that Gary, IN has access to exceptional wind resources compared to the rest of the state, especially for wind turbines up to 100 meters. Furthermore, the price of solar and wind energy technologies has drastically decreased in the past few years making them more economically viable options:



Source:
https://www.purdue.edu/discoverypark/sufg/docs/publications/2019_RenewablesReport.pdf

In short, Northwest Indiana is well poised to become a major renewable energy site, whether that is solar or wind energy and Gary is well-situated to capitalize on the available natural resources and ensure the economic benefit of Gary residents from the regional energy transition.

2. Goals

There are 6 climate-related economic goals:

(1) Improve the energy efficiency of homes and reduce the energy-burden on low-income residents (Property)
(2) Increase local property value (Property)
(3) Attract renewable energy investment and projects to Gary, IN (Investment)
(4) Increase the local tax-base and tax revenue (Investment)
(5) Expand existing renewable energy job-training programs (Jobs)
(6) Create stable and high-paying jobs for local residents (Jobs)

Reaching these five goals will put the City of Gary on track to exemplifying a Green Economy that benefits its local residents and serves as a model for the rest of the State of Indiana.

3. Residential and Municipal Property

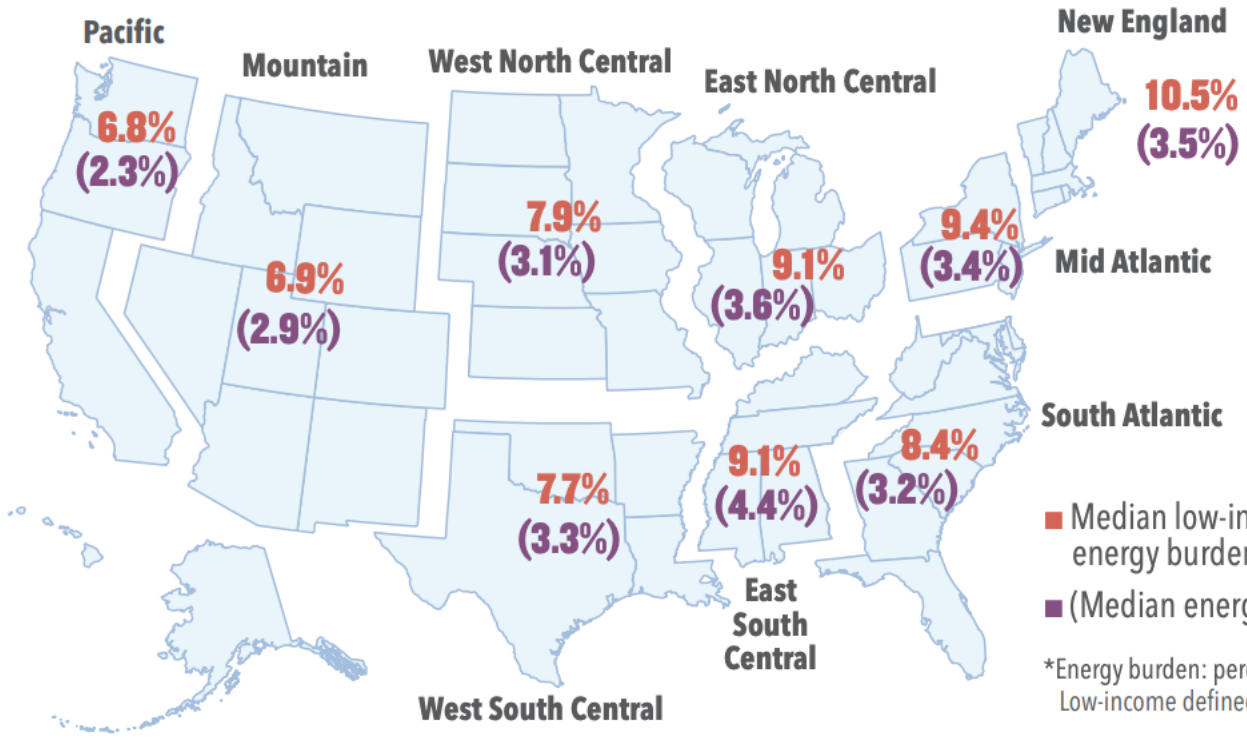
1) Energy Efficiency

In 2014, Indiana's energy efficiency standards were repealed which led to below-average state utility savings, costing residents and utilities millions of dollars. Despite adopting the 2018 International Residential Code (IRC) for residential buildings, the state substituted the 2009 IRC requirements for baseline compliance. As a result, utility companies scaled back on energy efficiency and savings per dollar have declined. Overall, IN residents pay more for utilities than residents in neighboring states like Illinois and Michigan. For example, the average resident in Gary, IN pays 8.8% more in utilities than the average resident in Detroit, MI, a comparable legacy city. Overall, Indiana has the 29th highest electricity costs and 23rd highest natural gas costs in the country. Furthermore, average electricity rate in Gary, IN (11.64 ¢/kWh) is 10.54% higher than the rest of the state of Indiana.

2) Energy Burden

Energy burden is the percentage of gross household income that is spent on energy costs. The average low-income household spends about 8.6% of the gross household income on energy, e.g., natural gas, electricity, etc. This is three times higher than non-low-income households which only expend about 3% of their gross household income. Metro areas in the Midwest, like Gary, and Southeast have the highest median energy burden across all groups (not just low-income groups) and African-American and multi-family households are the worst-off in these areas.

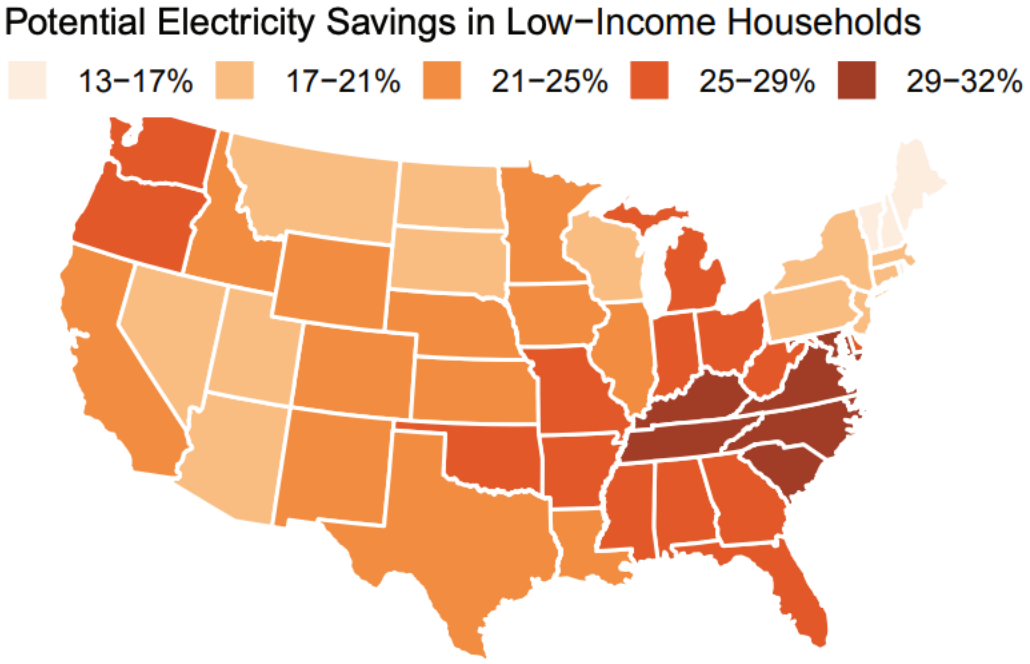
A high energy burden is considered to be above 6% with a severe energy burden being above 10%. The energy burden in the City of Gary is 9.1% which is above the average low-income energy burden (8.1%).



Source: https://www.aceee.org/sites/default/files/pdfs/ACEEE-01%20Energy%20Burden%20-%20National.pdf

This is exacerbated by a number of factors including: above average and high poverty rates—31% in Gary compared to 12% state-wide—, below average energy efficiency and utilities savings, and above average electric rates.

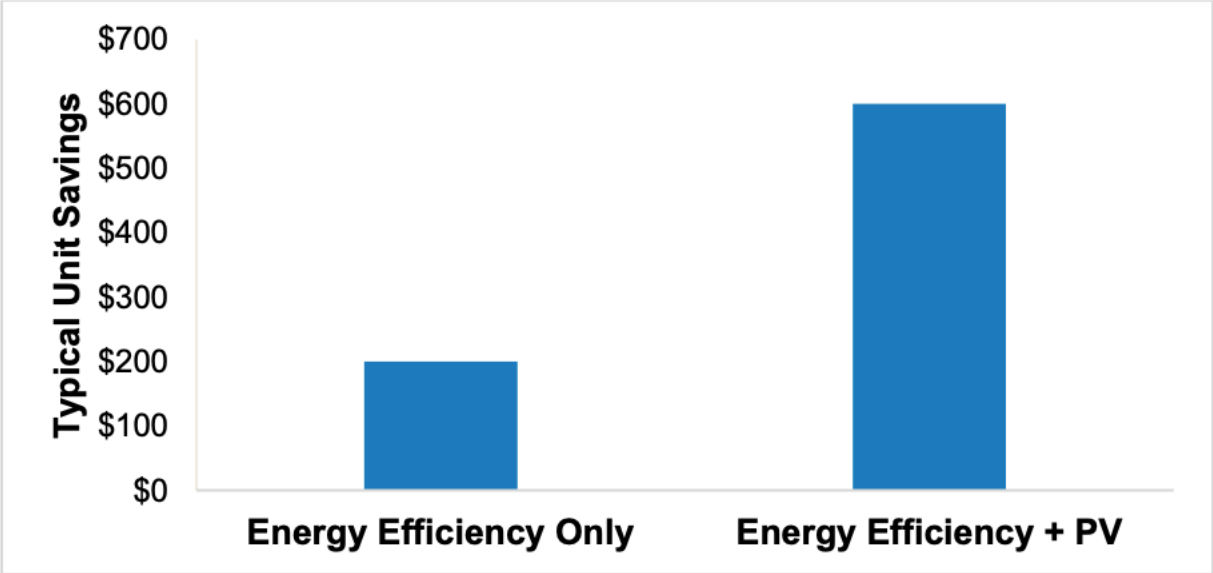
The economic benefits of improved energy efficiency for all residents, especially low-income residents, are significant:



Source: https://www.energy.gov/sites/prod/files/2019/01/f58/WIP-Energy-Burden_final.pdf

Indiana and Gary residents can potentially realize up to 29% in electricity savings through energy efficiency measures to reduce energy consumption such as more efficient lighting and appliances, improved insulation, etc. This would free up funds to other vital needs like healthcare and medications, which Gary residents are often unable to afford. For example, in a survey conducted by Methodist hospitals, 30% of Gary residents responded that they were unable to afford a medical prescription that they needed. Increased investment in energy efficiency is a valuable strategy for reducing the energy burden and save residents money.

Renewable energy technologies, for example on or off-site solar photovoltaic (PV) systems, can also reduce this energy burden while simultaneously improving indoor air quality, safety and comfort. For example, the state of Colorado recently implemented a strategy to reduce the energy burden on low-income residents using solar PV technology. Their first strategy, to support low-income community solar projects, demonstrated that solar projects offer substantial electricity bill savings for residents. They found that despite adopting various energy efficiency measures like weatherizing homes, incorporating PV to reduce electricity costs can save a low-income customer $400 or more annually:

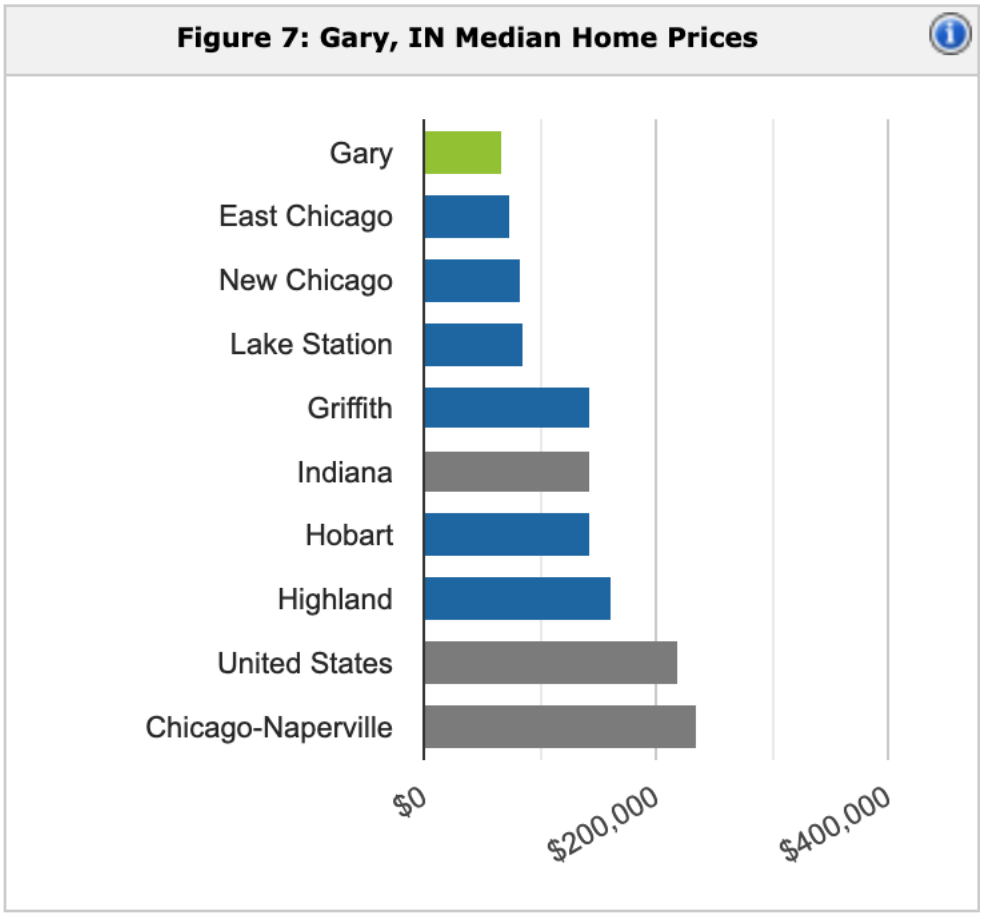


Source: https://www.nrel.gov/docs/fy18osti/70965.pdf

Having demonstrated the substantial economic benefit of solar PV for low-income residents, the state then incorporated onsite PV in its weatherization program and partnered with utility companies to encourage utility investment in low-income PV programs. For a further discussion of implementation and evaluation, see: https://www.nrel.gov/docs/fy18osti/70965.pdf .

3) Urban Blight and Property Value

Another major challenge for the city of Gary is urban blight. A more detailed discussion can be found in the chapter, "Built Environment". The key for this section is that due to blight and general decline, property values in Gary are low and below average when compared to surrounding areas. For example, the median home value in Gary is $66,100 which is the smallest of all the other places in the region:



Source: https://www.towncharts.com/Indiana/Housing/Gary-city-IN-Housing-data.html

By making homes more energy efficient and including renewable energy sources like solar panels, which are viewed as upgrades, renewable energy systems will likely increase the home value. In fact, a 2015 study found that homeowners would pay a premium for a solar home. Another study by Lawrence Berkley National Laboratory found that, on average, solar power increased a home's value by $15,000. Overall, solar energy systems have been found to boost a home's valuation as well as shorten a home's time on the market which makes renewable energy an effective strategy for increasing property value.

There is a key opportunity here to incorporate renewable energy like solar panels in the rehabilitation of blighted or abandoned buildings that are in the appropriate condition. See "Built Environment" for further discussion. This also provides an opportunity to fight blight by both making such homes more attractive and thus more likely to be returned to their original use and occupied, as well as increasing the general property value (and tax revenue) of Gary neighborhoods.

Improved energy efficiency and renewable energy sources can reduce the energy burden on residents as well as improve their property value and that of surrounding areas, two key economic goals.

4. Renewable Energy Investment

Americans spend about 8% of their total expenditures on energy purchases, 40% of which go to pay for electricity. This comes out to about $1900 per person. Usually, this represents money that is leaving the community and going to regional utility companies like NIPSCO which provide electricity and natural gas to 1.2 million customers across Northern Indiana, including the city of Gary. These dollars are lost from the local economy and residents do not benefit in terms of income or jobs from this regular expense. The key is to attract and regulate renewable energy investments and projects to make sure they support local economic development in the form of:

(1) providing affordable local energy,
(2) increasing tax revenue for public services and benefit, and
(3) creating stable and high-paying employment opportunities for local residents.

One key barrier to the enabling the expansion of renewable energy sources is the presence of clear regulatory frameworks to guide investment and adoption of distributed energy. One key way to address this problem is to develop, adopt and enforce clear regulations for licensing, permitting, siting, technical standards etc. for renewable energy sources. Gary has started this process by completing the requirements to qualify for a Bronze designation for SolSmart, a U.S. Department of Energy program that works with local governments to facilitate the adoption of solar energy projects at the local level and to spur local investment, development and employment. In addition, Gary needs to develop electrification standards and make sure that such standards facilitate private sector investment and electrification projects.

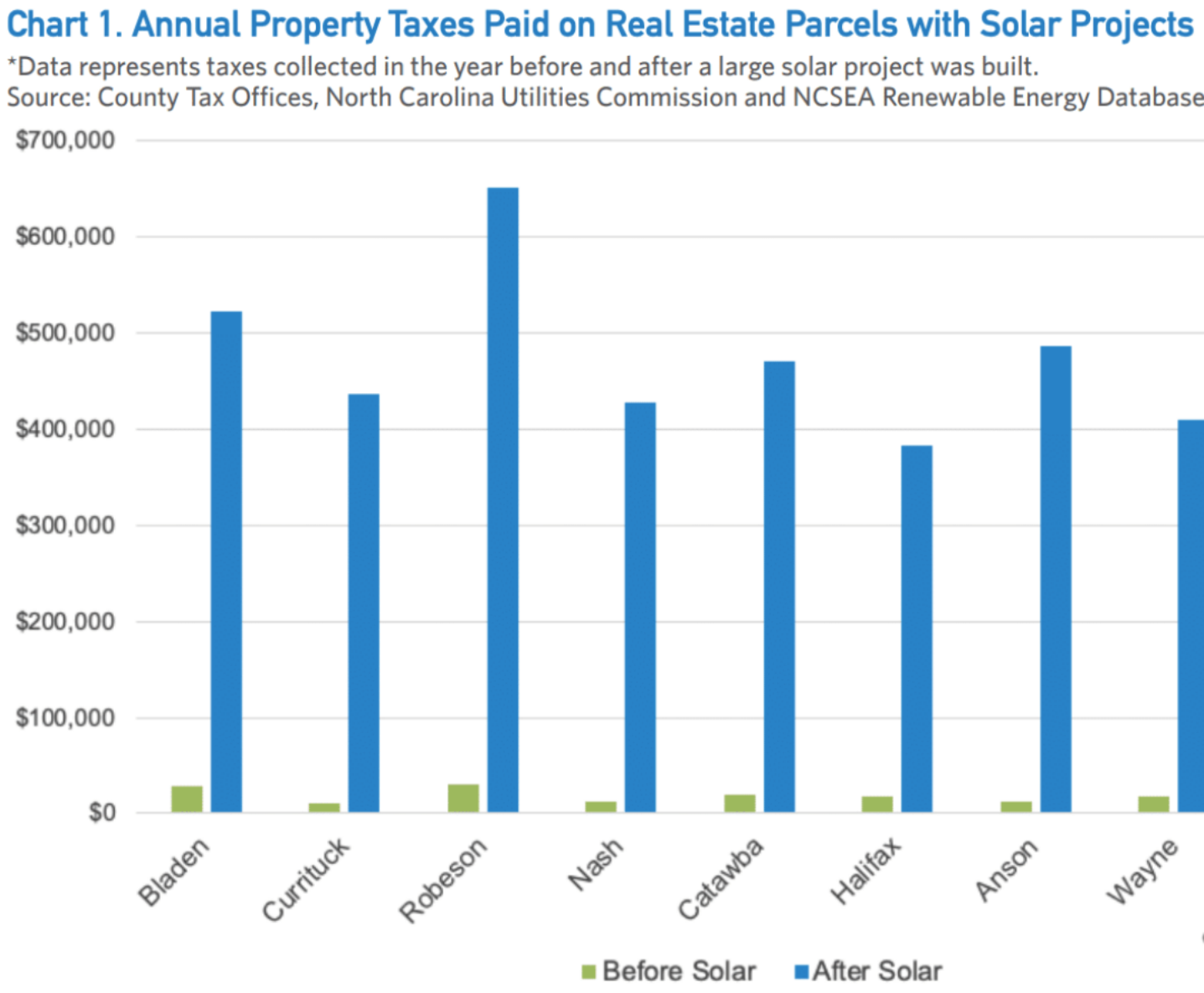
Several counties across the state have adopted local solar ordinances and regulations various aspects of renewable energy projects such as siting, maintenance, removal, etc. We recommend that the City of Gary adopt an ordinance which:

(1) requires that any project seeking tax abatement or economic considerations for project from government to submit Economic Development Agreement approved by the City of Gary Economic Development Commission and developed in consultation with local economic development organizations and City Council.
(2) places construction and permit fees and allocate a percentage thereof, and of any income and property tax revenue, for the benefit or residents within the project's footprint.
(3) requires commitment letters from power utility companies to purchase electricity generated at proposed site
(4) requires that the renewable energy project provide energy for and train/employ local residents

as well as other standards governing the establishment, maintenance and removal of renewable energy projects. Specifically, to adopt the Lake County regulations with the suggested amendments and/or Valparaiso ordinance. A key challenge for renewable energy investors is a lack of clear regulations and standards and/or a lack of favorable regulations/standards. By adopting clear regulations and standards that are favorable to renewable energy projects, secure the interests of local residents, and cohesive with other local ordinances (Lake County, Valparaiso, etc.), the City of Gary can effectively attract renewable energy projects and ensure that they benefit local residents.

Crucially, renewable energy projects bring in substantial tax revenue for local communities. This is especially important given Gary's existing problem of a large number of blighted buildings which represent lost opportunities for taxation and decreased property value. In fact, renewable energy sources generate a greater amount of tax revenue than the equivalent amount of energy

generated from traditional fossil fuel sources like natural gas. The California Energy Commission found that solar thermal power plants brought in double the amount of tax revenue as gas-fired plants. In a 2019 study, the North Carolina Sustainable Energy Association found that, statewide, properties that developed solar power saw a 2000% increase in tax revenue, growing from $513,000 before solar development to $10.6 million the year after solar projects were constructed:

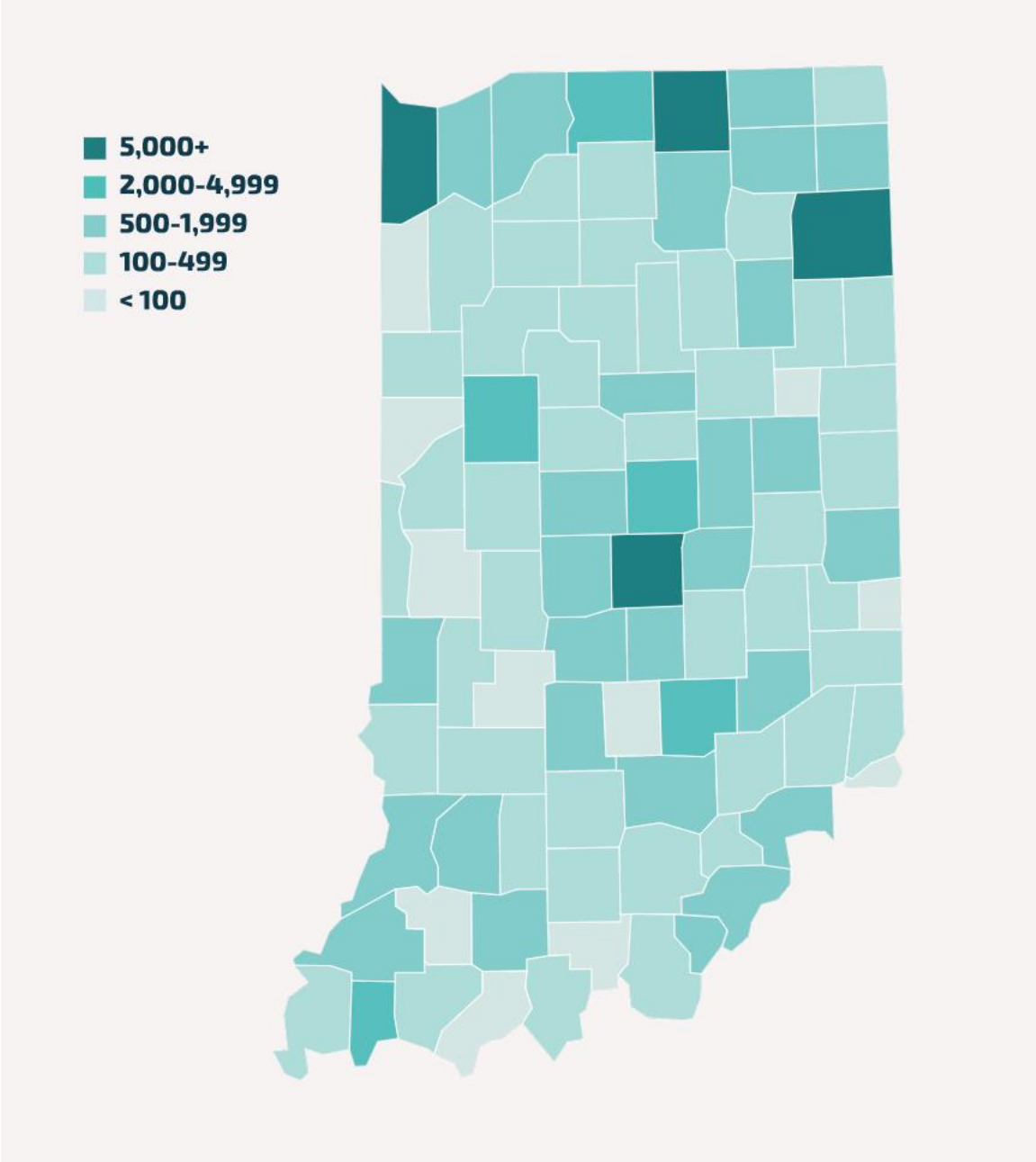


Source: https://energync.org/wp-content/uploads/2019/07/Small_Increased-NC-County-Tax-Revenue-from-Solar-Developmentv3.pdf?utm_source=Policy+Update+-+July+26%2C+2019&utm_campaign=d520a024de-EMAIL_CAMPAIGN_2019_04_12_07_19_COPY_01&utm_medium=email&utm_term=0_397657ce66-d520a024de-131714527

This was the case for all counties which developed solar projects and does not include business personal property tax that is paid on public utility-owned solar equipment, making the actual amount of tax revenue even higher. 50 counties reported their data and only 6/50 (12%) saw less than a 1000% increase in tax revenue. Other counties, like Cabarrus County, saw massive increases of 18,515% after installing a 5 MW installation which increased annual taxes from $255 to $47,533. Local governments and communities have a lot to gain from this increased tax revenue, especially if they require a portion of that revenue to be used for the benefit of local residents.

5. Energy Efficiency and Renewable Energy Jobs

Clean jobs —including energy efficiency, renewable energy, energy storage, etc.— are stable and financially rewarding. They can be a valuable source of economic recovery and revitalization. As of 2019, Indiana had more than 86,800 clean energy jobs—more than the combined workforce of computer programmers, real estate agents and brokers, web developers, and waiters/waitresses. Solar jobs grew by 9% and energy storage jobs grew by 4%, with over 98 jobs added in 2019 alone. A large majority of these jobs are being added in Northwest Indiana, where 10,320 jobs were created:



Source: https://www.cleanjobsmidwest.com/state/indiana

More specifically, Lake County had 5,344 clean energy jobs in 2019. Most of these jobs are in energy efficiency, which makes up 64% of the state's clean energy jobs, advanced transportation and renewable energy:

Source: https://www.cleanjobsmidwest.com/state/indiana

Renewable energy projects also create engineering, construction, and maintenance jobs. In fact, according to the Bureau of Labor Statistics, the number one fastest growing occupation from 2019-2029 is projected to be wind turbine service technicians—with a growth rate of 61%— and the third fastest growing occupation is solar photovoltaic installers—with a growth rate of 51%.

OCCUPATION	GROWTH RATE, 2019-29	2020 MEDIAN PAY
Wind turbine service technicians	61%	$56,230 per year
Nurse practitioners	52%	$111,680 per year
Solar photovoltaic installers	51%	$46,470 per year

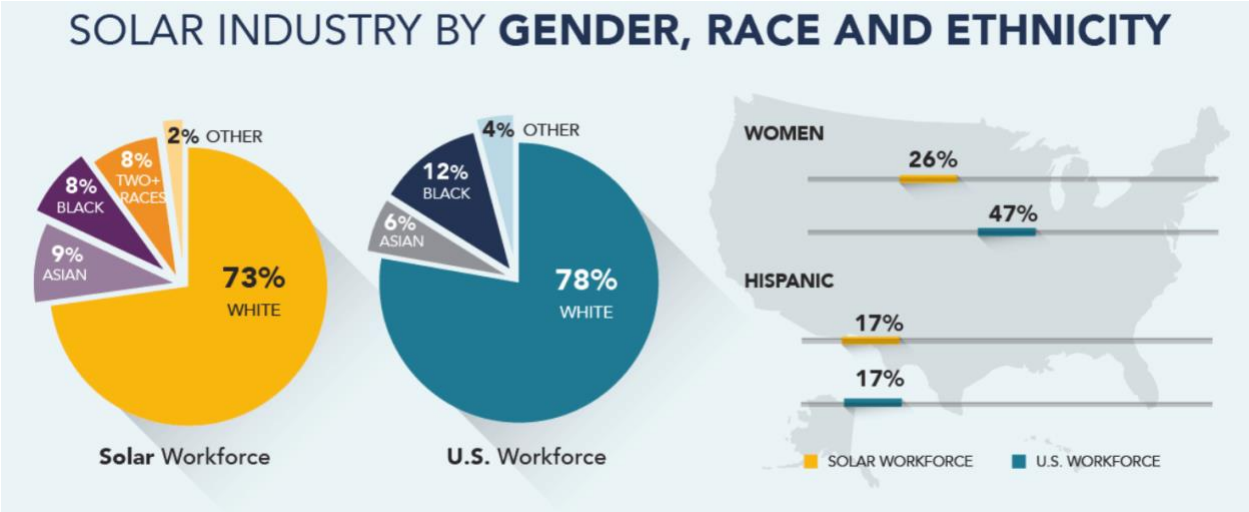
Source: https://www.bls.gov/ooh/fastest-growing.htm

The anticipated increase in solar energy capacity (70-85% of world's energy capacity by 2050) will require tens of thousands of new solar jobs in the US alone. In the current labor market, 26% of solar energy companies said it was "very difficult" to hire qualified workers in 2018 which is an 18% increase from previous year. The solar industry is already employing more Americans now than the coal industry as solar—once a niche product— now makes up 1/3 of new electricity capacity additions making up approximately 2 million solar installations in the US. The anticipated increase in solar energy capacity (70-85% of world's energy capacity by 2050) will require tens of thousands of new solar jobs in the US alone. As the northwest Indiana region transitions to renewable energies, there will certainly be a growing need for skilled laborers in the solar and renewable energy industry.

6. Equity Considerations

It is important that the emerging workforce reflect the diversity of the region through a conscious commitment to training and building a diverse, inclusive, skilled and competitive workforce. As it currently stands, women make up 47% of the US workforce but only 26% of the solar workforce. Men (37%) are more likely to be represented at the Manager, Director, President

level than women (28%). Furthermore, there is a 26% gender wage gap in the solar industry. The solar workforce is comprised of predominantly white workers who make up 73% of the solar workforce, with Asians (9%), Black (8%), and Biracial (8%) workers are underrepresented in the rapidly growing renewable energy industry. In fact, when all executive level positions were reported by US solar firms in a survey conducted by BW Research Partnership, the average firm reports that its executive-level positions were occupied by all white men.



Source: https://www.thesolarfoundation.org/diversity/

This is a relevant concern for the Indiana workforce where the majority of clean energy jobs are held by white (75.1%) men (73.4%), and only a small percentage of jobs are held by women (26.6%) or Black/African Americans (7.2%).

Some strategies that can be adopted to promote diversity and inclusion in the renewable energy industry include:

(1) Providing formal and informal mentorship opportunities to employees
(2) Track metrics of employee diversity and demographics at solar firms
(3) Promote a positive workplace culture among coworkers for women and people of color
(4) Recruit employees through job fairs and training programs which people of color report as being the most likely way they found a job as opposed to word of mouth or personal networks which lead companies to overlook job candidates from diverse backgrounds
(5) Make a public commitment to diversity and inclusion by solar energy firm leadership
(6) Set clear and measurable goals and evaluation methods for employees
(7) Close the gender pay gap
(8) A special focus on the advancement of, equal opportunities provided to, and evaluations of the achievements of women of color who face particularly trenchant challenges to advancement despite their competence and skill

More generally, low-income communities face various barriers to accessing energy technologies that improve energy efficiency and/or facilitate renewable energy use and production. One important consideration is that most low-income households (59%) are renters, not owners, of their homes. This leads to a split-incentive: homeowners would pay for energy technologies or improved energy efficiency but it is the low-income renters who would reap the benefits of energy technologies,

through a reduced energy burden, improved ventilation, etc. There is little incentive, perhaps even a disincentive, for homeowners to adopt such measures when it costs them more and they don't directly benefit, the renters are the ones to benefit. Why should homeowners pay for improvements that reduce the utility bills of low-income renters? Or any renter for that matter? Furthermore, low-income households may lack credit or be unable to finance the upgrades themselves, particularly given the steep up-front costs for renewable energy technologies like solar panels whose savings accrue in the long-term. For these, and many more, reasons, the benefits of renewable energy and energy efficiency have largely been restricted to high-earning households, universities, businesses, etc., rather than those who would benefit most from such technologies.

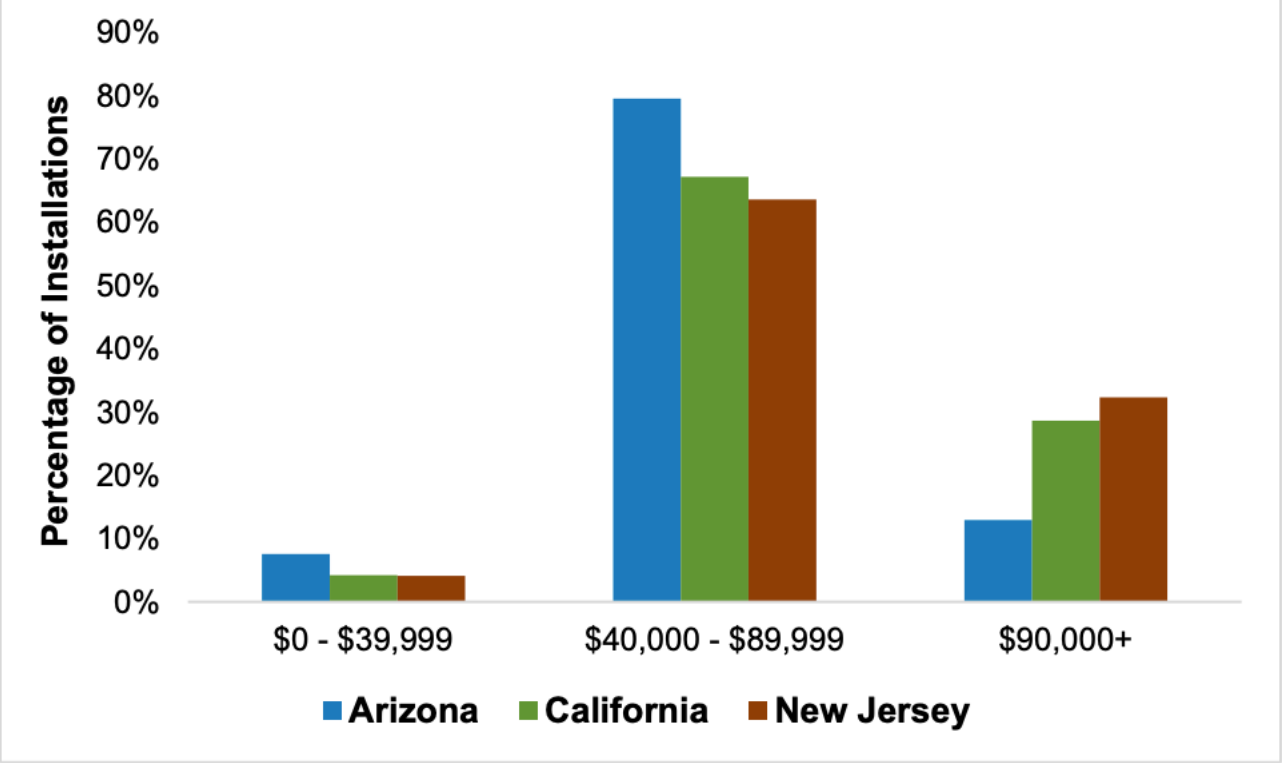


Figure: Percentage of homes with photovoltaic installations according to income level in three state programs: Arizona, California, and New Jersey. Source: https://www.nrel.gov/docs/fy18osti/70965.pdf

Table 1. Typical Energy Burden for Certain Households based on Income a $1,500 Annual Energy Expenditure

Annual Household Income	Classification Level	Percentage of Income Spent on E
<$15,000	energy impoverished	>10%
$15,000–$21,499	energy burdened	7%–10%
$21,500–$37,500	energy stressed	4%–7%
>$37,500	not burdened	<4%

Source: https://www.nrel.gov/docs/fy18osti/70965.pdf

If current trends continue, and assuming this trend is reproduced in other states as well, then renewable energy technologies will disproportionately benefit higher-income households and families nation-wide. Furthermore, they will not reduce the energy burden on low or middle-income households. This is because the majority of photovoltaic installations are on homes with an income above $40,000 and households above $37,500 are not burdened by energy costs, with less than 4% of their income being spent on utilities.

Crucially, there exist great barriers to the adoption and use of solar energy for people of color in the residential market. Researchers at Tufts University and UC Berkeley found that people of color are not as likely to enjoy the benefits of solar power as white residents despite controlling for disparities in home ownership rates and income. However, the study also found that communities with majority Hispanic or black residents adopt solar power faster than white communities once a few residents adopt solar energy ("seeding"). This indicates that there exists a major untapped potential for the solar industry to expand in Gary, with its predominantly non-white residents.

It is crucial that, moving forward, states and industry experts develop pilot programs and financial incentives to improve the accessibility of renewable energy and energy efficiency technologies for low-income residents and people of color. One example of a successful pilot program and model for other states is the Colorado Energy Offices' Low-Income Solar Strategy (https://www.nrel.gov/docs/fy18osti/70965.pdf) .

A major challenge is the state-wide curtailing of net metering whereby residents who produce on-site solar or wind energy can receive a financial credit on their utility bill for sending excess electricity that they generate back to the electricity grid. Anyone installing solar after 2022 will only receive wholesale rates and a small premium for the electricity they send back to the grid, so they receive much less credit for the energy they generate than the energy they pay for from the grid. In fact, SB309, passed four years ago, curtails net metering with the eventual aim of eliminating net metering entirely. This is particularly harmful for low- and middle-income residents who did not have the capital for solar in time to participate in net metering and to reap the benefits of accessing solar with a higher rate of return. The credit will be minimized for those who enter the market later, which will largely be low-income residents who face numerous barriers to accessing renewable energy technologies. This is important because energy savings due to renewable energies like solar could be passed forward into improving housing conditions for local communities, preventing utility shutoffs, and helping residents stay in their homes.

7. Existing Programs

Current efforts include the Soul Power Project that aims to promote solar power in Northwest Indiana by (1) providing individuals with training for renewable energy jobs, (2) educating individuals, companies and communities about solar power and solar opportunities, and (3) installing solar energy structures in low-income neighborhoods to provide residents with affordable, accessible and energy-efficient housing. Another effort was the EPA's Brownfields Training Program which provided the city with $200,000 to start a 12-week Brownfields and Green Jobs training program for 40 un- or under-employed individuals in 2010 and 2011. All 20 graduates of the

program found subsequent employment and the coordinator continued the program and to support participants until 2017.

NIPSCO currently has a variety of programs to incentivize the adoption of renewable energy in Northwest Indiana. The Green Power program is a voluntary program that allows residents to allocate a portion (25%, 50%, or 100%) of their monthly electric usage to come from power generated by renewable energy sources. Businesses have the option to allocate 5% or 10% of their electric usage to renewable energy sources. Such purchases help build a market for renewable energy. However, residents who opt-in pay a monthly premium in addition to the usual electric rate.

25%
$0.72
50%
$1.43
100%
$2.86

**Based on average monthly electric usage of 1,000 kWh.*

Figure: Chart showing how monthly premiums work based on how much of your electricity usage is allocated to renewable energy sources. Source: https://www.nipsco.com/services/renewable-energy-programs/green-power

NIPSCO also provides net-metering which allows residents to generate their own electricity from renewable energy by which they offset their electricity usage each month. NIPSCO will install one meter that measures energy generated and energy used. Residents who generate more energy than they use will receive energy credits which can be put towards future energy usage. A similar program is the Feed-in Tariff program by which residents have an opportunity to sell back the electricity they generate from their renewable energy project to NIPSCO. Residents may also receive payment for energy that contribute to the grid.

NIPSCO recently partnered with NextEra Energy Resources LLC, a world leader in renewable energy generation and storage, to build three solar energy projects and associated battery storage in Northwest Indiana. These projects are expected to bring in an additional 900 megawatts (MW) to Jasper County, IN. These projects will provide residents with affordable energy, saving customers $4 billion in the long term while also creating construction, maintenance and operation jobs for the solar plant and enhancing the county's tax base. These three projects are: (1) Dunns Bridge Solar I (2) Dunns Bridge Solar II and (3) Cavalry Solar. Dunns Bridge Solar I includes about 900,000 solar panels, will be operational in 2022 and will generate enough energy to power 79,500 homes. Dunns Bridge Solar II will include 1,500,000 solar panels, will be operational in 2023, and will generate enough energy to power 130,500 homes. Together, Dunns Bridge Solar I and II will generate approximately $59 million in tax revenue while also creating about 300 jobs during

construction. The Cavalry Solar project will include 650,000 solar panels, will be operational in 2023, and will produce enough energy to power 60,000 homes. Cavalry solar is expected to generate $25 million in additional revenue for White County and create 200 new jobs during construction.

8. Recommendations

1) Develop and expand existing green job training programs like Soul Power.
2) Provide high-school students with renewable energy skills vocational training that prepare graduates for more advanced training in programs like Soul Power
3) Develop a system with local partners for connecting local environmental jobs to Gary residents, especially young adults and graduates of local training programs like Soul Power
4) Commit to hiring graduates of training programs and contractors to do hybridized to full deconstruction projects, energy efficient retrofitting and construction
5) Coordinate with NIPSCO to:
    i. provide optimal rates for electric vehicle users
    ii. plan clean energy generation sites in the city to support their Integrated Resource Plan
    iii. investigate options for community choice electricity aggregation with NIPSCO to provide homes and businesses with cleaner energy at a competitive price.
    iv. clearly tie the energy efficiency component of the 2030 District to NIPSCO's commercial energy efficiency incentive programs
    v. to provide time-of-use (TOU) rates for PEV charging like Indiana Power and Light and Indiana Michigan Power
6) Partner with Indiana American Water or GSD to offer benefits/incentives for improving water efficiency through the 2030 District.
7) Incentivize renewable energy development and recruitment through favorable regulations (e.g., extended net metering benefits for low-income households)
8) Start a Green Business Challenge or organize a group of companies to participate in an existing challenge, like the 2030 Challenge.
9) Explore opportunities for wind power generation in Gary, IN
    i. Consider FAA regulations for Gary/Chicago airport and windmill height restrictions
    ii. Prioritize community wind projects that reduce the barriers to accessibility for low-income communities and reduce their energy burden
    iii. Establish regulatory standards for wind (and solar) energy to encourage renwable energy investment
10) Public outreach and education about renewable energies and energy efficiency and their public health and financial payoff for homeowners and renters. Key: align incentives between homeowners and renters in public communications and workshops
11) Achieve a SolSmart designation of Silver or Gold in the next 5-10 years.

9. Sources

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Chapter 5: Natural Environment

1. Background

The natural environment is an invaluable resource for the City of Gary as it works to rebuild and revitalize both the urban landscape and economy for current and prospective residents. This natural environment must be preserved both for the public health and recreational value it offers residents as well as for ensuring a habitable city for future generations. Climate change will impact the natural environment of neighborhoods, parks and the Indiana Dunes National Lakeshore.

The Department of Venues, Parks and Recreation recently conducted a tree inventory of 22 park properties in Gary, IN with the help of Great Lakes Urban Forestry Management (GLUFM). They surveyed 2,367 trees and presented the data in an Urban Forestry Management Plan (UFMP) which describes how urban forest resources need to be manages to ensure their continued benefit for Gary residents for the next 30 years (2020-2050).

An important natural resource for the City of Gary is the urban forest made up of trees on part properties throughout the city. This urban forest filters and reduces stormwater, reduces the urban heath island effect, protects against winter winds, creates shade and energy savings, uptakes carbon dioxide and filters pollutants, and increases property value for residents whose mental and physical wellbeing is improved by the greenery. The current urban tree canopy in the City of Gary is 23.24%. The UFMP aims to increase the urban tree canopy to 25% by 2050 (UFMP pg. 7). Importantly, the average tree condition (3.31) and average mature tree condition (3.33) are significantly below average (UFMP pg. 14).

2. Urban Heat Islands

Urban Heat Islands are defined by the EPA as areas where:

> "cities replace natural land cover with dense concentrations of pavement, buildings, and other surfaces that absorb and retain **heat**. This **effect** increases energy costs (e.g., for air conditioning), air pollution levels, and **heat**-related illness and mortality (https://www.epa.gov/green-infrastructure/reduce-urban-heat-island effect#:~:text=%22Urban%20heat%20islands%22%20occur%20when,heat%2Drelated%20illness%20and%20mortality)".

This is a serious and likely risk given that the Indiana Climate Change Impacts Assessment project that Indiana's changing climate will include higher temperatures, longer heat waves, and more extremely hot days which will affect the health of Hoosiers, particularly those without access to cooling technologies. As such, injuries and deaths due to extreme heat are projected to increase. In particular, the annual number of temperature-related deaths in Indiana is expected to increase and even double. The most at-risk will be children, the elderly, members of low-income households and those with pre-existing conditions. Cities, like Gary, will be especially vulnerable to health risks since urban areas create "heat islands" where temperature impacts are intensified. Given the high number of residents who live below the poverty line and for whom utility and energy costs are a substantial

burden, Gary needs to start planning early for mitigating the impacts of Indiana climate change, especially heat.

3. Goals

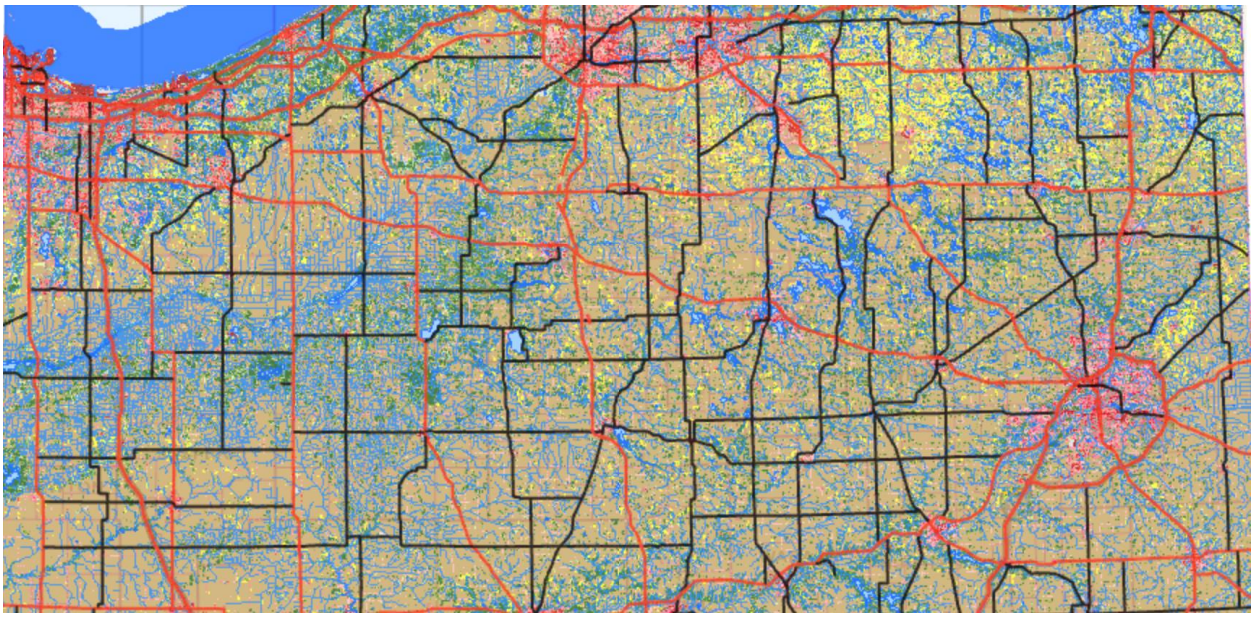
The climate-related goals concerning natural environment are to:

(1) mitigate the urban heat island effect through urban forestry efforts,
(2) adapt stormwater management practices and increase green infrastructure for projected increases in precipitation,
(3) improve the resilience of regional plants and animals by providing landscape corridors and climate refugia for species that need to migrate away from or adapt to changing (warmer) environments.

4. Urban Forestry

One way of mitigating the increased heat impacts of climate change and the development of urban heat islands is to plant trees which provide shade where temperatures are cooler. This leads to less use of air conditioners and associated utility costs. Trees also act as windbreaks in the winter reducing winds by almost 30% which also reduces the use of heating utilities and costs. The first step is to identify areas in the city with poor tree cover.

The following is a GIS map of the Northern Indiana region.

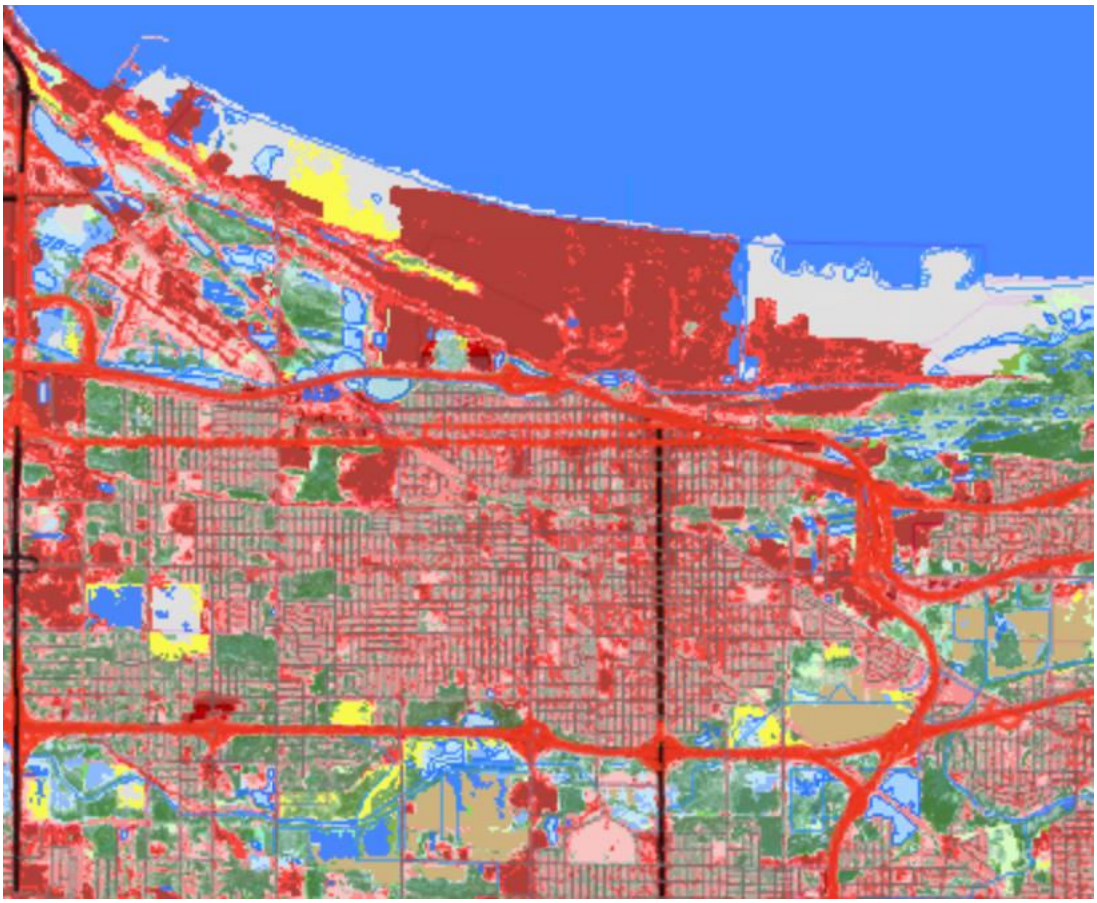


Source: https://maps.indiana.edu/ Accessed at 4:40 pm on 7/1/21

The following layers were applied: Environmental Land Cover 2011, Environmental Land Cover Tree Canopy 2001, Hydrology Water Bodies Lakes, Hydrology Water Bodies Streams, Infrastructure Streets Roads INDOT 2015, and Government Boundaries Administrative County Polis IGIO 2020.

Shades of green are used to indicate tree cover, blue to indicate bodies of water and wetlands, and red indicates low to high intensity developed areas that are vulnerable to becoming urban heat islands. You'll note three areas in northern Indiana, particularly Hammond and Gary in Northwest Indiana, that are predominantly red.

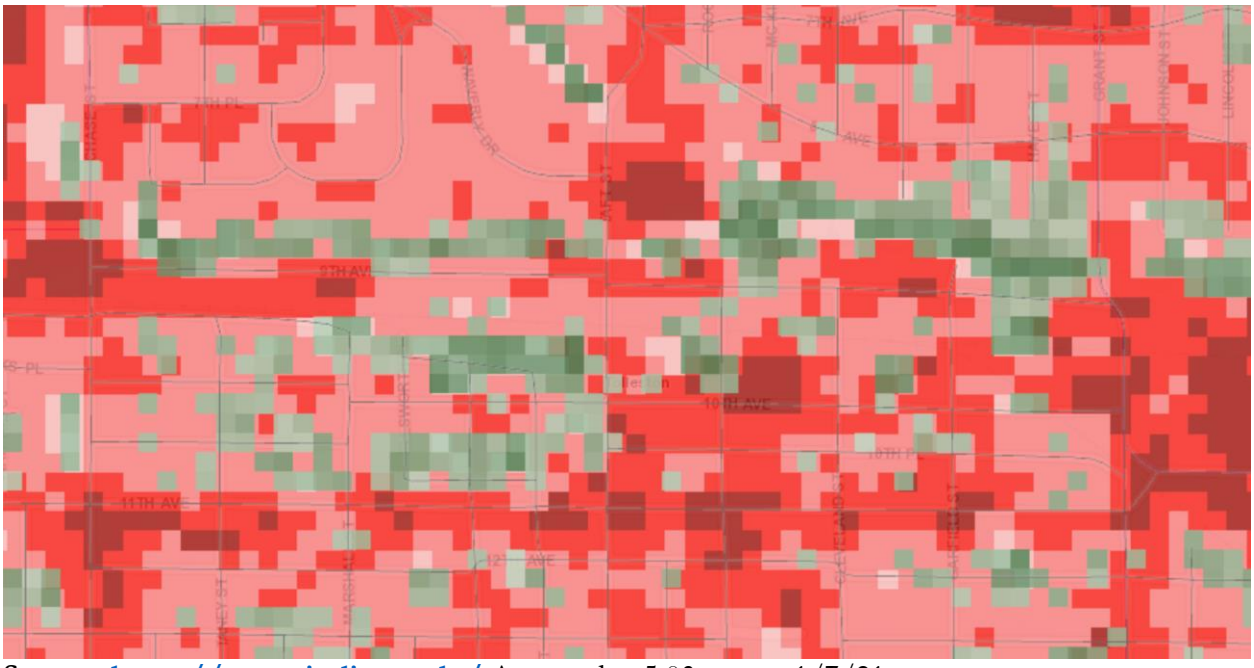
The following image is zoomed into the City of Gary and neighboring areas.



Source: https://maps.indiana.edu/ Accessed at 4:50 pm on 7/1/21.

It is clear that there is a substantial number of areas that are vulnerable to extreme heat including the industrial sector, along the interstate highway (I-90), and in residential neighborhoods, especially at street corners. These are locations where tree planting can have high cost-saving benefits in terms of reducing the need and use of cooling/heating utilities. This will also benefit residents' air quality and health. As previously mentioned, industrial activities and transportation emit a substantial amount of greenhouse gases and toxins in Northwest Indiana, and Gary specifically. Conifers are particularly well-suited for absorbing particulate matter from the atmosphere over long time periods. Such emissions have harmful effects on residents health such as exacerbating asthma, heart disease and lung disease(see Air Quality chapter 2). This results in high health care costs and less productivity for businesses. Furthermore, such chemicals and toxins mix with water in the atmosphere to create acids (nitric and sulfuric) as well as acid rain which pollutes water supplies. However, fortunately, tree leaves can absorb these compounds and act as filters on the air supply. In doing so, they reduce the concentration of harmful chemicals in the air that are responsible for adverse health outcomes in Gary residents.

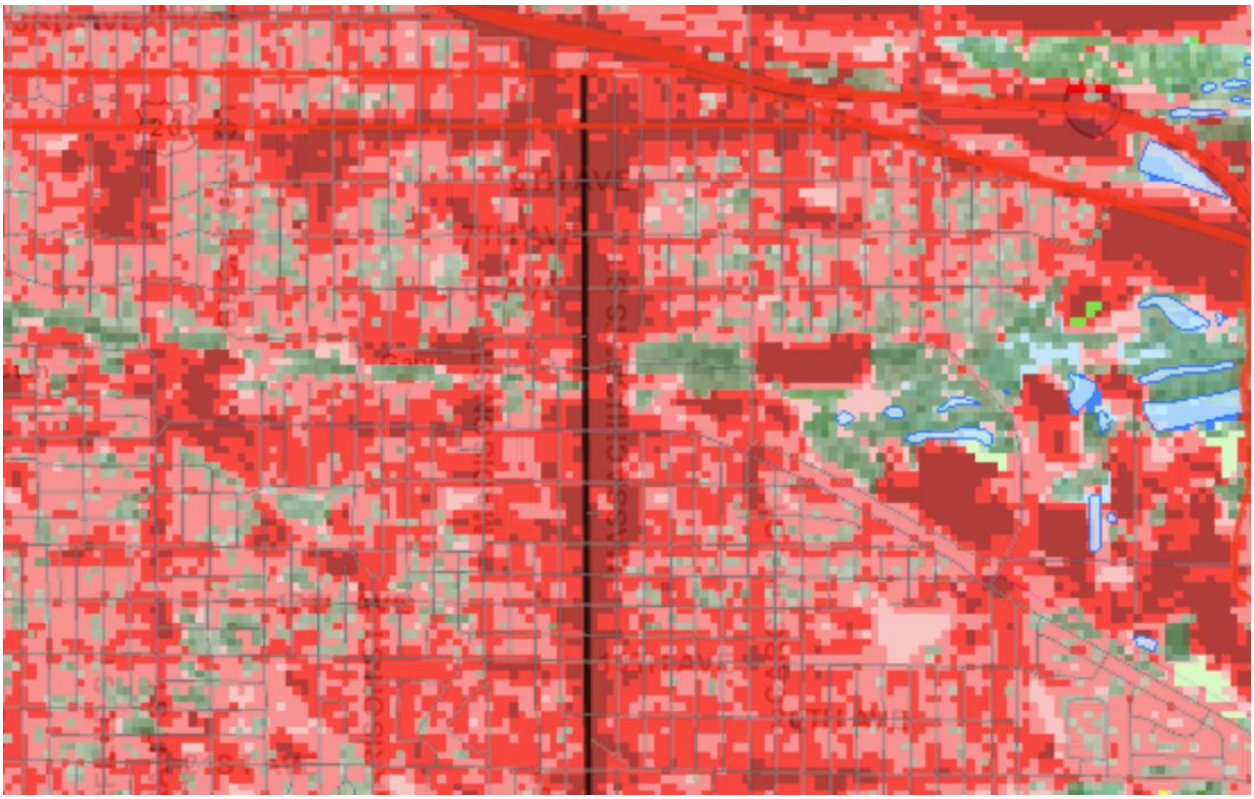
For example, this image shows tree cover between Chase St. and Grant St.



Source: https://maps.indiana.edu/ Accessed at 5:03 pm on 1/7/21.

As you can tell, areas that are particularly lacking in tree cover are corners like the intersection of Chase St. and 11th St or the intersection of 10th Ave. and Roosevelt St.

Another potential area for reforestation/replanting trees is along Broadway St.



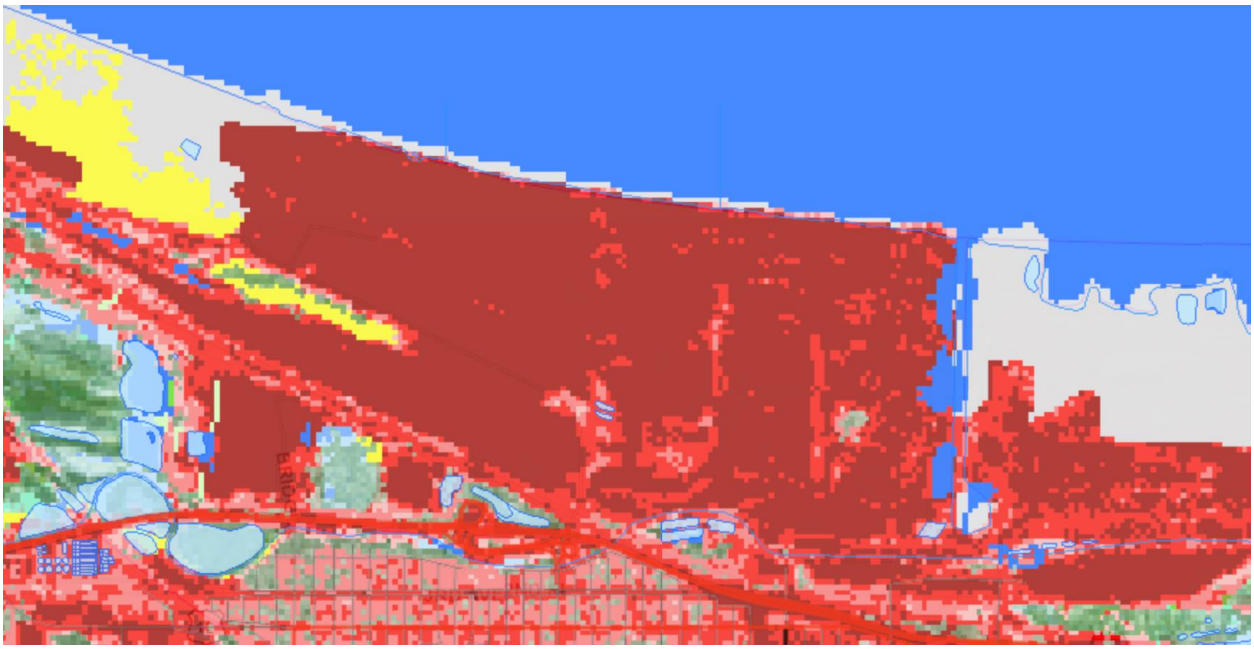
Source: https://maps.indiana.edu/ Accessed at 5:07 pm on 7/1/21.

The bold black line is Broadway St. and as you can see, the area on both sides of Broadway street are particularly vulnerable to the urban heat island effect and lack any sort of tree cover. This is troubling as Broadway St. used to be lined with elm trees but they were wiped out by the Dutch elm disease which first entered the state sometime before 1950 in the northwest corner of the state, where Gary, IN is located today (Indiana Academy of Science, and Indiana Academy of Science. Meeting. *Proceedings of the Indiana Academy of Science*. Vol. 26. 1917.) The Dutch Elm Disease was carried by the elm bark beetle and caused the wilting and eventual death of thousands of elm trees which were often replaced by green ash trees. This event forever changed the landscape of the Midwest and laid the groundwork for the epidemic of the emerald ash borer.

However, importantly, the devastated elm trees were never replaced along Broadway St. the way they were across the state and other parts of the country. Now this strip of developed land is left without tree cover, and its associated benefits. There are two action items that follow from this:

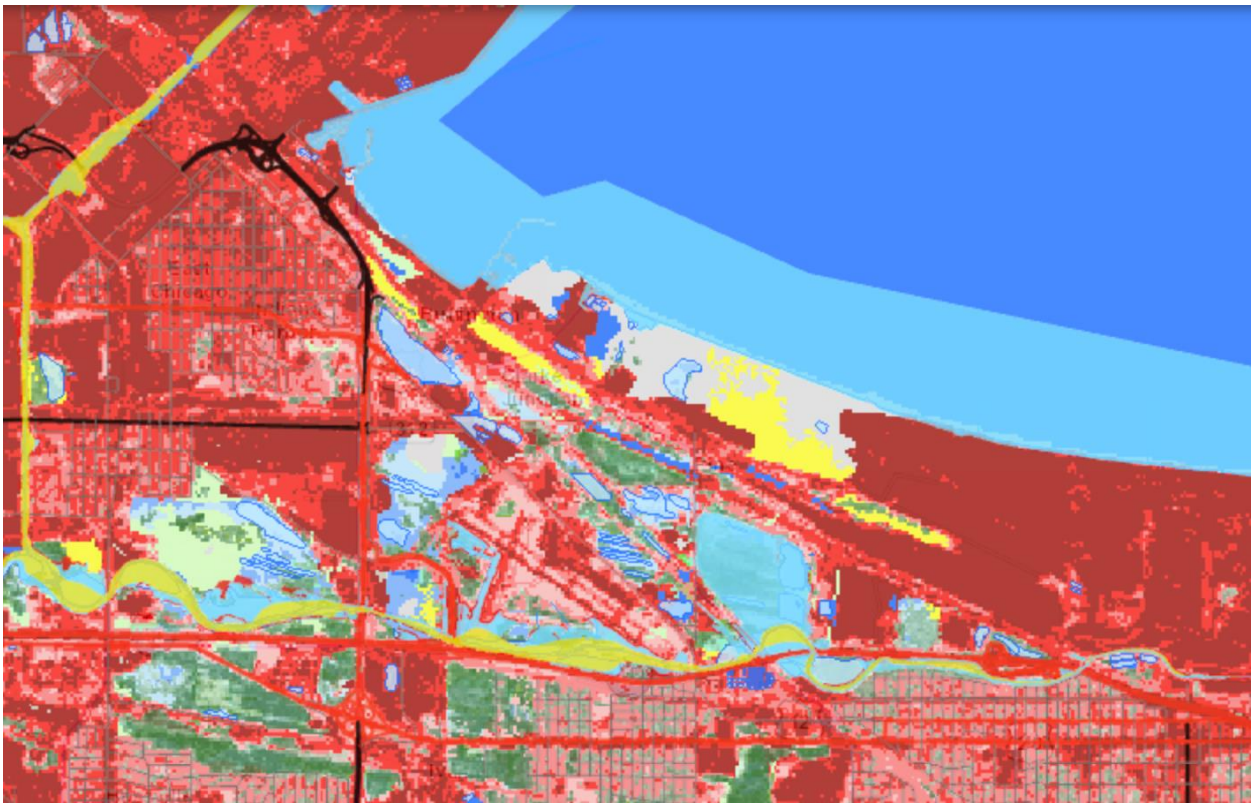
(1) Conduct a street-level tree canopy assessment to identify locations that are vulnerable to the heat island effect, amenable to tree replanting efforts, and high-priority with a high number of residents living nearby. One such location may be Broadway Street.

(2) Explore the possibility of replanting trees recommended by Urban Forestry Management along the interstate (I-90) which borders the industrial area of Gary which exhibits the highest density of development and no tree cover of any sort, posing a serious risk for residents nearby and workers. See the following image of land and tree cover for the industrial part of Gary, IN that is bounded by Lake Michigan to the south and the toll road to the south:



Source: https://maps.indiana.edu/ Accessed at 5:22 pm on 7/1/21.

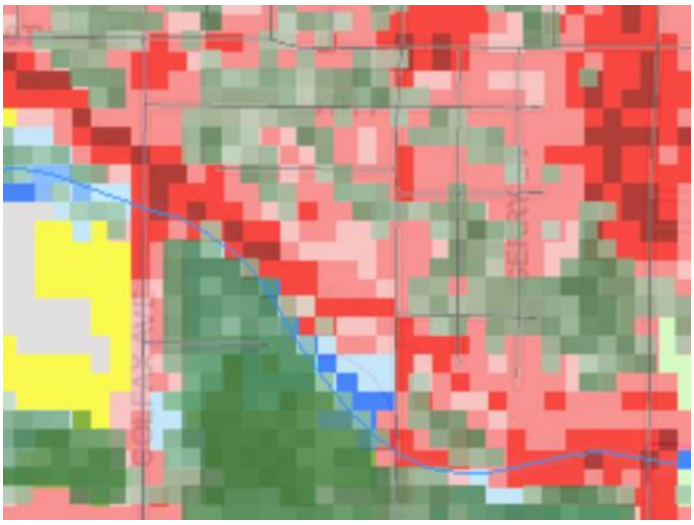
One way of incorporating urban forestry in storm water management is to plant trees along the toll road where stormwater collects. The EPA has identified stormwater runoff as a leading source of water pollution (metals, pathogens, etc.) for approximately 40% of water bodies in the US (https://indiana-arborist.org/wp-content/uploads/2021/02/Stormwater-and-Trees_ADA.pdf). Trees are very effective at taking water from the soil and transferring it to the atmosphere via transpiration. Thus, more trees, especially near areas that gather storm water, can reduce flooding and subsequently reduce the strain on storm water management infrastructure. One possible benefit is to reduce the repair and replacement of said infrastructure in the long-term. This is important given the fact that floodplains in Gary, IN follow the toll road. Floodplains are highlighted in yellow on the map image below:



Source: https://maps.indiana.edu/ Accessed 6:33 pm on 7/1/21.

As you can see, the floodplains (yellow) follow along the toll road. Planting trees in these areas would have a significant impact and benefit for stormwater management which includes managing both the quality and quantity of storm water. Another benefit of trees is that the tree canopy can effectively slow a rainfall's effect by intercepting the rain with its leaves and branches which delays the development of runoff and floodwater. This can result in large savings for the community (UFMP pg. 31).

One reason for the poor tree canopy is the emerald ash bore beetle which decimated a significant number of the ash trees along the Calumet River. For example, see the following map image of the tree canopy along the Calumet River, between Colfax Ave. and Burr St.:



Source: https://maps.indiana.edu/ Accessed at 5:39 pm on 7/1/21.

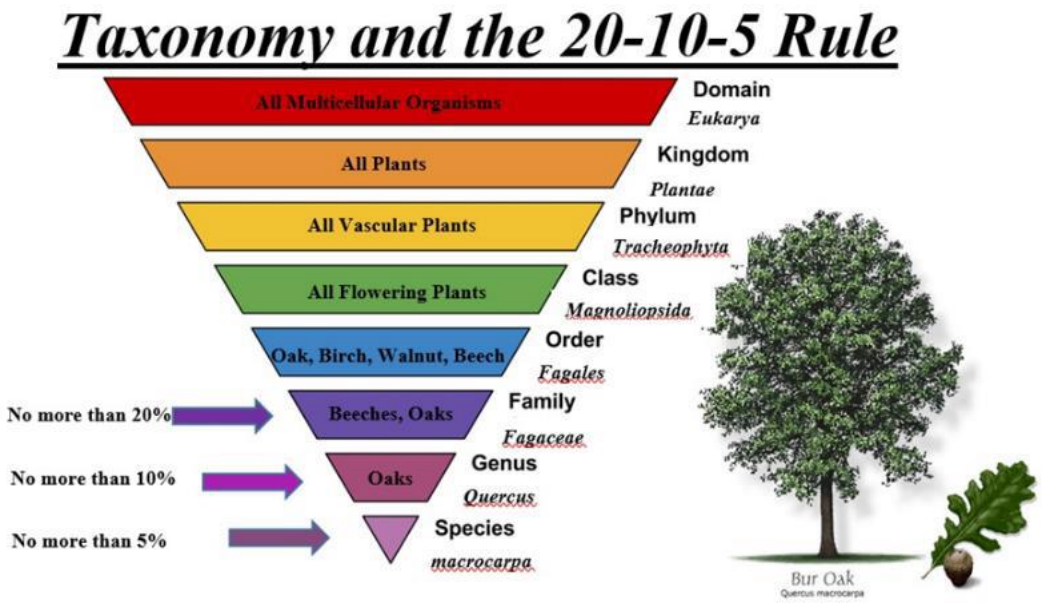
When replanting trees in the aforementioned areas, it is important to keep a few things in mind.

First, it is important to ensure that there is a priority on maintaining existing and old trees, not just replanting new and young trees. Such maintenance includes routine pruning. It is also critical to make sure that the reforestation effort values age-class diversity in the trees used in replanting. Age-class diversity in reforestation ensures that there is a variety of young, intermediate and mature trees so that trees will age and decline at different rates. This ensures that not all the trees will require removal and replanting at the same time which could leave an entire community or neighborhood without shade for nearly a decade—a major risk given projected increase in extreme heat (UFMP pg. 21). Older trees also sequester more carbon than younger trees and can do so over a long period of time making for a sustainable effort with low cost per tree in the long term. Trees uptake CO_2 and function as a carbon sink where carbon is stored for years, effectively removed from the atmosphere. For example, oak trees can sequester a significant amount of carbon for 200 years. This is critical given the current abundance of young trees and small number of older trees, some of which are dying or dead, in the tree assessment conducted in 2020:

Source: UFMP 2020, pg. 16.

Importantly, the number of middle aged to mature age trees is quite substantial. There is significant potential to maintain these trees into their old age and reap their benefits in the long-term (20-25 years).

Second, it is important to plant diverse trees. This is in line with the "Diversity Vision" (UFMP pg. 5) developed by the UFMP to increase overall tree diversity by 2050. Ideally, replanting efforts should follow the "20-10-5" rule whereby no more than 20% of tree plantings are from one family, no more than 10% from any one genus, and no more than 5% from any one species is replanted in one planting cycle (UFMP pg. 18).



Increased

Source: UFMP pg. 18

Diversity is important because it avoids the type of devastation wrought by insects like Dutch Elm Disease and the Emerald Ash Borer whose impact is outsized in large part because of the lack of diversity. When ash trees comprised upwards 20% of the trees in a community, the arrival of the Emerald Ash Borer is particularly damaging. Maintaining a diversity of tree species can prevent such damage and reduce the associated costs, while increasing benefits and stability. One way of pursuing this vision is to conduct targeted tree planting that identifies and selects underrepresented trees that thrive in specific locations. One challenge is that the urban street environment is not an easy place for a tree to live with lack of soil, road pollutants and homeowner stress. A key part of this effort should be referencing the Acceptable/Unacceptable Species list when selecting the trees to be replanted.

Third, it is important to protect existing (especially old) trees from being damaged during construction and development. A tree assessment should be required prior to construction and the goal is to preserve old trees during construction

In sum, urban forestry is a key strategy for mitigating the impacts of climate change and represents an opportunity for a profitable investment. Benefits include energy efficiency (electricity and natural gas), improved property value, reduced stormwater, improved air quality, and reduced CO_2. These environmental benefits can be quantified as a substantially positive financial return-on-investment:

Total Investment	**$4,150.00**
Total Return	**$8,585.00**
Total ROI Over 60 Years	**106.87%**

Source: UFMP pg. 31

Return on Investment: Years 21-40 (13-24" Diameter)

Costs	
Pruning - 6x @ $100/prune	$600.00
Emergency Maintenance (2x)	$500.00
	$1,100.00

Benefits	Avg/Year	Over 20 Years
Electricty	$18.89	$377.80
Natural Gas	$33.84	$676.80
Property Value	$44.44	$888.80
Stormwater	$52.69	$1,053.80
Air Quality	$9.34	$186.80
CO2 Reduction	$6.10	$122.00
		$3,306.00

ROI Years 21-40 = 200%

Source: UFMP pg. 32.

5. National Dunes Lakeshore

One of the priority areas identified by the Indiana Dunes Ecosystem Alliance was Miller Woods which is in Gary, IN.

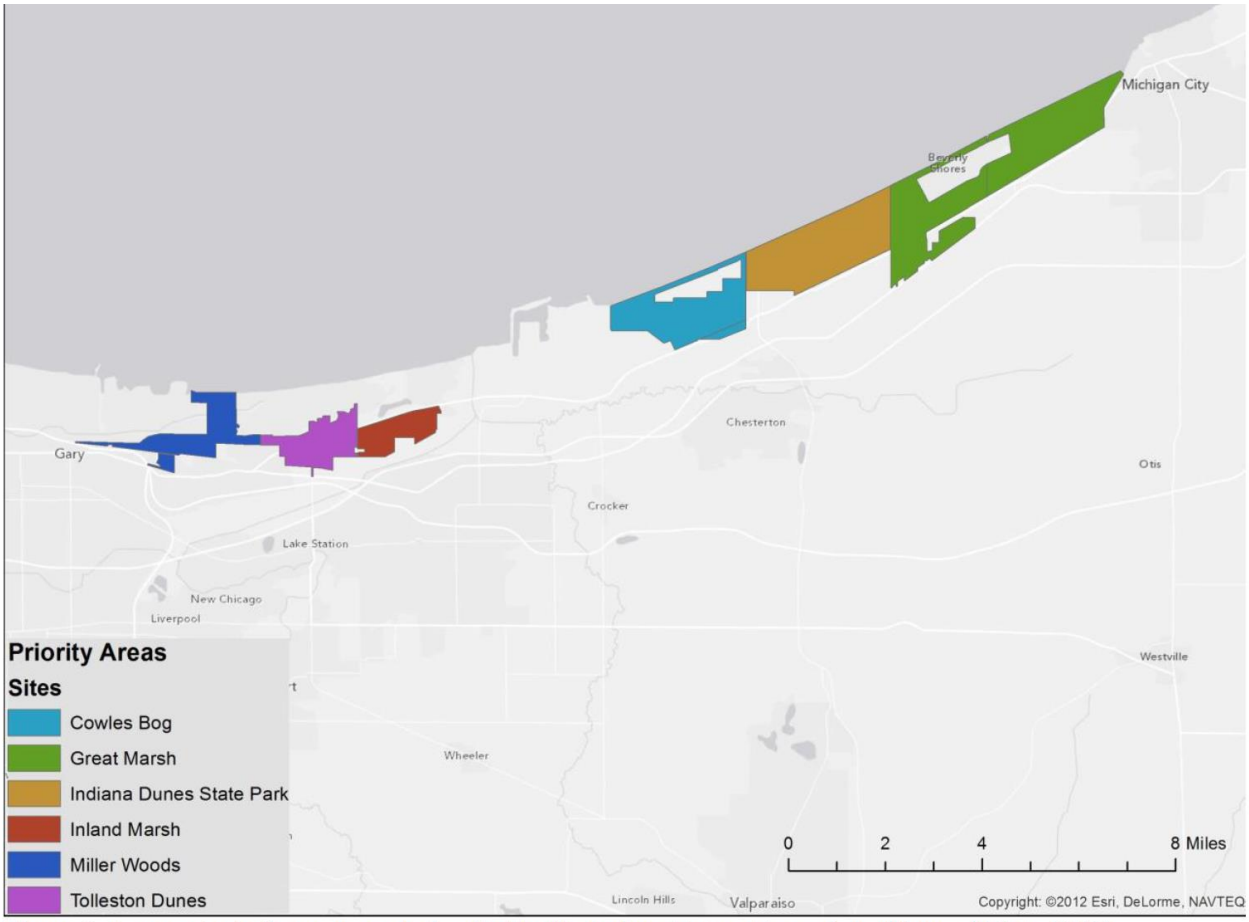


Figure 8. A map of priority areas as designated by the Indiana Dunes Ecosystem Alliance (IDEA, 2016).

Source: https://savedunes.org/wp-content/uploads/2018/05/Indiana-Dunes-Climate-Change-Adaptation-Plan-2018-2.pdf

This western portion of the National Dunes Lakeshore is in Gary, IN and boasts an incredible amount of plant diversity, 7th in the country, with more than 1,135 native plant species.

Figure 14. Dune and swale habit from the Miller Woods trail looking north towards Lake Michigan (left) and a foredune from the Cowles Bog trail looking west towards Burns Harbor (right). Photo credit: Katherine Moore Powell.

Source: https://savedunes.org/wp-content/uploads/2018/05/Indiana-Dunes-Climate-Change-Adaptation-Plan-2018-2.pdf pg. 45.

One major accomplishment was the restoration of 1077 acres of black oak savanna in Miller Woods, Tolleston Dunes and Indiana Dunes State Park by the end of 2015. However, local residents have observed a change in the plants' appearance given climate change impacts (https://www.chicagotribune.com/suburbs/post-tribune/ct-ptb-indiana-climate-change-st-1223-story.html) such as increased temperatures and precipitation, with an earlier start to the spring season. The Dunes is projected to have a growing season that is one month longer, hotter summers with 30-45 days above 95 degrees, and wetter winters with 24-36 less days of snow cover. Longer summers allow invasive species to thrive and take over. This has important implications for the plant diversity in the area. One key priority is to preserve the variety of plant species in the region. Another priority is to ensure that warm-weather plants, which will increase given increasing temperatures, don't crowd out many of the plants that grow in the Northern forest. Some of the *direct* impacts have been summarized in the table below:

Direct Impacts

Climate Stressor	Impacts / vulnerabilities
Increase in air temperature and seasonal shifts in precipitation	Higher air temperatures could favor Phragmites invasions in swales, increasing the difficulty in controlling the spread. Some areas could shift to a more drought tolerant plant community structure, including more C_4 (warm season) grasses. Swale tree productivity could be negatively affected by extreme heat and seasonal precipitation shifts.
Increase in mean air temperature	Plant species with preferred lower temperature ranges will suffer – white pines and other boreal relics are more vulnerable to heat.
Extreme air temperatures	Temperatures could exceed the tolerance range for some species (e.g., bumblebees).
Drought and heat	Some wetlands may dry up, especially pannes and vernal pool habitats, and adjacent wetlands influence those inside the parks: ❖ A panne in Marquette Park is outside the National Lakeshore boundary, but the city has few resources to manage and maintain this habitat.
Change in lake water levels	There could be a loss of beach area and / or foredune habitats.
Increase in winter air temperature and loss of lake ice	Loss of beach ice can result in an increase in soil erosion, blowing sand farther inland. Strong winds cause an increase in wave height along the coast, increasing beach erosion.

Source: https://savedunes.org/wp-content/uploads/2018/05/Indiana-Dunes-Climate-Change-Adaptation-Plan-2018-2.pdf pg. 39

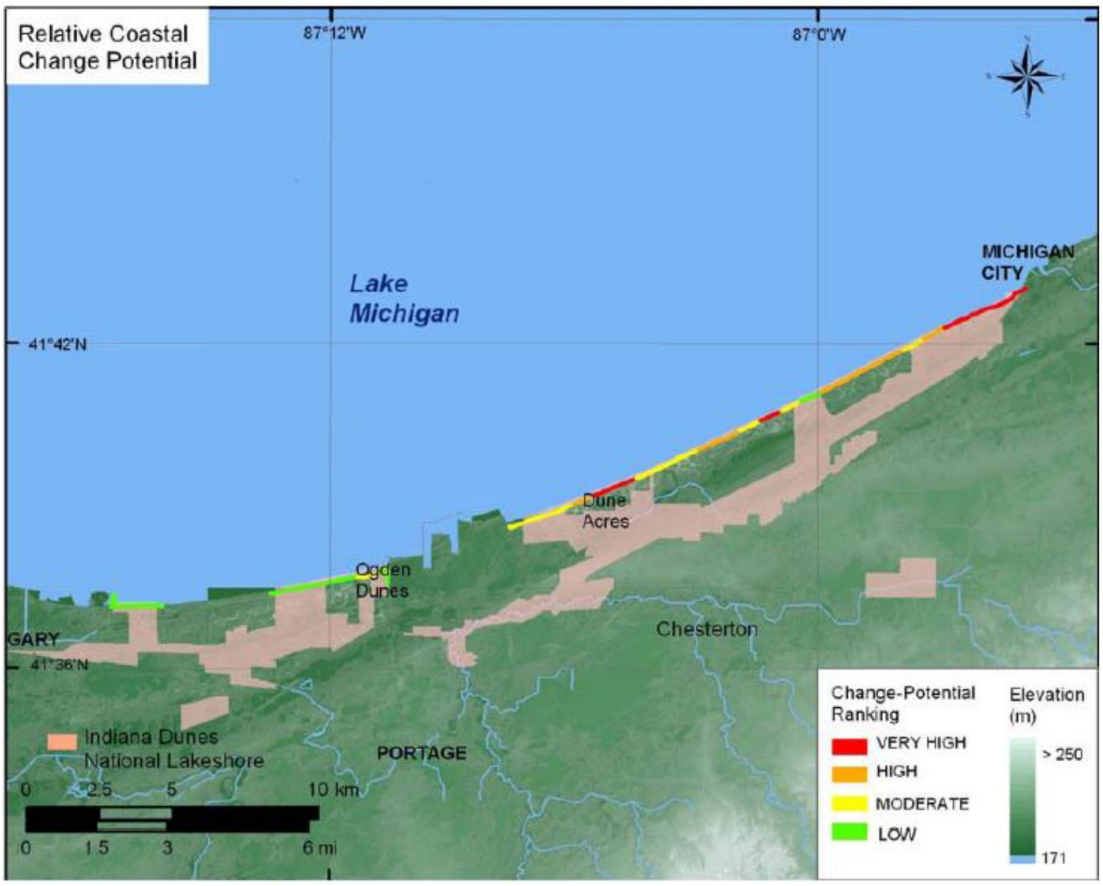
Some of the *indirect* impacts of climate change on this region are summarized in the table below:

Climate Stressor	Impacts / vulnerabilities
Increase in air temperature and seasonal shifts in precipitation	There may be a loss of microhabitats that typically occur along the slopes between dune and swale. Unchecked growth of some invasive plants can destabilize sand banks. ❖ Japanese knotweed is taking over areas near West Beach in Miller Woods. The loss of trees in swale habitat decreases canopy cover and leaf litter needed to maintain vernal pools habitats.
Increase in air temperature, seasonal shifts in precipitation, extreme temperatures	Endemic plants already weakened by predation from insects and/or birds are more vulnerable to other climate impacts. ❖ Pitcher's thistle, *Cirsium pitcher* (Figure 13) is endemic to the Great Lakes region. Confined to open sandy soils along the lakefront, it is currently stressed by insects and birds. It is vulnerable to the loss of mutualistic insect-plant interactions, such as pollination. Some pollinators, such as bees, are negatively affected by increases in air temperature, especially extreme heat, decreasing their populations and activities and reducing Pitcher's thistle reproduction.

Source: https://savedunes.org/wp-content/uploads/2018/05/Indiana-Dunes-Climate-Change-Adaptation-Plan-2018-2.pdf pg. 39

The Indiana Dunes National Lakeshore joined as a participant in the Climate FriendlyParks program on March 30, 2011, conducted a greenhouse-gas emission inventory and developed a climate action plan for the park. Importantly, the nonprofit organization "Save the Dunes" (in collaboration with the Field Museum and Lake Michigan Coastal Program) developed the Indiana Dunes Climate Change Adaptation Plan (https://savedunes.org/wp-content/uploads/2018/05/Indiana-Dunes-Climate-Change-Adaptation-Plan-2018-2.pdf) in an effort to prepare for and address the anticipated climate change impacts on the Dunes National Lakeshore.

There is a variety of ways in which climate change has already and will impact the Indiana Dunes. The National Park Service Climate Response Team found that 1/5 of the park's lakeshore length is highly vulnerable to changes in the lake level. However, these changes are predicted for parts of the lakeshore that are not in Gary, IN. The part of the lakeshore that is in Gary, IN is predicted to have a relatively low coastal change potential:

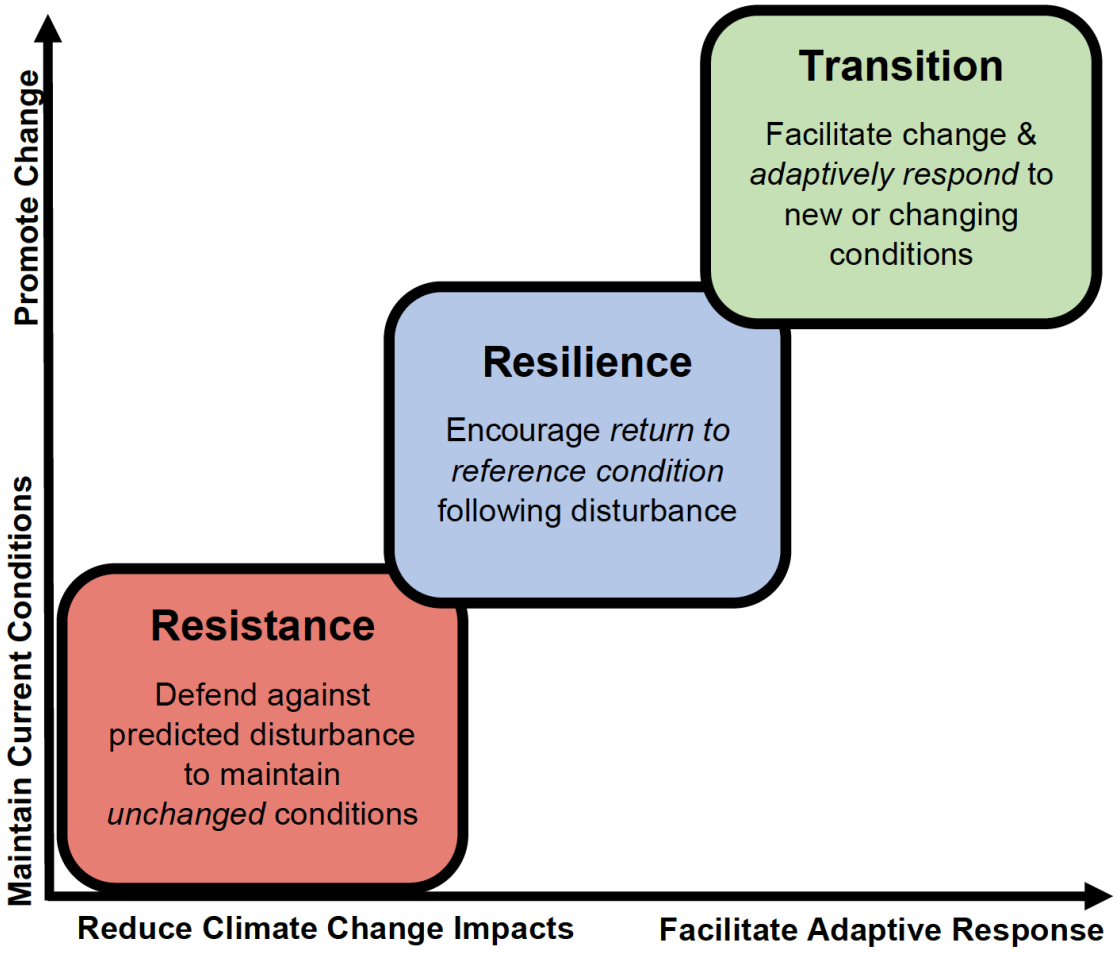


Source: https://savedunes.org/wp-content/uploads/2018/05/Indiana-Dunes-Climate-Change-Adaptation-Plan-2018-2.pdf

Furthermore, habitats in the park are expected to become less amenable to certain species, like boreal plants, as temperatures continue to rise. The composition of forests is expected to change as tree species that once flourished are driven northward. Furthermore, increased precipitation and decreased snow will result in less ice cover on Lake Michigan. More precipitation will also inundate watersheds and increase runoff and infilitration issues in the Indiana Dunes. Regional hydrology and water quality is already stressed by local industry, especially the railroad and steel industry. Furthermore, storm management structures, runoff and transportation routes provide a way for invasive or non-native species to enter and develop in the region. The growing season is expected to lengthen by a month, the advent of spring to start earlier and autumn later.

One important impact is phenological mismatch, or out of sync life cycle associations of organisms (like predator-prey relations or migration) that occurs when individual phenology shifts at different rates. Due to climate change, the triggers for plant's life cycle events is dependent on soil temperature. But the life cycle events of animals like bird migration are triggered by air temperature changes. However, one of the impacts of climate change is that air temperature is increasing faster than soil temperature and there is no change in day length so that animal and plant cycles are increasingly out of sync with each other (IDCCAP pg. 19).

For all these reasons, the Indiana Dunes is expected to face considerable environmental stress and the National Park System is developing strategies to ensure that the lakeshore is resilient to anticipated changes by strengthening certain elements.



Source: https://savedunes.org/wp-content/uploads/2018/05/Indiana-Dunes-Climate-Change-Adaptation-Plan-2018-2.pdf

For example, the availability of climate refugia (habitats that will persist as climate changes), landscape corridors that facilitate the movement of plants and animals to more suitable environments, healthy populations that are genetically diverse enough to adapt to said changes, and blocks of natural landscape that are large enough to be resilient to large-scale disturbances and long-term climate change impacts. Strategies like creating climate refugia exemplify resistance to climate change by trying to preserve an ecosystem and protect it from disturbance. Others, like enhancing biodiversity, exemplify strategies that promote resilience, or the ability of an ecosystem to deal with the disturbance and recover. Strategies that try to intentionally make a change and enable an ecosystem to respond to climate disturbances are transition actions, e.g. creating deeper wetlands. To read more about adaptation options and strategies for the part of the Indiana Dunes which extends into Gary, IN (Dunes and Swales), see pgs. 41-43 of the IDCCAP.

One challenge for climate mitigation strategies is the extensive habitat fragmentation in the region. The landscape is made up of industrial, natural and residential areas near each other and this can pose a great challenge for restoration and conservation, while also exacerbating existing stressors. Furthermore, this sort of fragmented habitat reduces the number of wildlife corridors that are needed for a resilient environment.

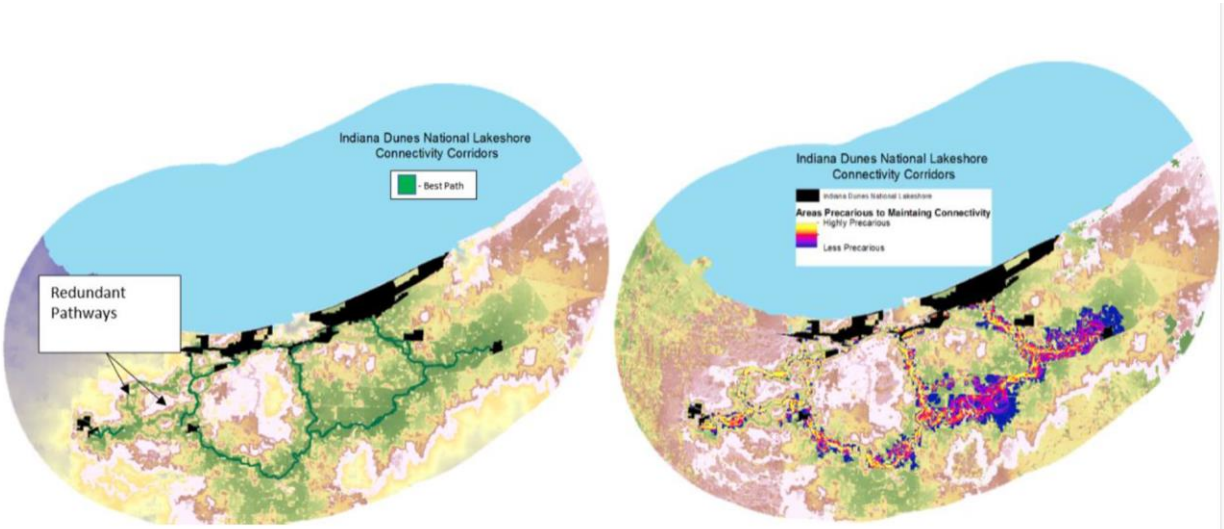


Figure 11. CircuitScape generated maps for the Indiana Dunes region, used during Workshop II for the adaptation planning process (courtesy Lindsay Hunt, U.S. Geological Survey).

Source: https://savedunes.org/wp-content/uploads/2018/05/Indiana-Dunes-Climate-Change-Adaptation-Plan-2018-2.pdf

Looking forward, it will be very important that regional planners and park managers have messaging systems for communicating climate related threats to visitors, residents and staff. This has already been identified as a key adaptation option and strategy for the entire Indiana Dunes Region:

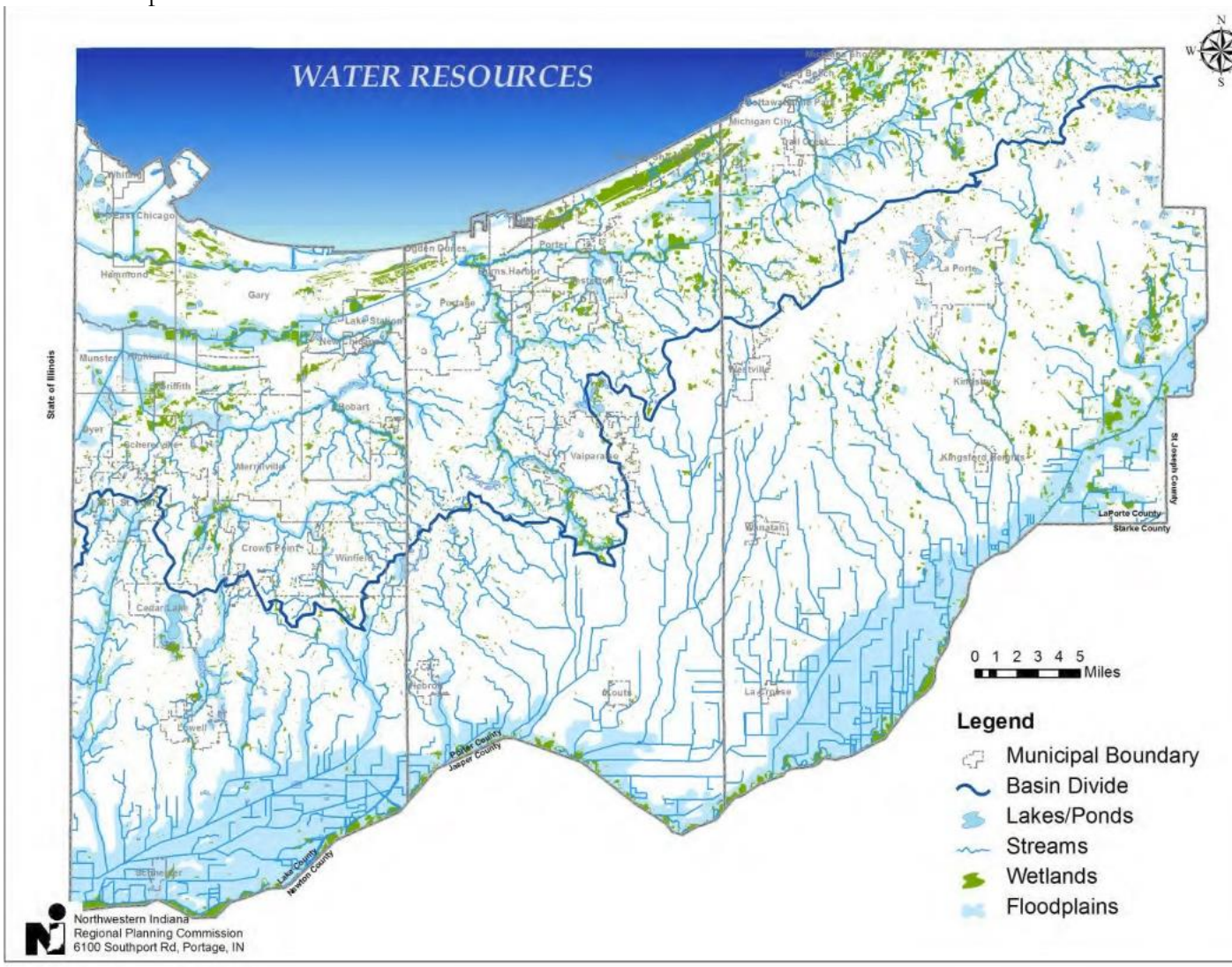
Monitor and communicate environmental conditions	Set up a system of alerts and actions (e.g., close trails, stay inside) to protect staff, residents, and visitors from extreme conditions (e.g., flooding events, heat stress). Monitor threats from wildlife and be proactive in communicating to the local community the appropriate responses.

Source: https://savedunes.org/wp-content/uploads/2018/05/Indiana-Dunes-Climate-Change-Adaptation-Plan-2018-2.pdf pg. 35

This echoes an earlier suggestion in chapter 2 (Air Quality) for a subscription-based or mobile-based application that sends automated notices to residents about relevant climate conditions and warnings. For a more detailed analysis of individual predicted climate change impacts and strategies for mitigating such impacts, see the following report: https://savedunes.org/wp-content/uploads/2018/05/Indiana-Dunes-Climate-Change-Adaptation-Plan-2018-2.pdf

6. Water

Water plays a vital role in Gary, IN where all businesses and residents get their drinking water from Lake Michigan or from groundwater in the Lake Michigan or Kankakee River basins. The industrial and agricultural sectors both rely heavily on continued and ready access to water, as do ports, harbors, and the marina all of which provide a means for both transporting goods nationally and internationally as well as opportunities for eco-tourism (at Buffington Harbor for example). For a variety of reasons, it is important that water quality is improved and responsible water use and conservation are prioritized.



Source: NIRPC 2040 Plan

Stormwater is rainwater or melted snow which runs off into the streets, lawns, etc. In urban areas, stormwater runs off streets, roofs, and parking lots into city sewers, storm drains, and local water sources like rivers and lakes. Stormwater can cause flooding and property damage, as well as wash pollutants and toxins off roads, residential and commercial property.

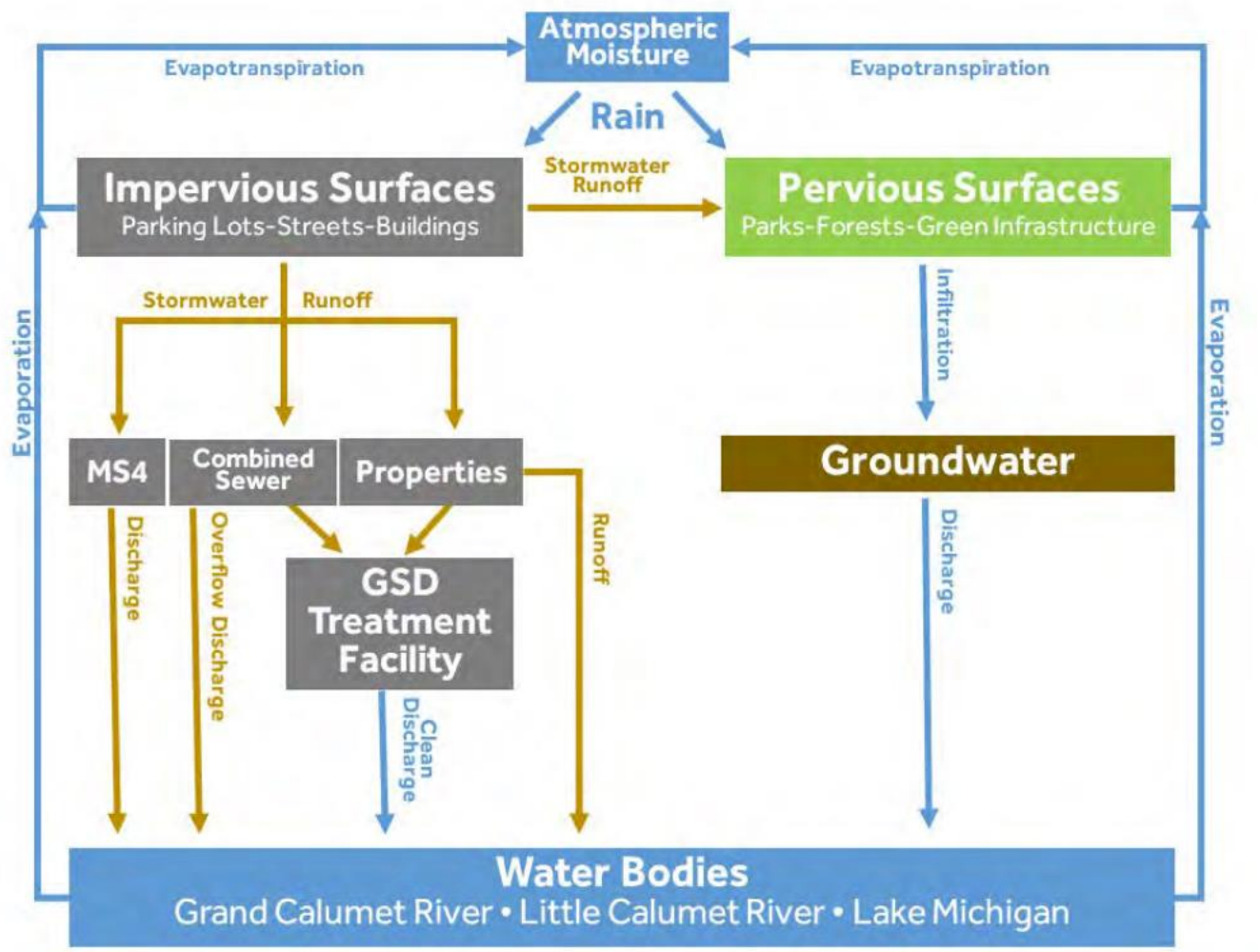
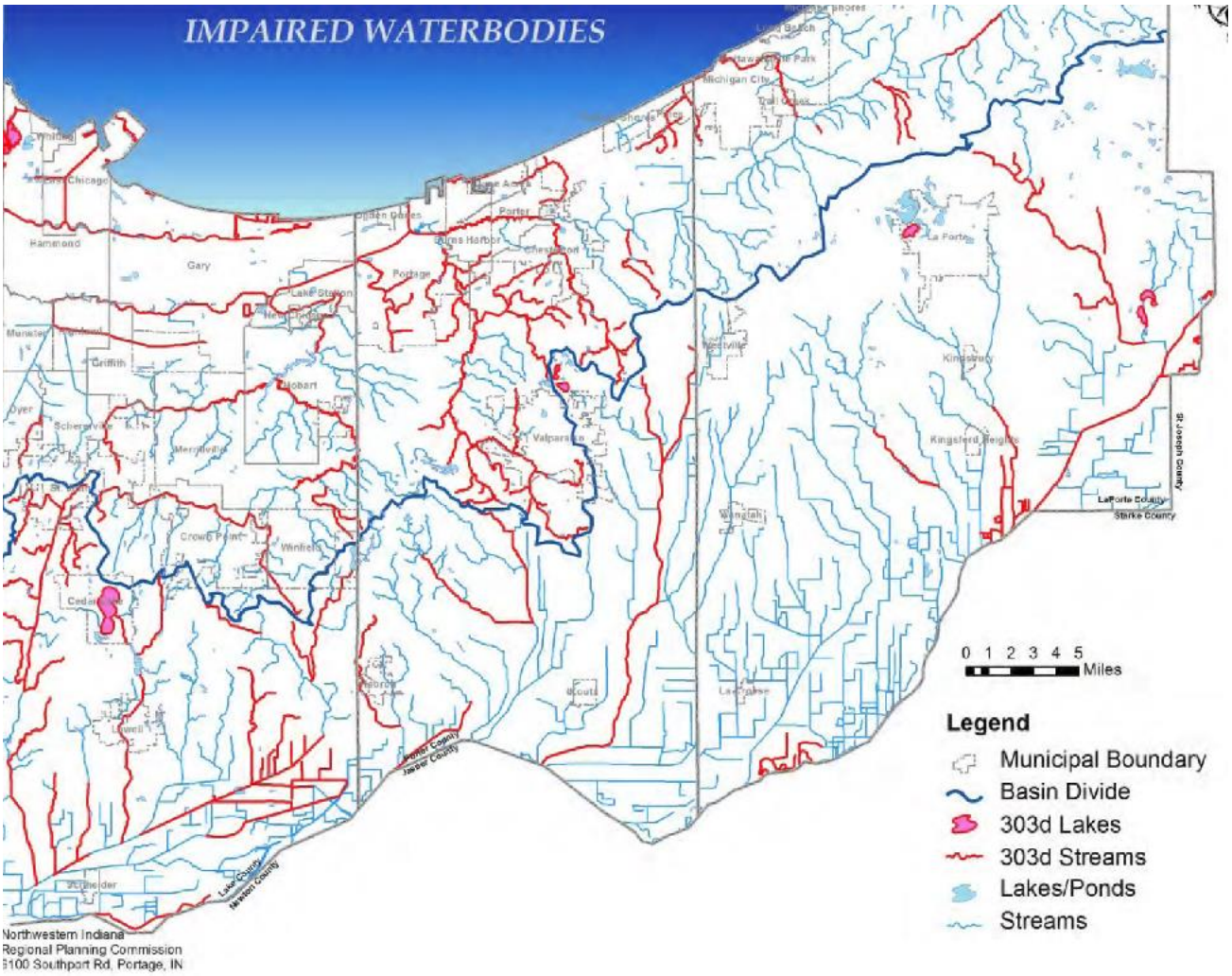


Figure 4: Gary Stormwater Diagram

Source: Gary Green Infrastructure Plan (2019) https://gary.gov/redevelopment/wp-content/uploads/sites/2/2019/10/Gary-Comp-Plan_Final_Appendix-A_GI-Plan_LR.pdf

Pollutants include litter, waste, pesticides, oils, fuels, fertilizers, etc. Septic systems can also contribute fecal bacteria to runoff and all these pollutants can end up in local water sources, contaminating drinking and recreational water supplies—all of which threatens public health. In fact, the EPA reports that stormwater runoff is a leading cause of impairment for 40% of US water bodies that do not meet water quality standards. The following figure shows impaired waterbodies in NWI:



Source: NIRPC 2040 Plan

One of the climate change impacts projected for Northwest Indiana is increased precipitation which means more frequent and intense rain which can overwhelm existing stormwater management systems leading to backups, local flooding, and/or greater quantities of contaminants in local waterways like the Little Calumet River and the Grand Calumet River.

Figure: Flooding of the Little Calumet River which flooded the parking lot at Indiana University Northwest (IUN) in 2008.

Gary suffers from both urban and riverine flooding during storms.

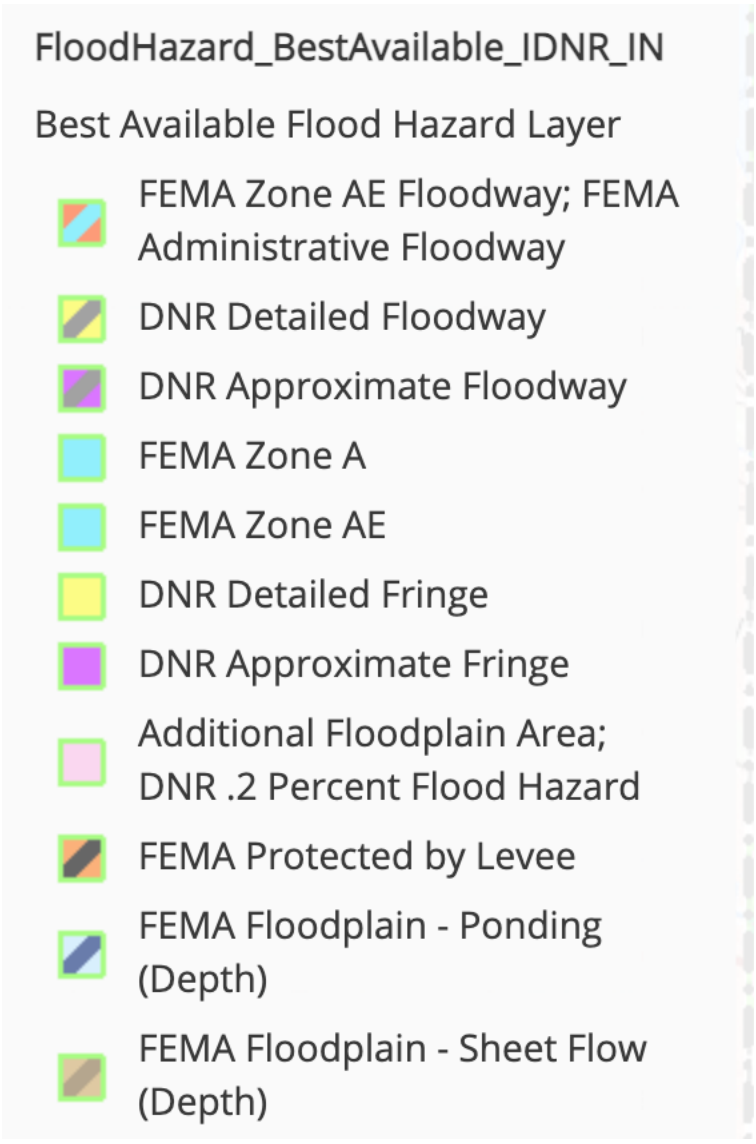
Urban flooding is caused by storms and due to urban development patterns because pavement and buildings (impervious surfaces) prevent water from being absorbed by the soil. Instead it collects on the surface and runs off. This is unfortunate since Gary's soil composition has high sand content with a higher water infiltration rate than other types of soil. This sandy soil means it can absorb a large amount of water.

Riverine flooding is also caused by storm events which increase the water volume of a river so it floods over the banks onto the floodplains.

A particular challenge is combined stormwater and wastewater drainage systems which, when overwhelmed with large amounts of rainfall, can lead to combined sewer overflows (CSOs) when untreated wastewater is discharged into waterways which reduces water quality. Combined sewers make up about 90% of the City's sewer system, serving about 25,000 residents. The sewer system transports combined wastewater to a sewage treatment plant to be treated before being discharged into a water body. In Gary, 4 CSO outfalls discharge into the Little Calumet River and 7 CSO outfalls discharge into the Grand Calumet River. Gary's CSOs negatively impact the water quality of the Lake Michigan watershed.

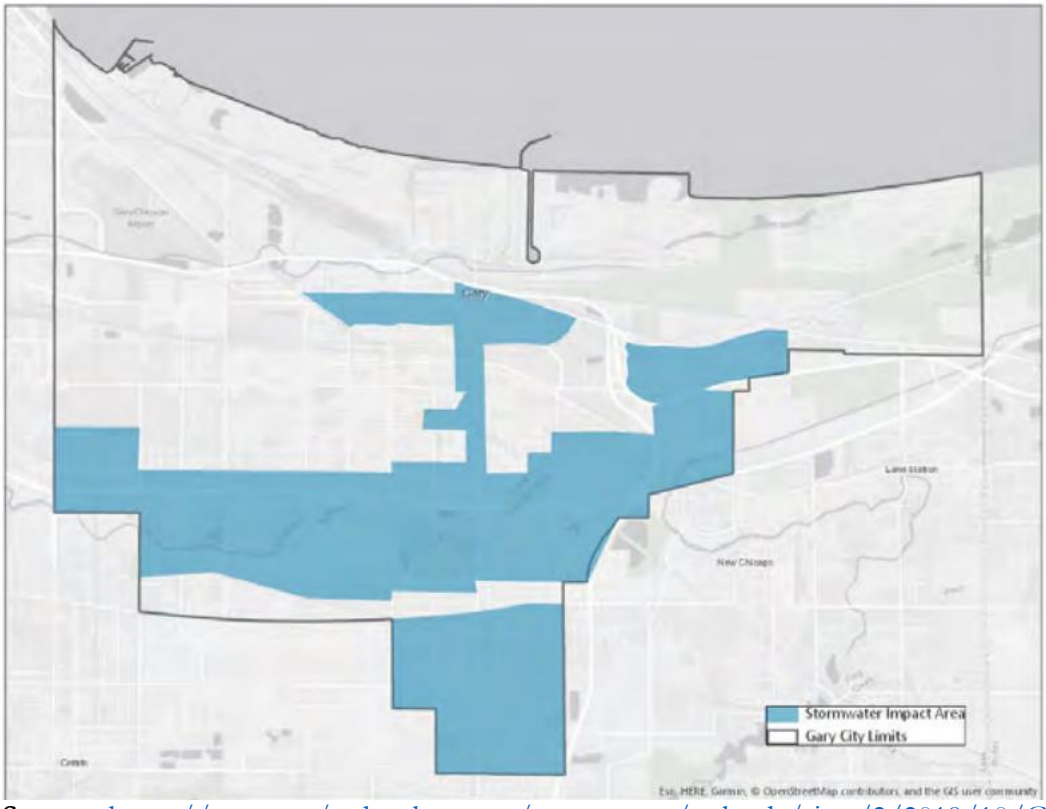
Floodplains are a very important feature of the natural environment that effectively provide areas where floodwaters can be stored and flood velocities and peaks can be reduced. They also help recharge groundwater supplies.


INDUSTRIAL HWY
Gary/Chicago
International
Airport
W 5TH AVE
Lake
W 4TH AVE
Gary
CLINE AVE
55
53
6



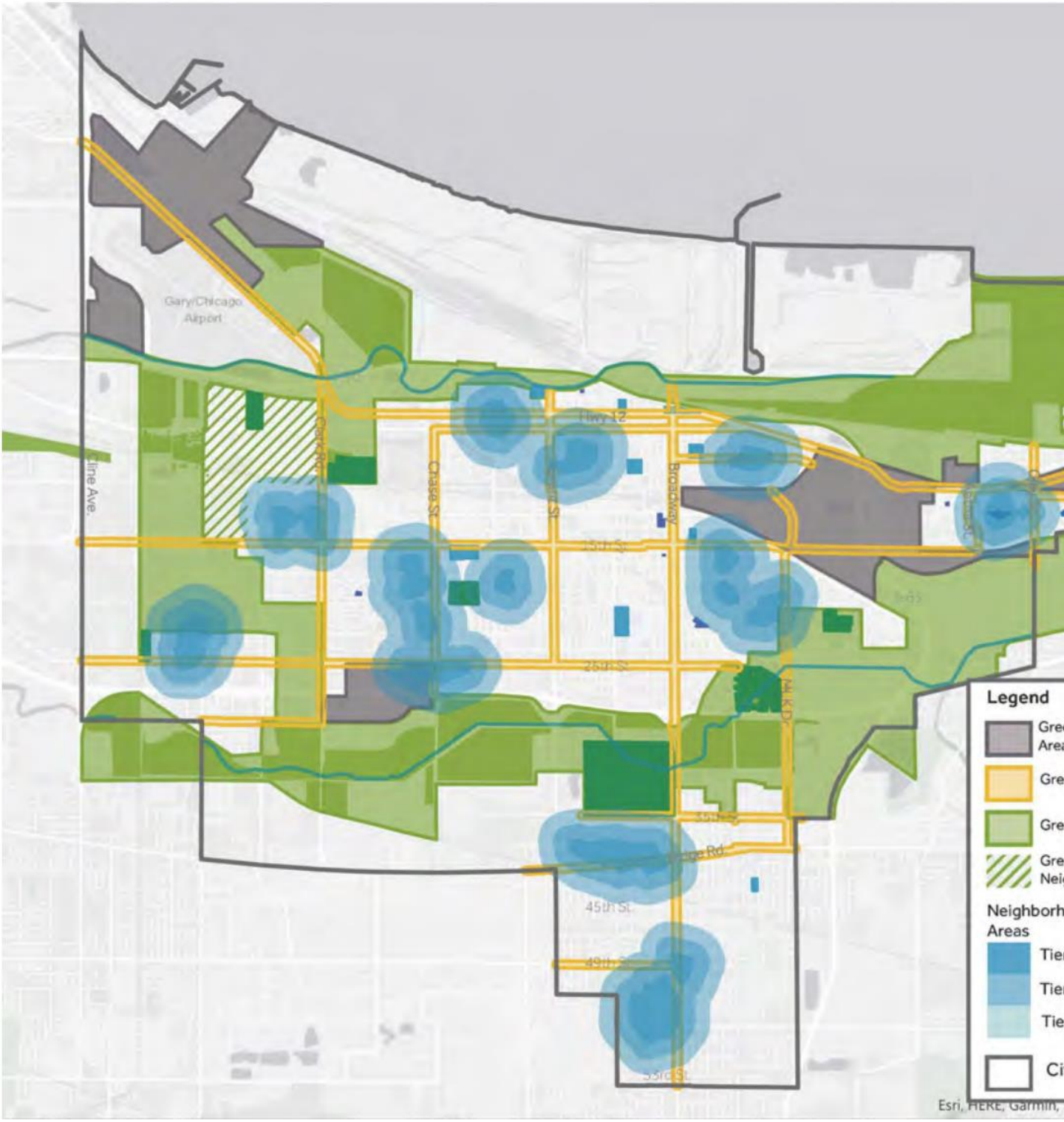
Source: https://indnr.maps.arcgis.com/apps/MapSeries/index.html?appid=48665e0948b04b398fbc07b8ea1cf232

We recommend preserving floodplains and increased green infrastructure in the form of planned systems that mimic natural processes, like rain gardens, trees and green roofs, to effectively manage stormwater. Parcels of land with (1) impervious land cover (2) that are classified as having high or moderate infiltration rates and (3) are at or near high flooding or sewer back up areas are high priority areas for green infrastructure projects. The following are the areas of greatest concerns for chronic flooding and negative water quality:



Source: https://gary.gov/redevelopment/wp-content/uploads/sites/2/2019/10/Gary-Comp-Plan_Final_Appendix-A_GI-Plan_LR.pdf

This is because these are areas that are particularly vulnerable to future climate change impacts. The figure below identifies stormwater parks which are parks that could be retrofitted with green infrastructure to improve stormwater management.

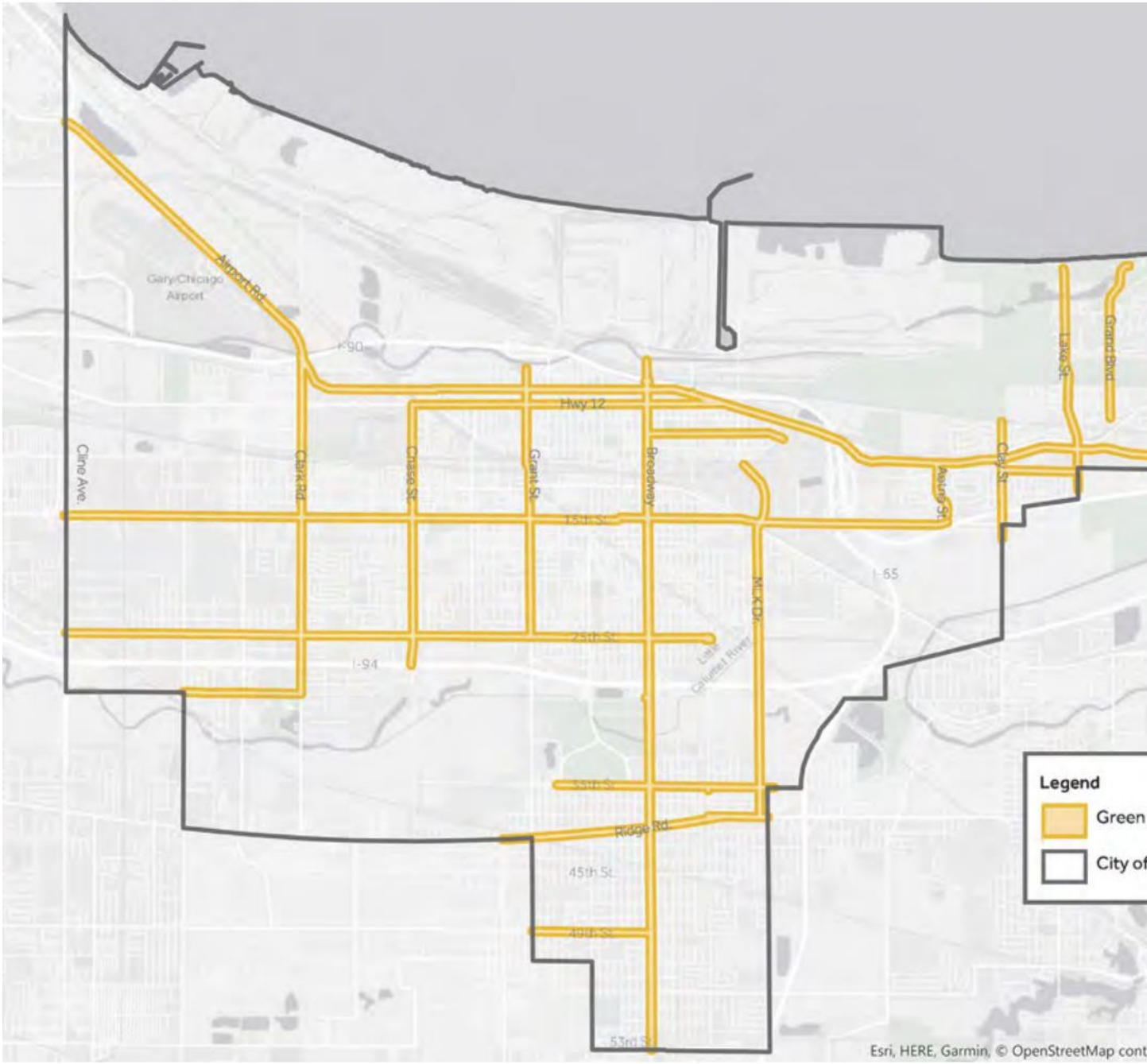


Source: https://gary.gov/redevelopment/wp-content/uploads/sites/2/2019/10/Gary-Comp-Plan_Final_Appendix-A_GI-Plan_LR.pdf

These parks include:

Aetna Playground 2
Unnamed Playlot,
Nichols Place,
Aetna Playground 1,
Van Buren Totlot,
Pierce Park,
Tarrytown Playground,
Aetna Park,
June LaBroi Park,
Gateway Park,
Jackson Park,
Reed Park,
Roosevelt Park,
Ambridge Mann Park,
Borman Square Park,
Tolleston Park,
Buffington Park,
Howe Park

Other important areas to keep in mind for tree planting and other forms of green infrastructure are green corridors, roadways that are a major source of stormwater runoff because they represent large bodies of impervious surfaces, including buildings:



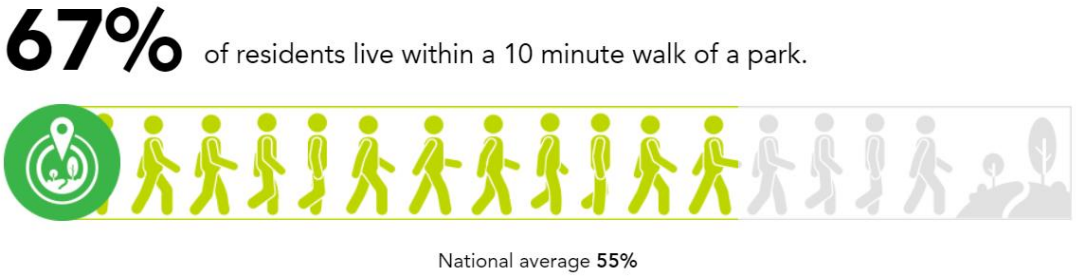
Source: https://gary.gov/redevelopment/wp-content/uploads/sites/2/2019/10/Gary-Comp-Plan_Final_Appendix-A_GI-Plan_LR.pdf

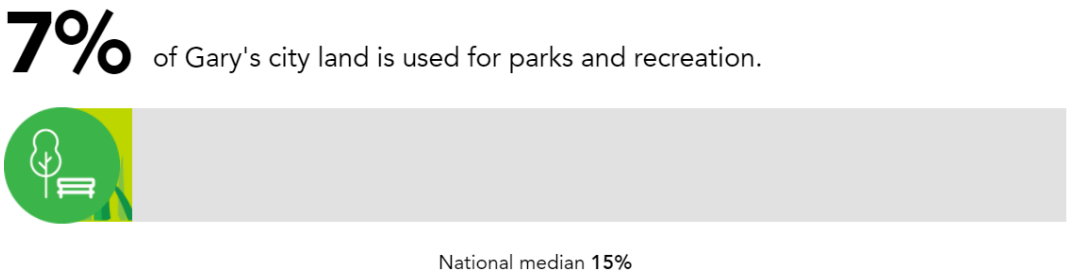
A more comprehensive list of green infrastructure projects can be found in the Green Infrastructure Framework Map and Priority Project List which were developed using the Green Infrastructure Tool which measures and evaluates an area's suitability for green infrastructure projects.

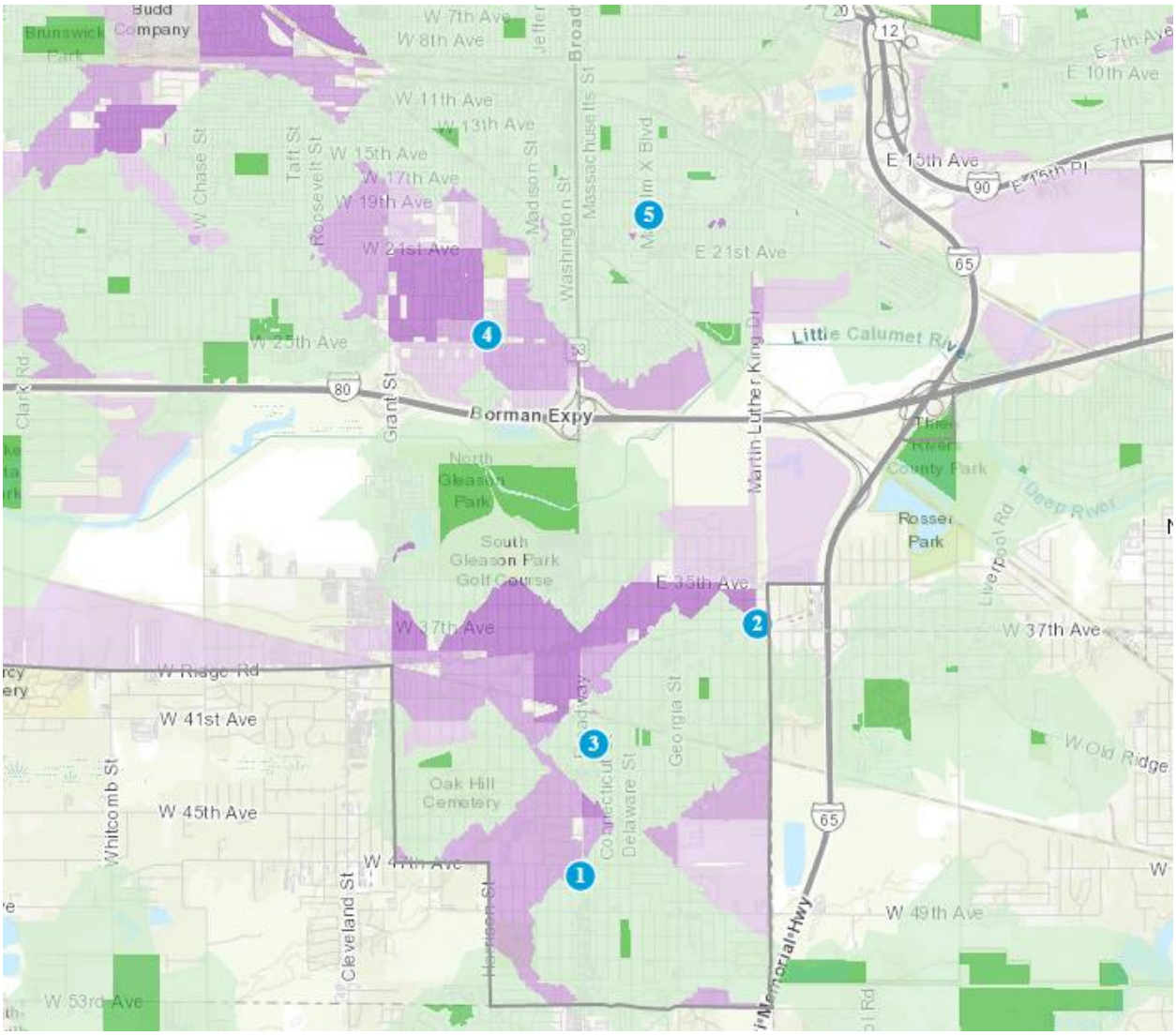
Park Accessibility

The Trust for Public Land's Parks initiative aims to identify areas that lack access to safe, high quality park within a 10-minute walk from home. 67% of Gary residents live within a 10-minute walk of a park, and there are no major difference in park accessibility based on age. Approximately 2/3 of children, adults, and seniors live within a 10-minute walk of a park.

One of Gary's challenges with respect to parks emerges from the geographic size of Gary, as the City has a significantly lower proportion of land used for parks and recreation compared to the national median. A related challenge is that a significant number (about 27) of municipal parks are not actively maintained by the Department of Public Parks. The Trust for Public Land mapping tool identifies populated areas in a city that fall outside of a 10-minute walk to a park and include factors such population density, density of low-income households, density of people of color, community health, urban heat islands, and air pollution. The tool identifies the top 5 locations for new green space based on community vulnerability. Similar tools may be useful to identify locations for new urban greening projects in Gary and to identify priority parks to rehabilitate.







Current parks are represented in green. Portions of the map shaded in purple have a high need for new parks, and the darkest purple areas have the highest need.

Source: The Trust for Public Land

Some strategies for improved stormwater management include the following:

(1) Bioswale ditches (with native plants) or hybrid ditches (with grass) along roadways, like Green Corridors, which collect storm water and channel it to an existing ditch, sewer or water source.
(2) Box tree filters which take runoff, treat it with physical/biological methods so it returns cleaner to existing storm sewers
(3) Permeable pavement which allows infiltration of rainwater
(4) Rain gardens which are low elevation areas that collect rainwater and drain slowly into native soil or an underdrain system
(5) Green roofs with plants which absorb water so they convert an impervious surface into one that can retain and filter stormwater

7. Recommendations

(1) Build stronger and higher flood walls where necessary
(2) Install rain barrels at City Hall and other municipal buildings where planters require watering
(3) Model perforated pipe projects to estimate capital cost range and runoff reduction potential
(4) Implement the Gary Green Infrastructure Plan and associated recommendations
(5) Conduct a street-level tree canopy assessment to identify locations that are vulnerable to the heat island effect and/or flooding, amenable to tree replanting efforts, and high-priority with a high number of residents living nearby
(6) Plant 1000 trees
(7) Replant trees recommended by Urban Forestry Management along the interstate (I-90) which borders the industrial area with large amounts of impervious surfaces and where stormwater collects
(8) Maintain existing middle aged to mature age trees
(9) Protect existing (especially old) trees from being damaged during construction and development
(10) Preserve the variety of plant species in the region
(11) Ensure that warm-weather plants, which will increase given increasing temperatures, don't crowd out many of the plants that grow in Northern forest
(12) Improve stormwater management at Indiana Dunes park
(13) Create climate refugia and landscape corridors for pants and animals
(14) Improve plant and animal genetic diversity
(15) Reclaim vacant lots as parks for stormwater management and resilience to long term climate change impacts
(16) Develop messaging systems for communicating climate related threats to visitors, residents and staff.
(17) Expand green infrastructure projects in high priority areas for stormwater management
(18) Achieve water quality standards for lakes and rivers
(19) Upgrade aging water infrastructures
(20) Preserve floodplains and wetlands and/or construct wetlands in open spaces for stormwater management
(21) Preserve regional greenways and blueways (water trails) and linkages between them

City Accomplishments: Taking Climate Action

Vacant to Vibrant Program:

From 2014 to 2016, the City of Gary, in partnership with the U.S. Environmental Protection Agency Green Infrastructure Technical Program, the Cleveland Botanical Garden, Indiana University Northwest, and Strong Cities, Strong Communities completed three Vacant to Vibrant projects. The City converted .37 acres of vacant land in Gary's Aetna neighborhood to green infrastructure. These spaces now feature bat houses, rain gardens, and native plants. The Gary Storm Water Management District created the Urban Conservation Team to provide maintenance support for these and Gary's numerous other green infrastructure installations.

Gary Green Infrastructure Plan is included in Appendix A of the Gary Comprehensive Plan. Informed by over two years of research, planning, and engagement, it provides a city-wide framework for green infrastructure that is integrated with its broader land use planning and redevelopment efforts. It presents three clear and distinct purposes for green infrastructure in the city:

1. Environmental Conservation: Expansion, restoration and enhancement Gary's native landscape, including the globally-rare features of the Indiana Dunes National Park, such as black oak savanna, dune and swale, etc.
2. Stormwater Management: Reduction of flooding and polluted stormwater runoff through the strategic installation of engineered green infrastructure practices in flood prone areas, along the public right of way, and on public and private property.
3. Beautification & Recreation: Enhancement of the aesthetics and accessibility of the City's neighborhoods, corridors, and parks, through strategically planned and well-maintained landscaping, gardens, park spaces, etc.

The Plan includes Model Zoning and Permitting Guidelines, developed by the Alliance for the Great Lakes and Delta Institute Watershed Management Plans, a Financial Analysis that details the return of investment from a city-wide implementation of the Plan's Priority Projects, and suggested Management, Funding & Financing Strategies for implementing and maintaining green infrastructure.

Gary Green Link Master Plan

The Gary Green Link Master Plan, completed in 2005 and summarized in the Gary Comprehensive Plan Appendix B, outlines implementation and management measures to create a natural resources greenway and recreation corridor, the Gary Green Link, which will ring the City of Gary, connecting the Grand Calumet River, the Little Calumet River, and the Lake Michigan shoreline. The Gary Green Link Master Plan addresses the dune and swale habitat unique to the Southern Lake Michigan coast with a plan to protect natural areas, connect them with multi-use trails, and interpret Gary's natural history and natural areas, economic history, and social history.

Grey to Green Initiative

From 2013 until 2017, utilizing the Grey to Green: EPA Great Lakes Restoration Initiative: Shoreline Grant from US EPA. The City of Gary selected up to 15 City-owned sites currently covered by impervious surface materials (e.g., parking lots) and retrofitted these sites with green infrastructure such as permeable pavement, rain gardens and bioswale.

Roadway Green Infrastructure
Roadway Green Infrastructure is a priority project in the Gary Comprehensive Plan that includes 24 Sidewalk Green Infrastructure, Bioswale/Hybrid Ditches and Perforated Pipe projects encompassing 25 miles and four intersections throughout the City. Measures addressing flooding and stormwater issues include installation of stormwater planters, tree replacement, box tree filters, permeable pavement bike lanes and other sidewalk improvements.

Buchanan Street Green Gateway
In 2012, the City of Gary, in collaboration with the U.S. EPA, restored the east lagoon. Following community outreach for input, restoration efforts included dredging portions of the lagoon, reconstruction of Patterson Island, shoreline restoration, creation of fish habitat, and construction of an additional non-motorized watercraft launch and new fishing overlook. This project installed about 20 projects including bioswales, rain gardens, filtration strips, and street scape infrastructure, and trained five Brownfield-knowledgeable residents to install and care for the features.

Marquette Park Lagoon Green Stormwater Management Initiative
Marquette Park is a Conservation Park, the crown jewel of Gary's park system, and abutting the Indiana Dunes National Lakeshore property. Marquette Park boasts numerous high quality natural features of the Indiana Dunes ecosystem, including sand dunes, lagoons, upland forests, and wetlands. Marquette Park underwent a $28 million redevelopment and enhancement in 2010, including restoration of the dunes, remediation of the lagoons, and installation of wet prairies on the eastern portion of Grand Boulevard. In turn, valuable, well-maintained conservation land already exists in the park. Nonetheless, effective maintenance of the park's coastal features is a critical ongoing need.

CommuniTree
In northwest Indiana, the CommuniTree program grew out of the need to promote tree planting, after-planting care and maintenance of trees. CommuniTree partnership grants from the NIRPC CommuniTree supported dynamic partnerships of community, industry and government agencies with the ultimate goal of creating a healthier and more diverse tree population.1 In 2017 and 2018, members from the Lab for Urban Forestry in the Anthropocene (LUFA), the Student Conservation Association's (SCA) Calumet Tree Conservation Corps, and community volunteers planted trees in Gary.

NFWF Green Stormwater Management
The National Fish and Wildlife Foundation (NFWF) provides grants to protect and retore fish, wildlife, plants and habitats for current and future generations. In November 2018 the City of Gary was awarded a grant from the CHI-CAL Rivers Fund to help improve and enhance waterways in the Chicago and Calumet region. Gary received $259,263 to install 43,200 square feet of green stormwater infrastructure at 27 public sites throughout the city.

8. Sources

1. https://gary.gov/environmental-affairs/storm-water-management-ms4-program/
2. https://www.epa.gov/arc-x/climate-impacts-water-quality#stormwater
3. https://www.epa.gov/arc-x/climate-adaptation-and-stormwater-runoff
4. https://gary.gov/redevelopment/wp-content/uploads/sites/2/2019/10/Gary-Comp-Plan_Final_Appendix-A_GI-Plan_LR.pdf
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6. https://maps.indiana.edu/
7. https://www.epa.gov/green-infrastructure/reduce-urban-heat-island effect#:~:text=%22Urban%20heat%20islands%22%20occur%20when,heat%2Drelated%20illness%20and%20mortality
8. https://indnr.maps.arcgis.com/apps/MapSeries/index.html?appid=48665e0948b04b398fbc07b8ea1cf232
9. https://www.tpl.org/city/gary-indiana

Chapter 6. Transportation

Burning fossil fuels releases greenhouse gases into the Earth's atmospheres. These greenhouse gases— such as carbon dioxide (CO_2) methane (CH_4) and nitrous oxide (N_2O)— cause the atmosphere to warm up which changes Earth's climate in a variety of observable ways such as rising sea levels, decreased precipitation, and more frequent and intense extreme weather events like monsoons. Common fossil fuels used by human beings include diesel and gasoline which are relied on as fuel sources for vehicles and transportation more generally. In the US, transportation accounts for approximately 30% of total greenhouse gas emissions, being the largest contributor of US greenhouse gases (EPA).

1. Goals

There are three climate-related transportation goals:

(1) Reduce transportation emissions,
(2) Increase resident access to energy efficient transportation for mobility and job accessibility ,and
(3) Conserve and maintain natural habitats in the city such as wetlands and dune and swale habitats.

2. Background

If Indiana is the "Crossroads of America", then Northwest Indiana is the "Crossroads of Indiana" being a major intermodal transportation hub at the intersection of multiple major inter- and intra-state highways and toll roads including: I-80/90, I-80/94, I-65, U.S. 41, U.S. 30, I-90, and US 231. In fact, all major surface routes between the east coast and Chicago (a national railroad hub) pass through Northwest Indiana, where Gary is located. Within Gary, there are 67 miles of interstate highways and 54 miles of U.S. and state highways as well as over 150 miles of heavy rail mainline. Northwest Indiana lies within a day's drive to 80% of the US population with easy access to Chicago, a network of railroads, a port, airport facilities and various major highways. This asset provides a major growth opportunity that has yet to be fully explored and leveraged to attract investment and development by regional businesses.

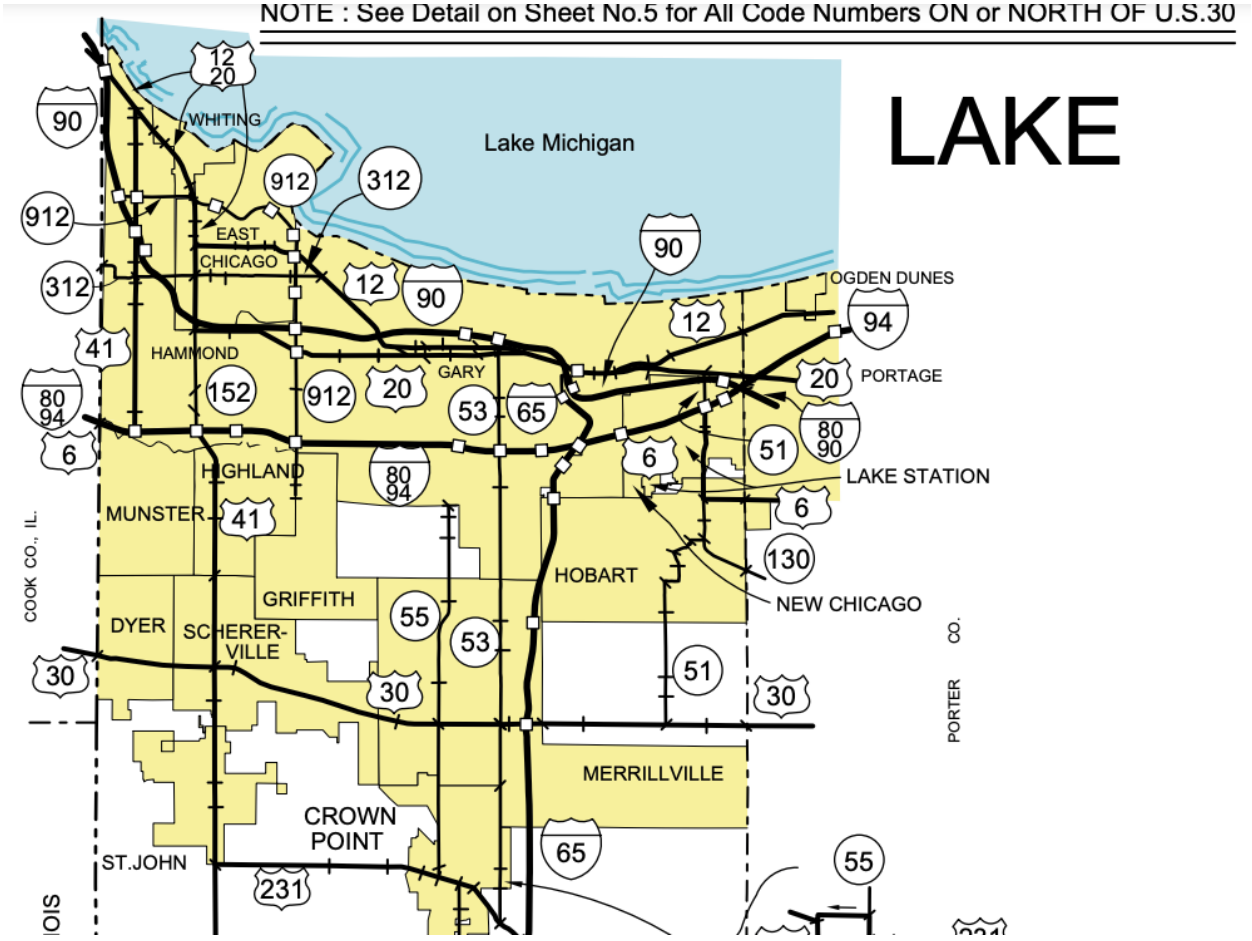


Figure 1: Map of major roadways in Northwest Indiana. Source: https://www.in.gov/indot/files/lake(1).pdf

3. Current Data

In 2019, the city of Gary completed a greenhouse-gas emissions inventory for the year 2017 and found that industrial facilities generated the most emissions. However, when industrial facilities are excluded, the transportation sector contributed 30% of total emissions. With respect to city operations, the city vehicle and transit fleet contribute 5.1% of emissions relative to other city operations like buildings and wastewater. Within the transportation sector, on-road vehicles contribute the most emissions (62%) followed by rail transportation (17%) and off road vehicles (13%). On-road vehicles include the following: passenger cars, motorcycles, light trucks and heavy trucks.

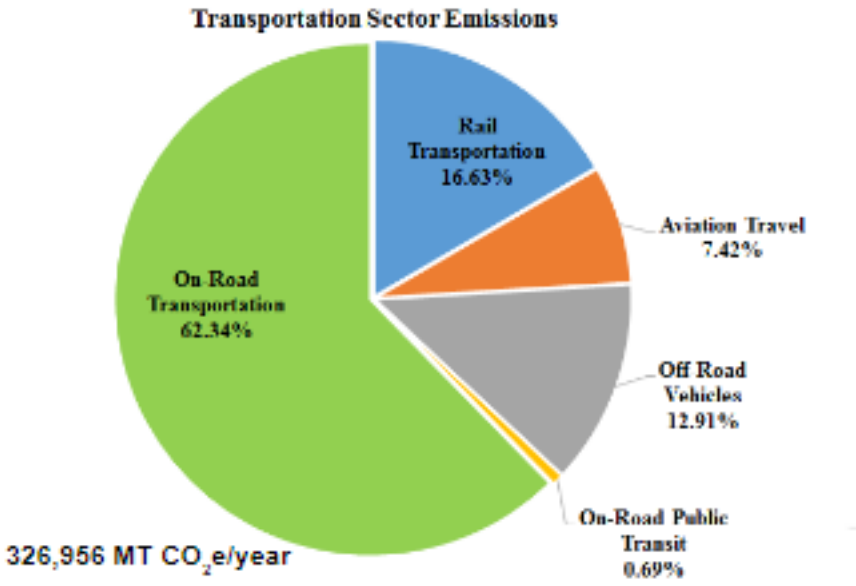


Figure 2: Emissions from Different Sources Within the Transportation Sectors (year).

The following table summarizes data about mileage and daily vehicle miles traveled (DVMT) for the city of Gary in Lake County, IN.

Functional Classification	Length (Miles)	Vehicle Miles Traveled (All Vehicles)	Vehicle Miles Traveled (Commercial Vehicles)
Principal Arterial - Other	6.36	38,581	1,463
Minor Arterial	25.85	211,694	7,074
Major Collector	34.36	110,030	2,786
Minor Collector	25.14	76,429	1,218
Local	342.30	1,229,564	531
	434.02	**1,666,298**	**13,072**

Figure 3: Summary of miles traveled in Gary, IN broken down by functional classification (INDOT 2020).

Relative to the rest of the state, Lake County is second only to Marion County in terms of total vehicle miles traveled for both all and commercial vehicles.

Length (Miles)	Vehicle Miles Traveled (All Vehicles)
2,917.60	**16,710,000**

Figure 4: Summary of total length and vehicle miles traveled for all and commercial vehicles in Lake County, IN (INDOT 2020).

Length (Miles)	Vehicle Miles Traveled (All Vehicles)
3,824.63	28,953,000

Figure 5: Summary of total length and vehicle miles traveled for all and commercial vehicles in Marion County, IN (INDOT 2020).

With respect to the entire state, Lake County accounts for 7.9% of total daily vehicle travel and 3% of total miles traveled in length.

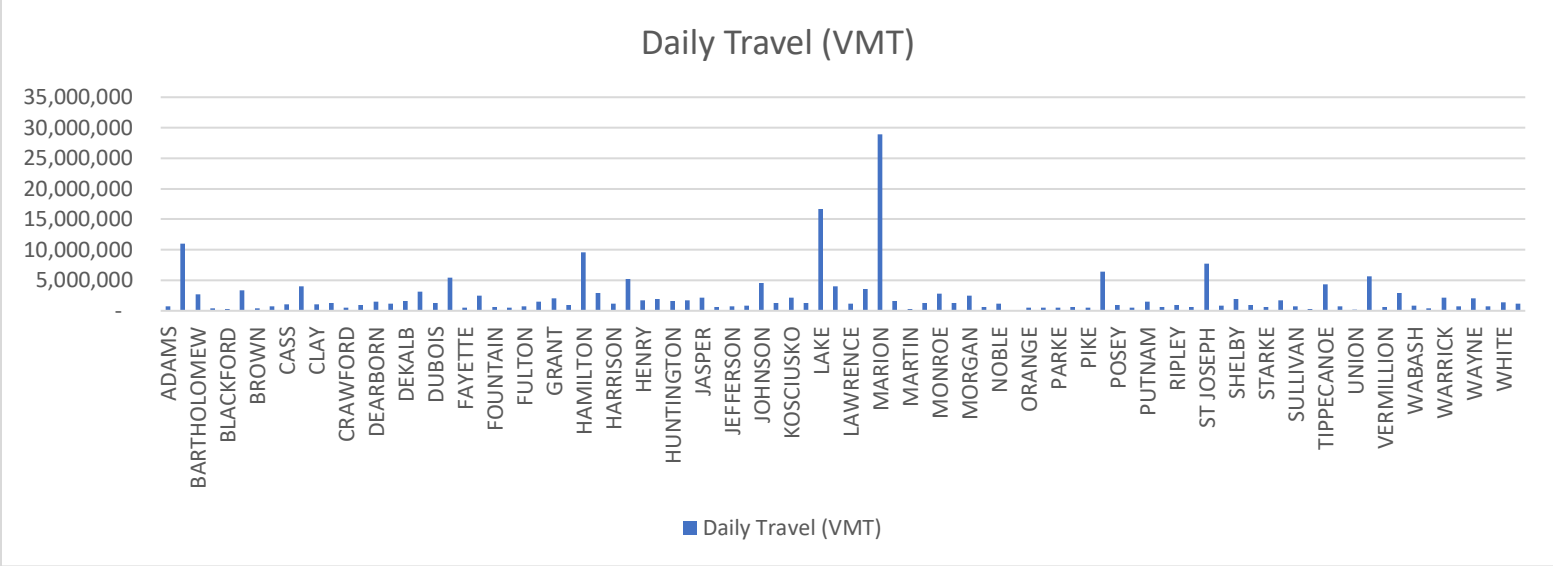


Figure 6: Daily VMT by county (INDOT 2020).

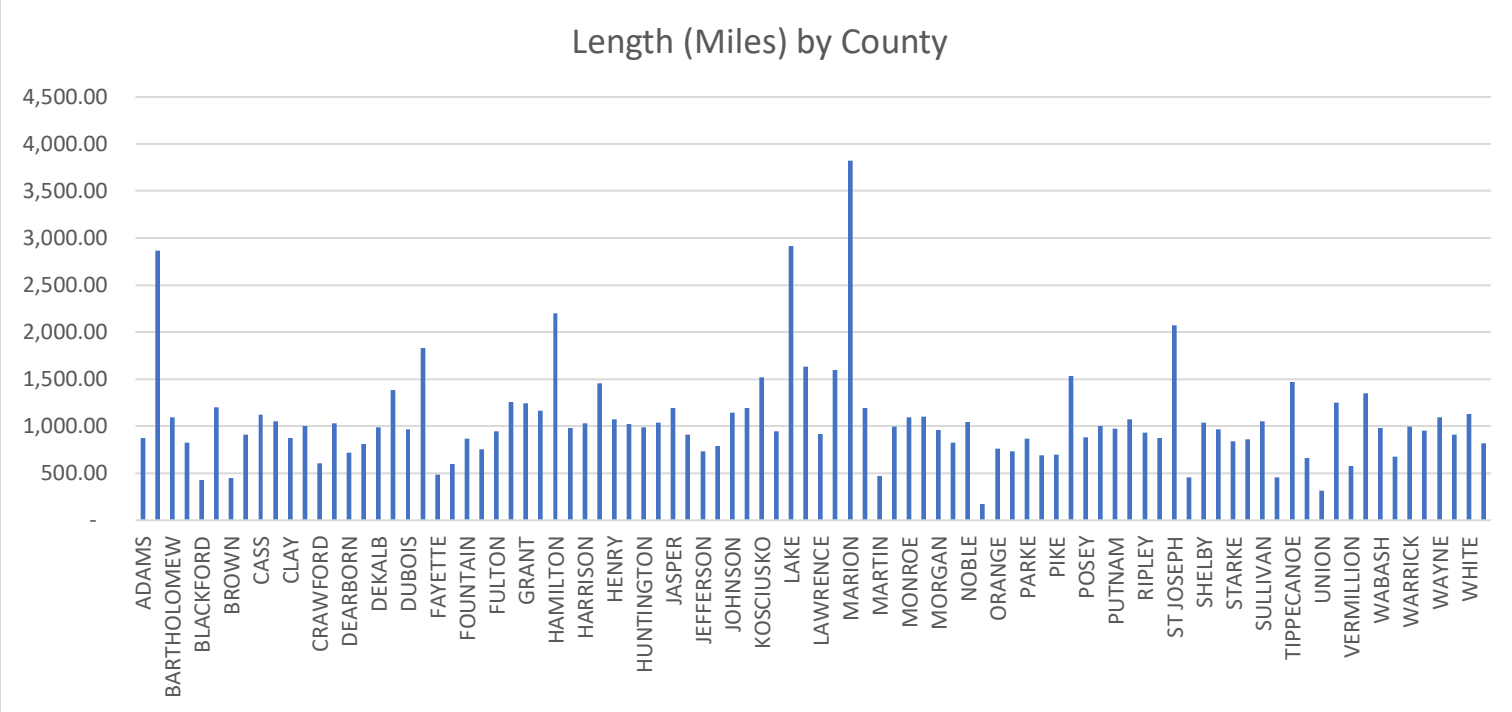


Figure 6: Length of miles traveled by county (INDOT 2020).

Within Lake County, Gary accounts for the majority of miles traveled by all and commercial vehicles when rural areas are excluded. The same holds for VMT (daily vehicle miles traveled) for all and commercial vehicles.

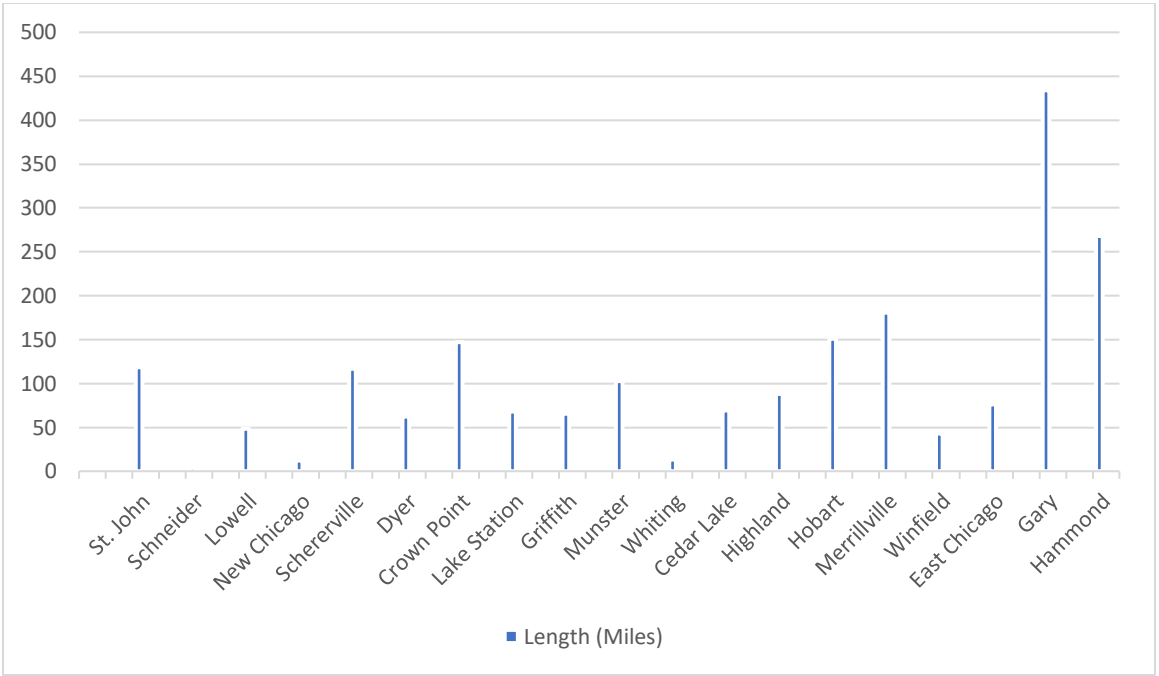


Figure 6: Miles traveled in each city in Lake County, excluding rural areas (INDOT 2020).

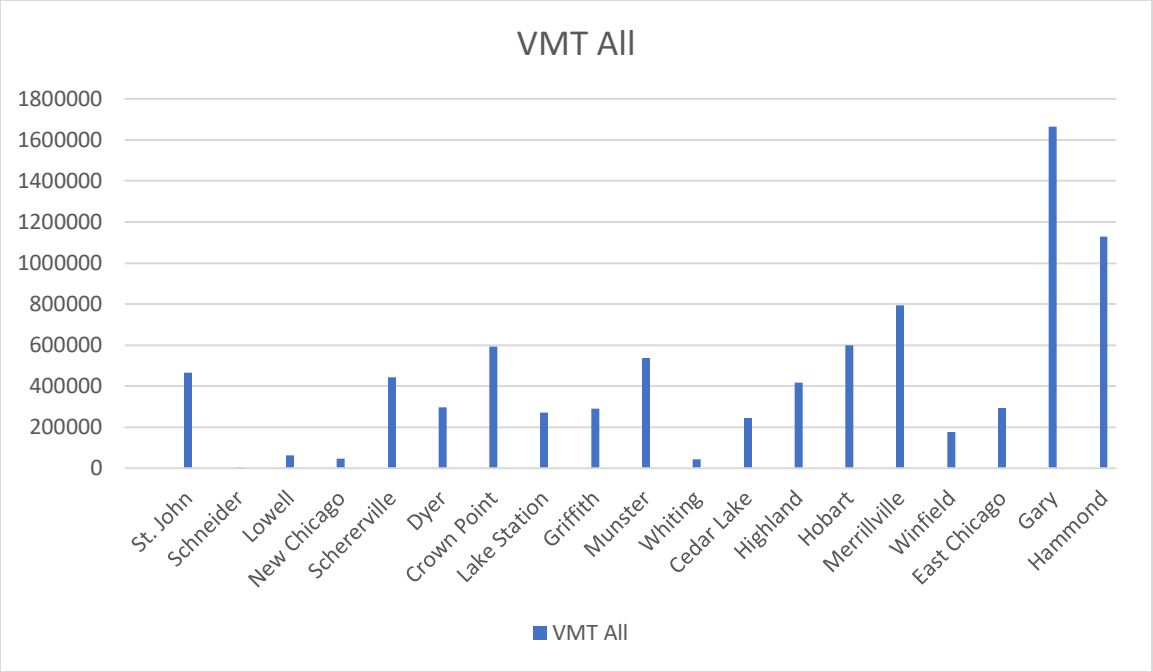


Figure 7: VMT for all vehicles in each city in Lake County, excluding rural areas (INDOT 2020).

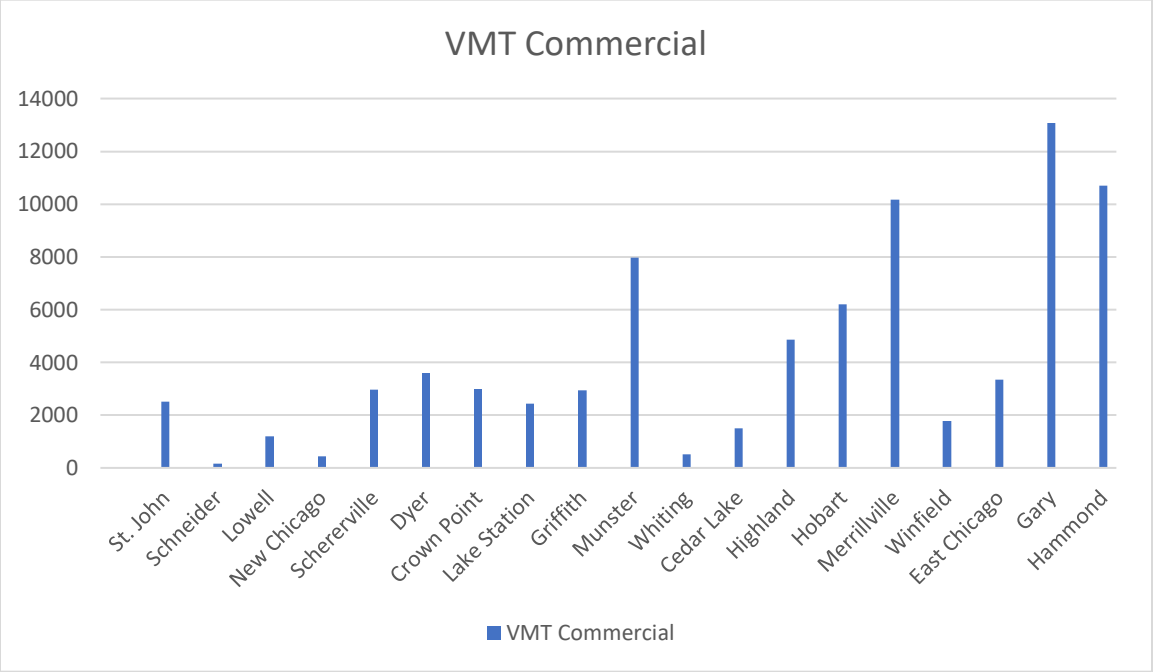


Figure 8: VMT for commercial vehicles in each city in Lake County, excluding rural areas (INDOT 2020).

Rail transportation includes emissions from Class I, II, and III Freight and Passenger Railroads. The figure below breaks down the railroad emissions by rail companies:

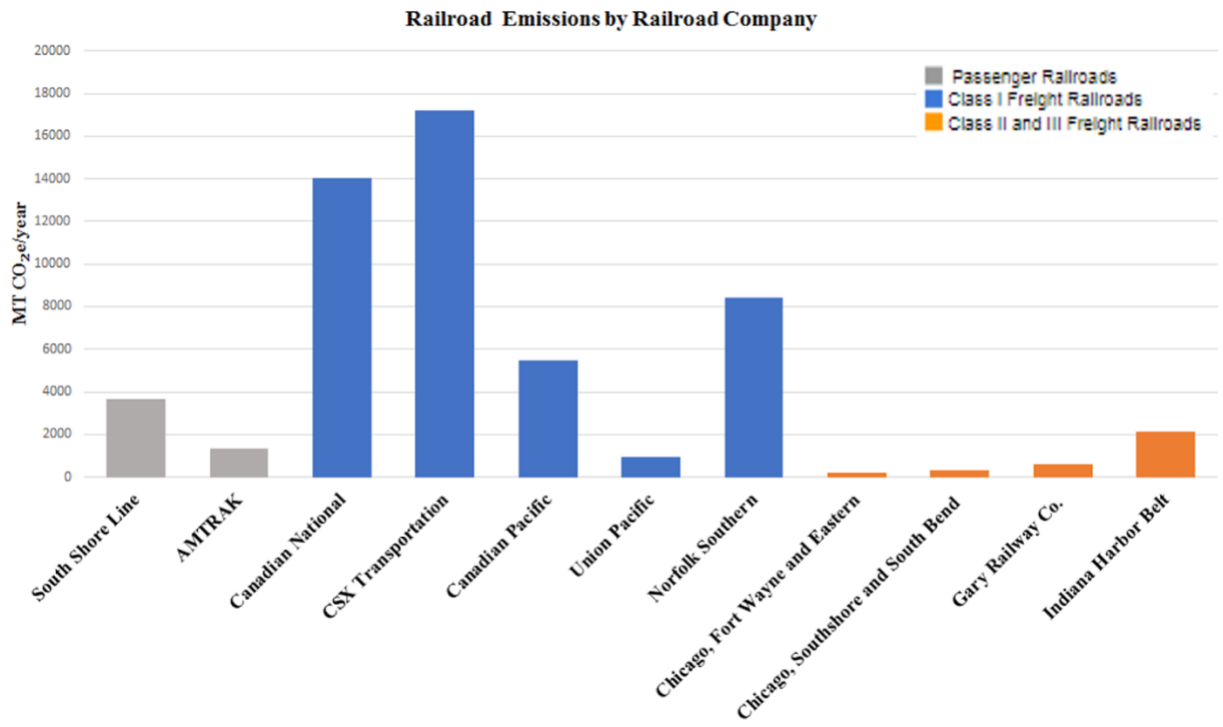


Figure 9: Emissions by Railroad Company according to its Specific Classifications.

This figure is based on measurements of the total track miles that lay within city limits and the estimated fuel use per gallon per year. The South Shore Line passenger train is the only railroad to operate on electricity, so their emissions are Scope II emissions. All the rest of the railroads run on diesel and generate Scope I emissions.

On road public transit, Gary Public Transportation Corp (GPTC) generates less than 1% of total transportation emissions. Public transit refers to all vehicles in the GPTC fleet, including transit and paratransit buses, light trucks (SUVs and pick-up trucks), and passenger vehicles. Unsurprisingly, transit buses are contributing the majority of emissions within the public transit services category.

4. Accomplishments

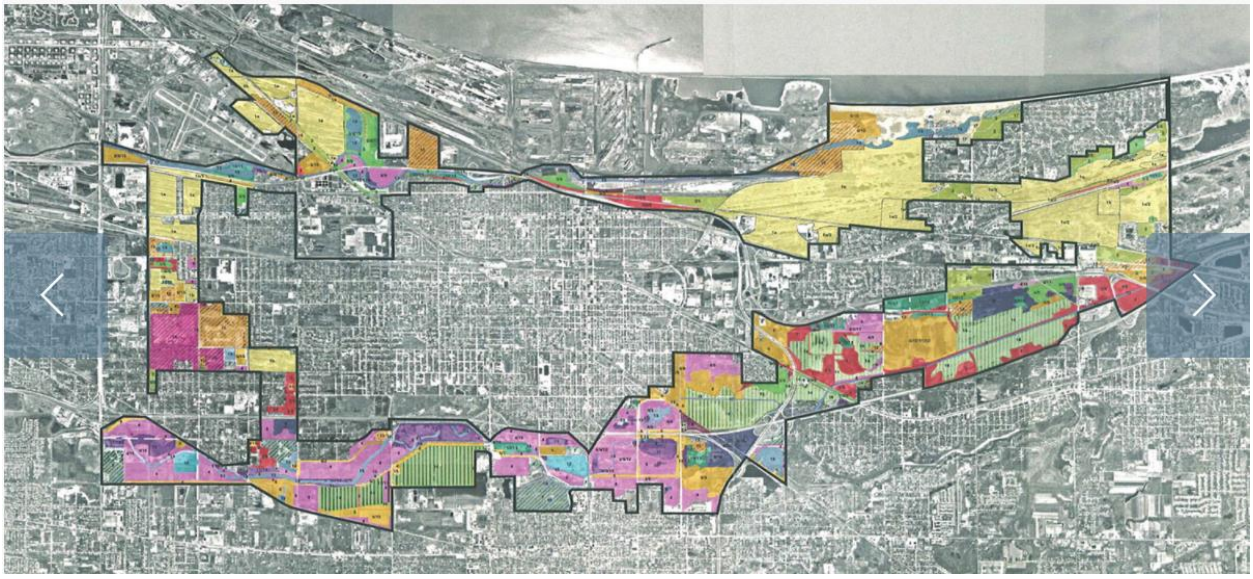
a. Repairs/Safety

In 2018, the city of Gary received $15.2 million through the Indiana Department of Transportation to close a dangerous rail road crossing along North Clark Road. With improved safety, there is an opportunity to increase infrastructure and develop the surrounding industrial acres around the crossing.

b. Trail Systems – Natural Environment

The Gary Green Link Master Plan was completed in February 2005 and was solicited to find a natural resources greenway that goes around the city and connects the Grand Calumet River, Little Calumet River, and Lake Michigan. It is intended to provide residents with access to the Lake

Michigan shoreline for recreational activities with 30 miles of multi-use trails to be used by pedestrians and cyclists. This is also intended to provide a natural green corridor for wildlife that may need to migrate given the impacts of climate change. Such a corridor would be a part of the Indiana Dunes National Lakeshort. In the course of the study, various significant natural resources and open spaces were identified to be protected and restored.



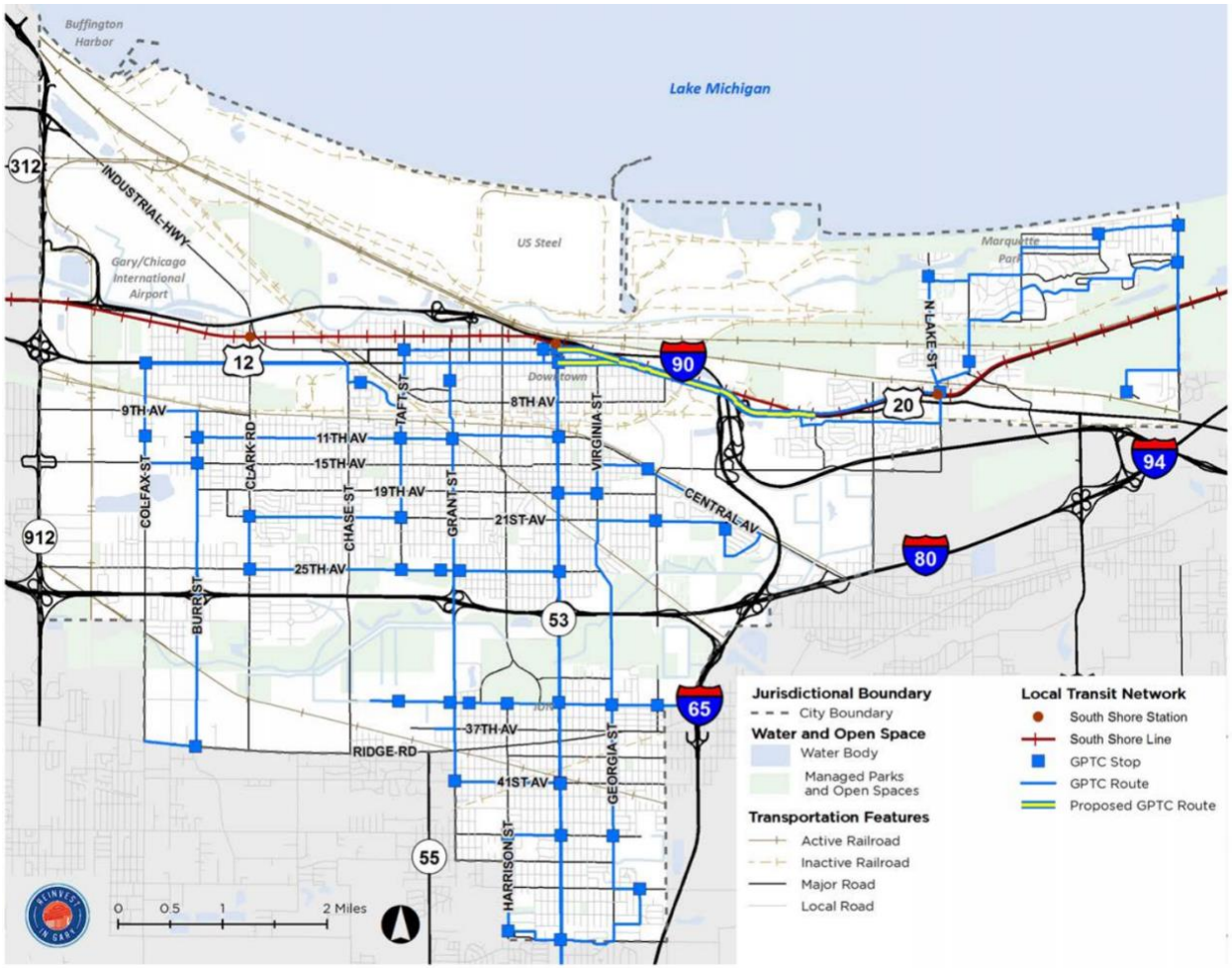
Source: https://www.urbanworksarchitecture.com/portfolio/gary-green-link-corridor/

The Marquette Greenway Trail is a part of the overall Green Link system and follows the Grand Calumet River and the lakeshore. It. A portion of that trail has already been constructed (County Line Road to Grand Blvd).

Another trail system is the Gary Elevate project to redevelop an elevated train line through Midtown to connect key neighborhoods and residents to both the Marquette Greenway Train and the Gary Greenlink Trail. This includes providing residents with continuous sidewalks and bike and pedestrian connections from the South Shore Commuter rail to Lake Street.

c. Public Transit Services

The Gary Public Transportation Corporation (GPTC) provides public transit services to Gary residents. The figure below shows the transit network in Gary, IN.



Source: Gary Comprehensive Plan (2019) pg. 110

In 2013, GPTC received a grant to fund a mobility study of the Broadway corridor. The Livable Broadway Regional Plan recommended upgrades to public transit in Gary and Merrilville along the Broadway corridor to make Broadway livable and improve residents' mobility. Since then, INDOT has improved the Broadway Corridor by resurfacing roadways, installing 'bypass lanes' for buses and installing bus stop infrastructure in Gary and Merrillville. In 2018, GPTC introduced rapid bus service on Broadway St. from Gary to Merrillville, "Broadway Metro Express" (Bmx). This was the first rapid bus service in the state. Three new stops have been requested in Gary and Indiana University Northwest (IUN) and Ivy Tech have jointly established a new building to maximize transit. This project has exhibited measurable success as Bmx ridership was up 33% in 2018 from 2017.

A long-standing and valuable form of passenger transportation for Gary residents is the South Shore Line (SSL), a 90-mile electric-powered commuter train to downtown Chicago, IL. There are three stations for the SSL in Gary: Gary Metro Center, Gary/Chicago Airport, and Lake Street/Miller.

Source: Gary Comprehensive Plan (2019) pg. 112.

The improvement of public transit services to Gary residents is an invaluable means of reducing personal vehicle emissions and their contribution to transportation emissions more broadly.

This is significant given the above average concentration of particulate matter due to road and rail travel through Northwest Indiana:

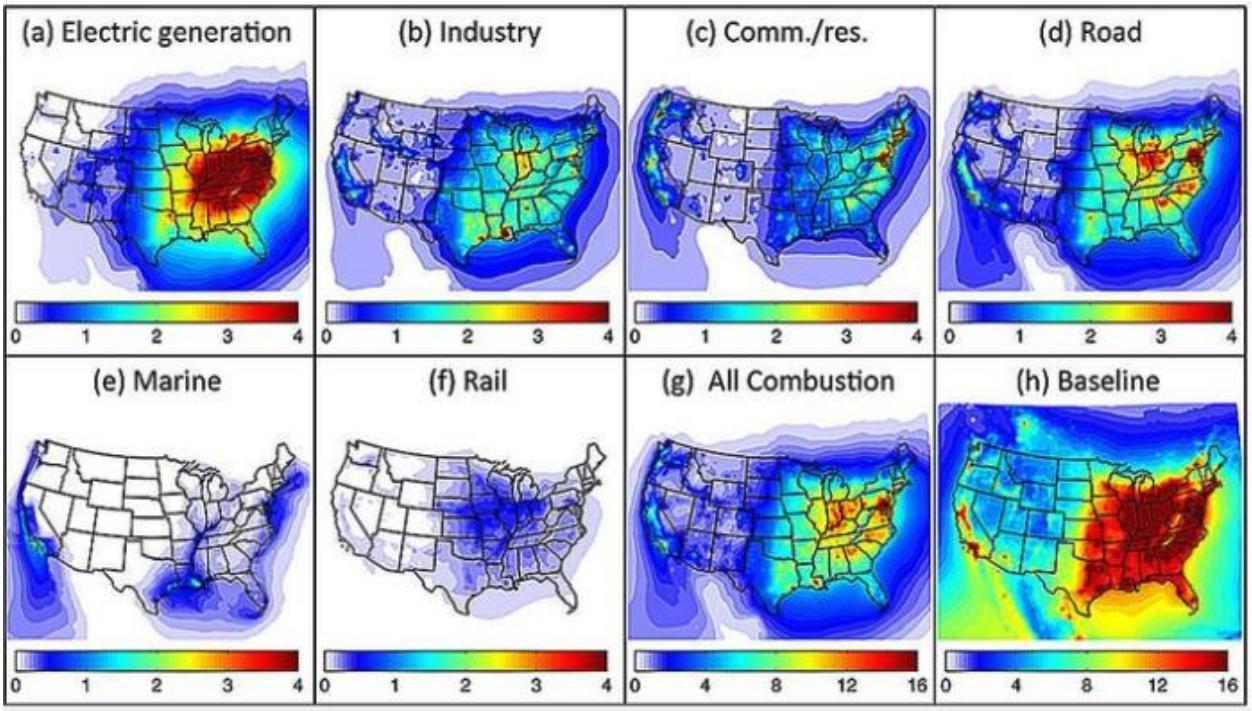


Figure: This graphic shows annual average concentration of fine particulate matter, pollutants leading to major health problems, from various sources of emissions including: (a) electric power generation (b) industry (c) commercial and residential sources (d) road transportation €d marine transportation (f) rail transportation (g) sum of all combustion sources and (h) all sources. Graphic Source: Laboratory for Aviation and the Environment. https://news.mit.edu/2013/study-air-pollution-causes-200000-early-deaths-each-year-in-the-us-0829

d. Airport

Another major accomplishment is the series of improvements to the Gary/Chicago Airport.

Source: Gary Comprehensive Plan (2019) pg. 118.

The airport is a major asset and impetus for regional economic development given its proximity to extensive rail lines and easy access via interstates I-90, I-80/94, I-65 and SR 912. It has undergone over $50 million worth of infrastructure improvements including the extension of the main runway,

building a new Customs and Border Control (CBP) facility in 2018 and various runway rehabilitation projects.

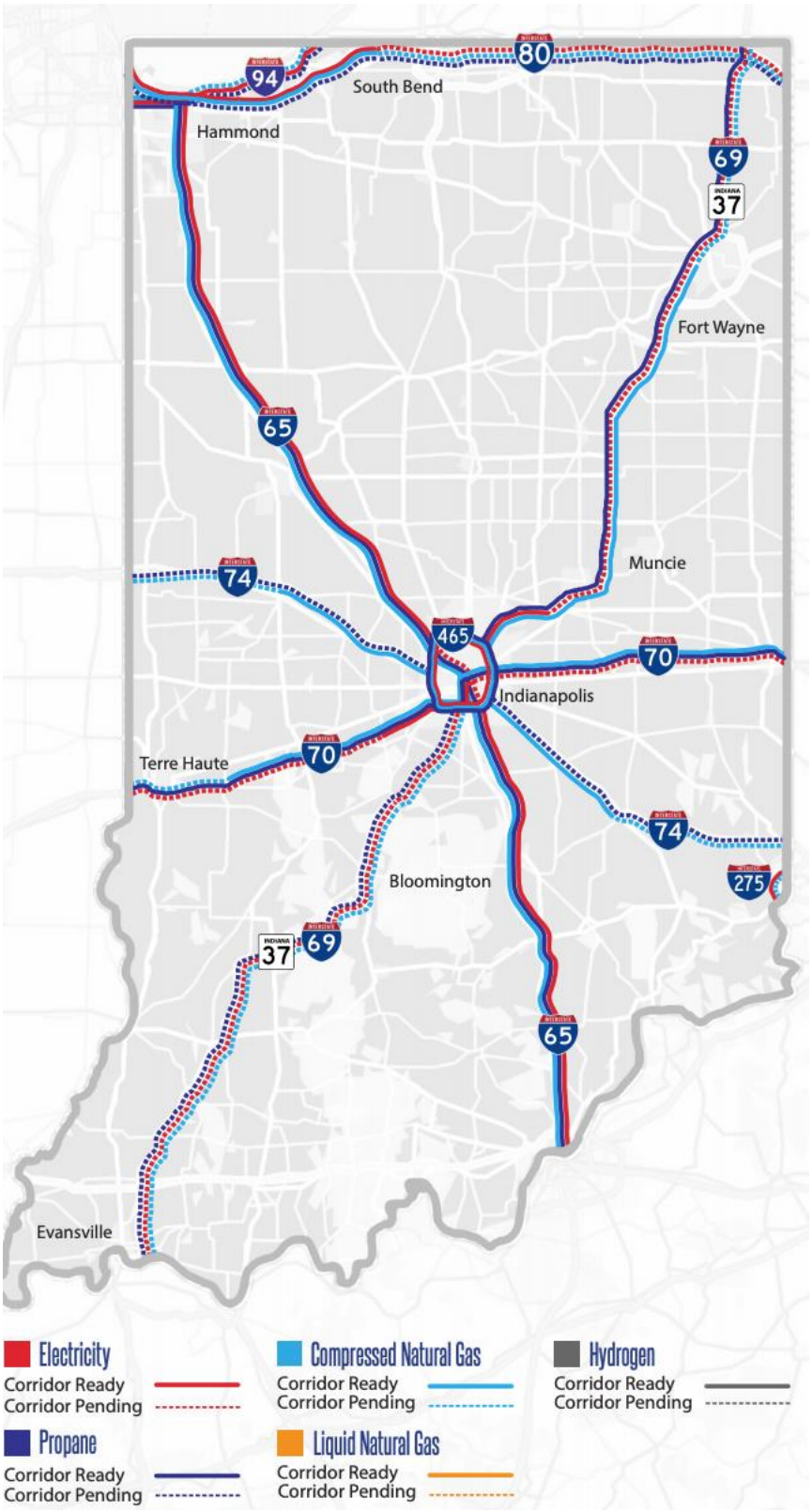
In November 2020, the EPA finished cleaning up contamination at the Midco II Superfund Site near the Gary/Chicago Airport that was caused by a 1977 fire at a hazardous waste recycling operation. This adjacent site is now available for the airport's expansion, such as being used for more parking.

e. Renewable Energy

Gary, IN received federal funding through the Northwestern Indiana Regional Planning Commission (NIRPC) and the Indiana Volkswagen Environmental Mitigation Trust Fund to operate the region's first electric transit buses. The Gary Public Transportation Corporation is implementing this project in partnership with South Shore Clean Cities. The aim of the Indiana Green Fleet program is to improve the environmental performance of government and business vehicle fleets in the region by creating policies that support vehicle emission reduction and mitigate barriers to adopting alternative fuels and advanced technology vehicles such as the electric transit buses.

There are currently two electric vehicle charging stations in Northwest Indiana at Indiana University Northwest in Gary, IN as well as two public electric charging stations—one at the Gary Metro Station and one at the bus station on Miller St. (confirm this).

I-94 is a part of the M2M (Michigan to Montana) project which supports an alternative fuel corridor along I-94 that reaches from Michigan to Montana. This corridor provides commercial and individual vehicles with alternative energy and electric fueling sites.



Source: https://southshorecleancities.org/wp-content/uploads/2018/02/M2M-Flyer-Indiana-UPDATED-04.30.20.pdf

Currently, I-94 in Northwest Indiana is designated as "corridor ready" for both compressed natural gas and electricity. This designation means that there are sufficient refueling opportunities along that part of the highway for a specific alternative fuel. However, it is designated as "corridor pending" for propane. This means that there is some fueling infrastructure, but there are gaps that can be filled by new refueling sites. This sort of infrastructure can facilitate the regional transition to renewable energy and the adoption of lower-emission vehicles. This sort of infrastructure has a huge pay off in terms of reducing emissions due to road transportation, especially given the fact that Gary, IN is a transportation hub at the intersection of several inter and intra state highways.

5. Challenges

The local street network in Gary is in need of maintenance that has long been deferred due to lack of funding. The longer the streets remain in disrepair, the more intensive and expensive the eventual rehabilitation will be.

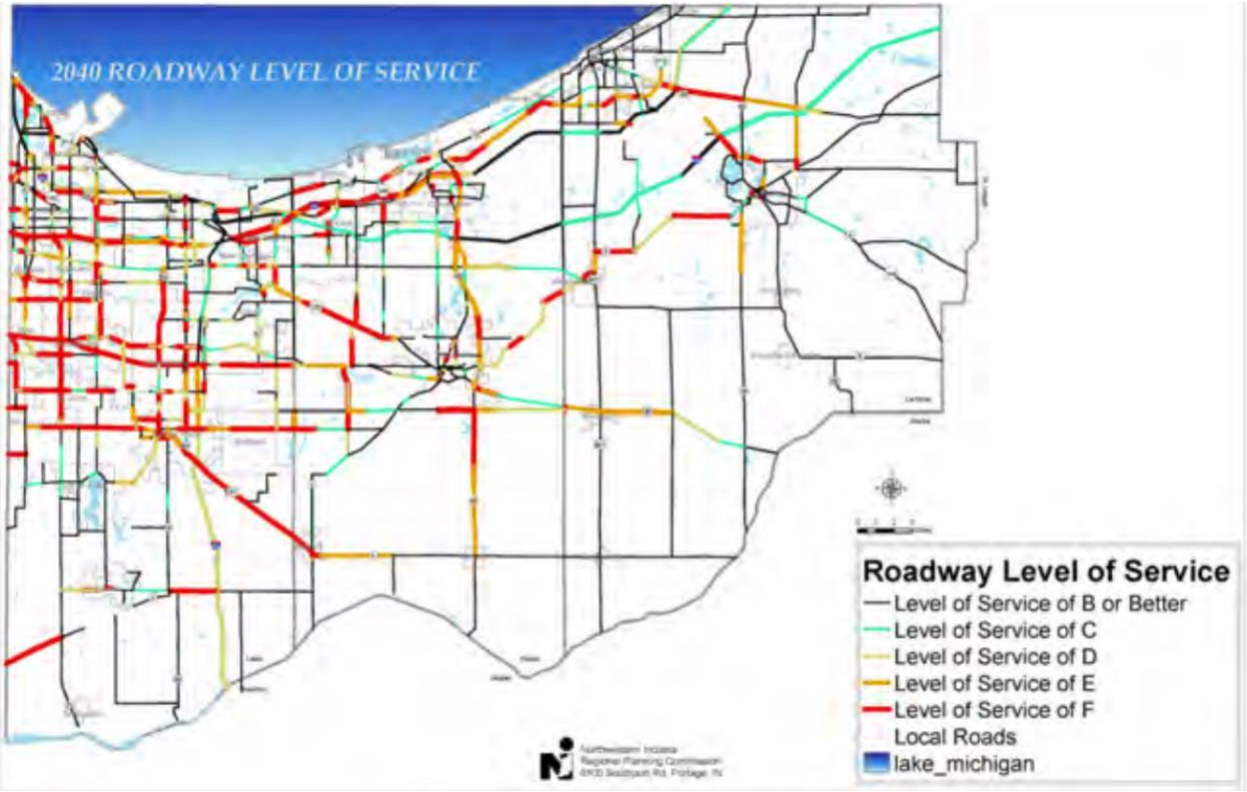
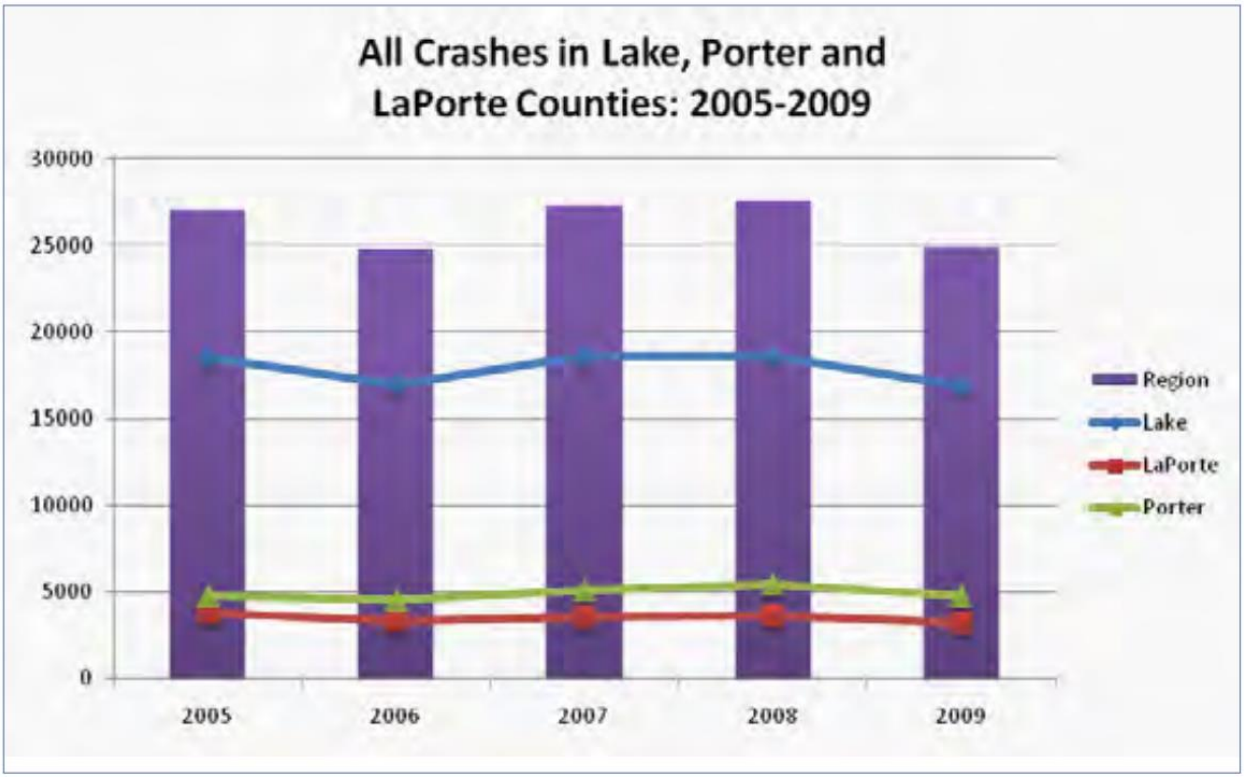


Figure: A map of the roadways in Gary and the level of service they provide graded from B to F.
Source: https://nirpc.org/wp-content/uploads/2017/02/CRP_Summary_Corrected_02_2017_Compressed.pdf

The local street network has been negatively impacted by flooding and drainage issues and by the deteriorating drainage structures which make road maintenance and rehabilitation exceedingly difficult. Importantly, the local street network is not amenable to pedestrian and bicycle travel due to a number of one-way streets, road and rail crossings, poor sidewalk conditions and a lack of 'complete' streets. Complete streets are streets that are designed to meet the needs of a variety of users including: pedestrians, disabled residents, cyclists, children, public transit riders, senior citizens,

etc. They include bike lanes, bus lanes, sidewalks and accessible public transit stops, safe crossing paths, etc. Furthermore, several local streets are truck routes which puts pedestrians and cyclists at risk and exposes residents to harmful emissions. The safety hazard of existing and poor quality roadways can be captured by the significantly higher number of crashes in Lake County compared to Laporte or Porter County:



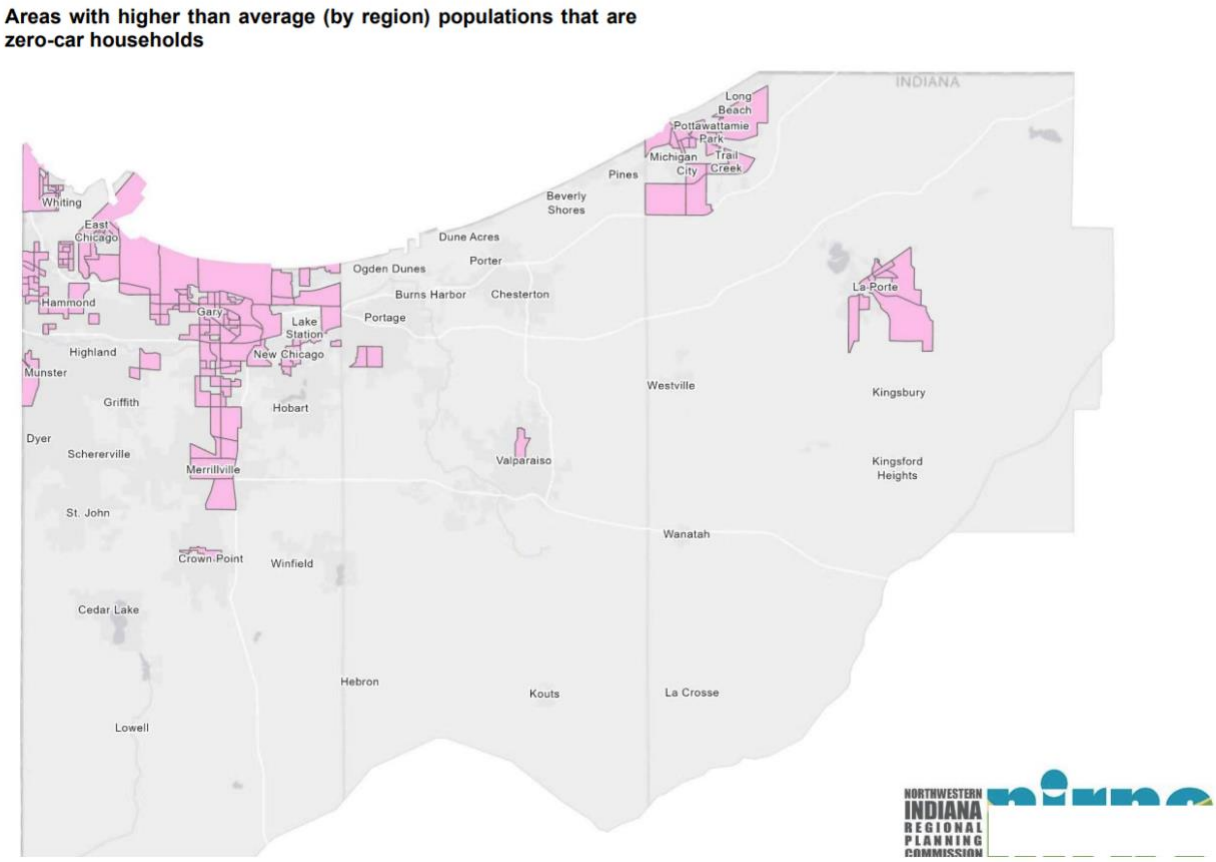
Another challenge is to balance the desire to expand the Chicago/Gary Airport and the desire to conserve the existing wetlands and remnants of dune and swale habitat. The Airport lies in close proximity to both the Grand Calumet River and Lake Michigan, which means it is also in close proximity to environmentally protected lands. The continued protection and conservation of this land is incredibly important, especially given the fact that other properties around the airport are known to have environmental contamination. All expansion proposals should be required to identify adjacent contaminated sites and prioritize the clean-up and reuse of those sites over possible encroachment on protected natural habitats. In this way, the aim for development and expansion can be pursued without sacrificing our environmental goals of conservation.

6. Equity and Resilience

The expansion of public transit infrastructure is particularly important given the fact that a sizeable portion of Gary residents rely on public transit, with this number only increasing in recent years:

Source: Gary Comprehensive Plan, pg. 109.

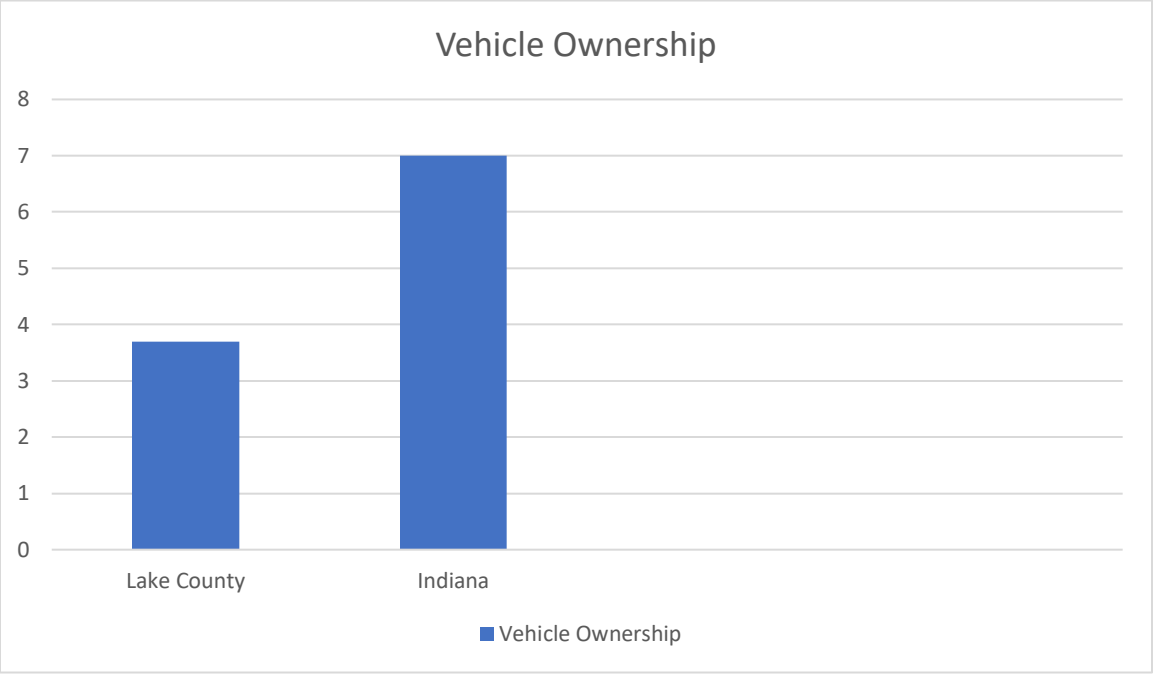
In fact, a disproportionately larger number of Gary residents (19%) belong to zero-car households with limited mobility which is more than double the rate in Lake County and the rest of Indiana (https://gary.gov/redevelopment/wp-content/uploads/sites/2/2019/10/Gary-Comp-Plan_Final_Chapt-5.pdf pages 101-125).

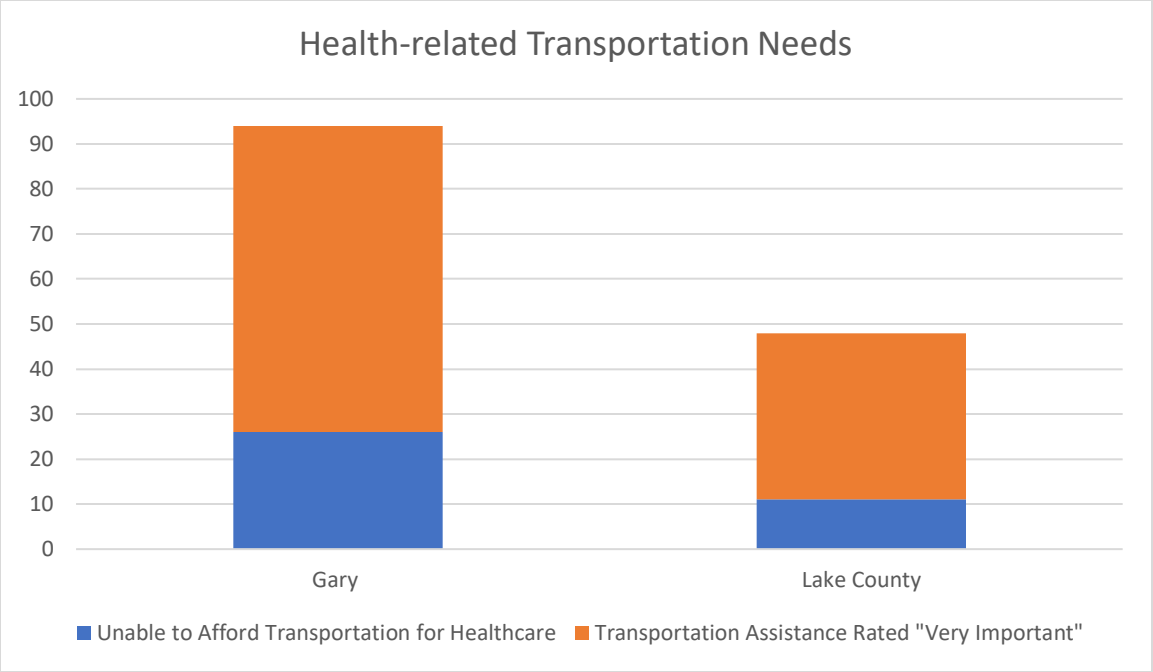


Source: https://nirpc.org/wp-content/uploads/2021/03/NIRPC-NWI-2022-2026-Transit-Improvement-Program-DRAFT.pdf pg. 16

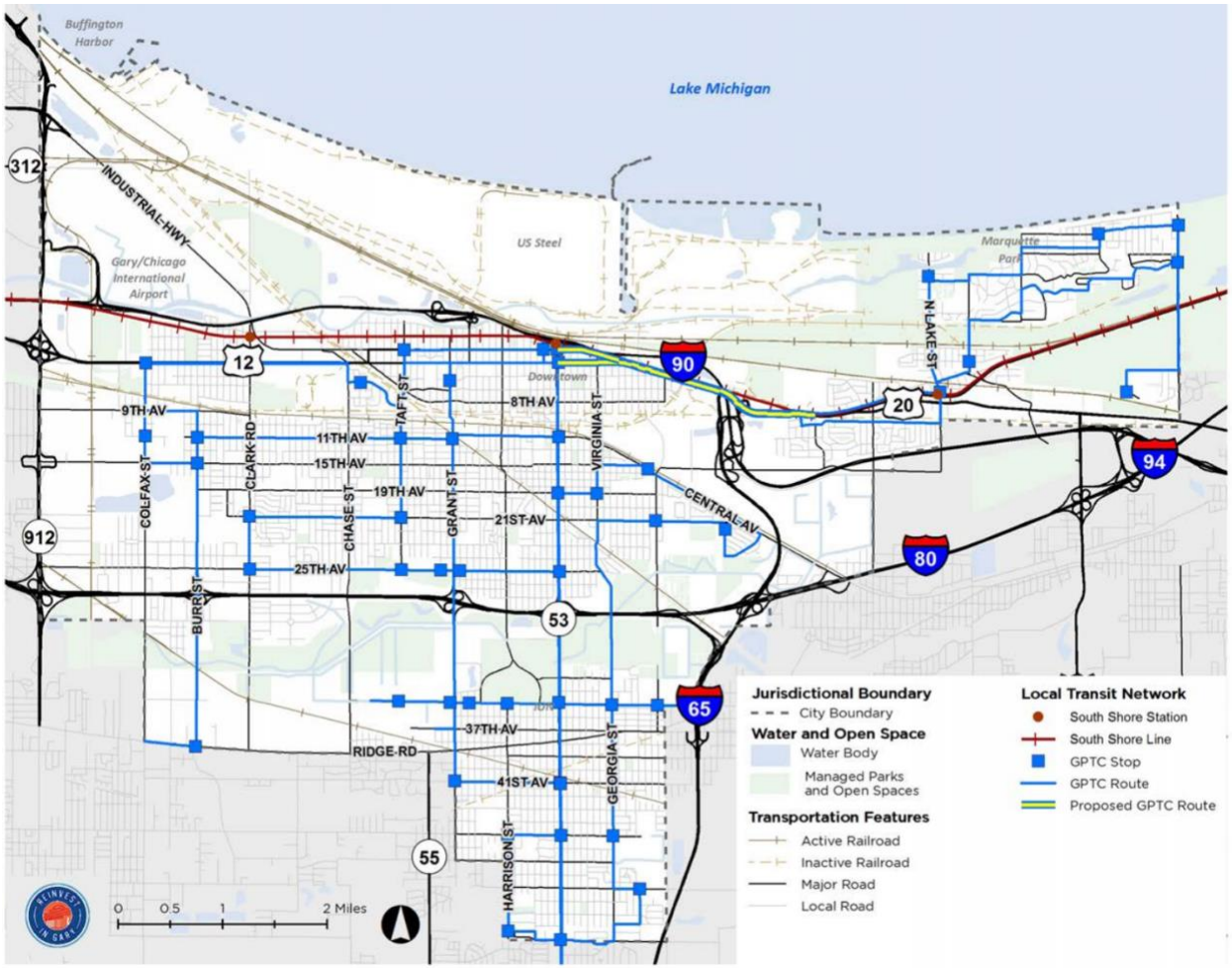
As a result, residents can be found biking or walking along US 12/20, a very busy route that lacks sidewalks and dedicated bike lanes. For these reasons, ensuring accessibility to public transit or bike and pedestrian pathways is of vital importance because they serve as the primary form of transportation for residents, not just for recreational use. Furthermore, the establishment of walk and biking paths also serves a public health goal of promoting healthier lifestyles.

Vehicle ownership is directly related to the ability to access essential local services and employment opportunities. The residents of Gary are particularly vulnerable to accessibility challenges given both the reduced vehicle ownership rates and high poverty rates which impact the ability of residents to afford transportation via personal vehicles. 26% of Gary residents, compared to 11% of Lake County residents, reported having needed but been unable to afford transportation for a health purpose of appointment. 68% of participants in a survey conducted by Methodist Hospitals rated transportation assistance as a "very important" community resource compared to 37% of Lake County residents, a major discrepancy.





It is important to keep such consideration of equity and environmental justice in mind when pursuing transportation-related projects. It is vital that public transit serve those most in-need and connect them to health care providers, emergency services and job opportunities. For example, a public transit stop at the airport may open up a large number of employment opportunities and increase general access to residents who otherwise have limited mobility. As can be seen below, there are currently no stops near the airport which is a major employer:



Source: Gary Comprehensive Plan (2019)

Such a project would simultaneously promote economic development while keeping equity concerns at the forefront. Similarly, establishing more bike and walking paths that connect transit stops (bus or passenger rail) can improve pedestrian mobility and access to goods, jobs, services and education and training opportunities. Currently, there are no on-road bike facilities on the Broadway corridor. Railroad rights-of-way offer a great opportunity for developing bike paths. This is a major opportunity since, within Gary, there are over 150 miles of heavy rail mainline, 108 of which are active and 48 of which are inactive trails. Abandoned railroad rights of ways stretch throughout the region and connect several municipalities so they provide a great opportunity to serve as the backbone of a trail network that connects to other trains and trail facilities outside Gary.

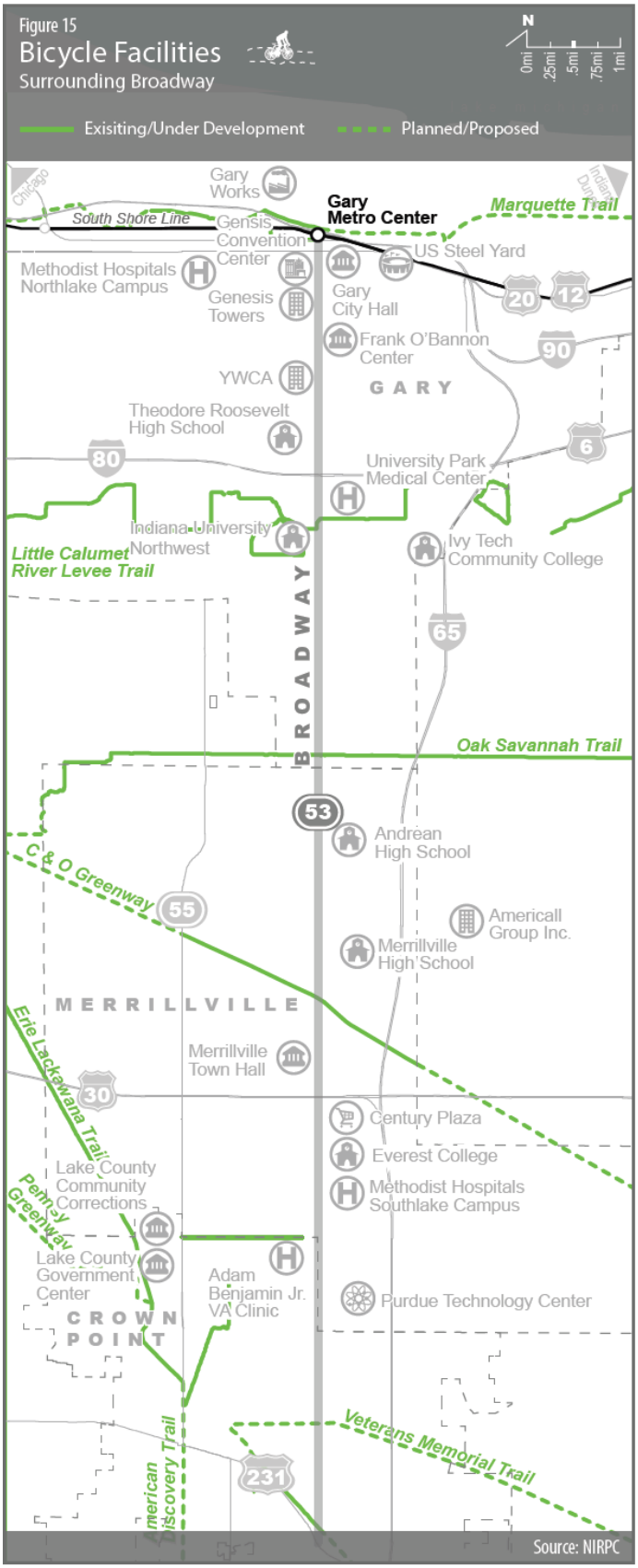


Figure 15
Bicycle Facilities
Surrounding Broadway
N
0mi
.25mi
.5mi
.75mi
1mi
Exisiting/Under Development
Planned/Proposed
Chicago
Indiana Dunes
South Shore Line
Gary Works
Gary Metro Center
Marquette Trail
Gensis Convention Center
US Steel Yard
Methodist Hospitals Northlake Campus
Genesis Towers
Gary City Hall
Frank O'Bannon Center
YWCA
GARY
Theodore Roosevelt High School
University Park Medical Center
Indiana University Northwest
Ivy Tech Community College
Little Calumet River Levee Trail
BROADWAY
Oak Savannah Trail
Andrean High School
C & O Greenway
Americall Group Inc.
Merrillville High School
MERRILLVILLE
Erie Lackawana Trail
Merrillville Town Hall
Century Plaza
Everest College
Methodist Hospitals Southlake Campus
Lake County Community Corrections
Penney Greenway
Lake County Government Center
Adam Benjamin Jr. VA Clinic
Purdue Technology Center
CROWN POINT
Veterans Memorial Trail
Source: NIRPC

Figure: Existing and planned bicycle facilities in the Broadway corridor. The Little Calumet Trail, the Oak Savannah Trail, and the Chesapeake Ohio Trail which connect Broadway and the regional trail network.

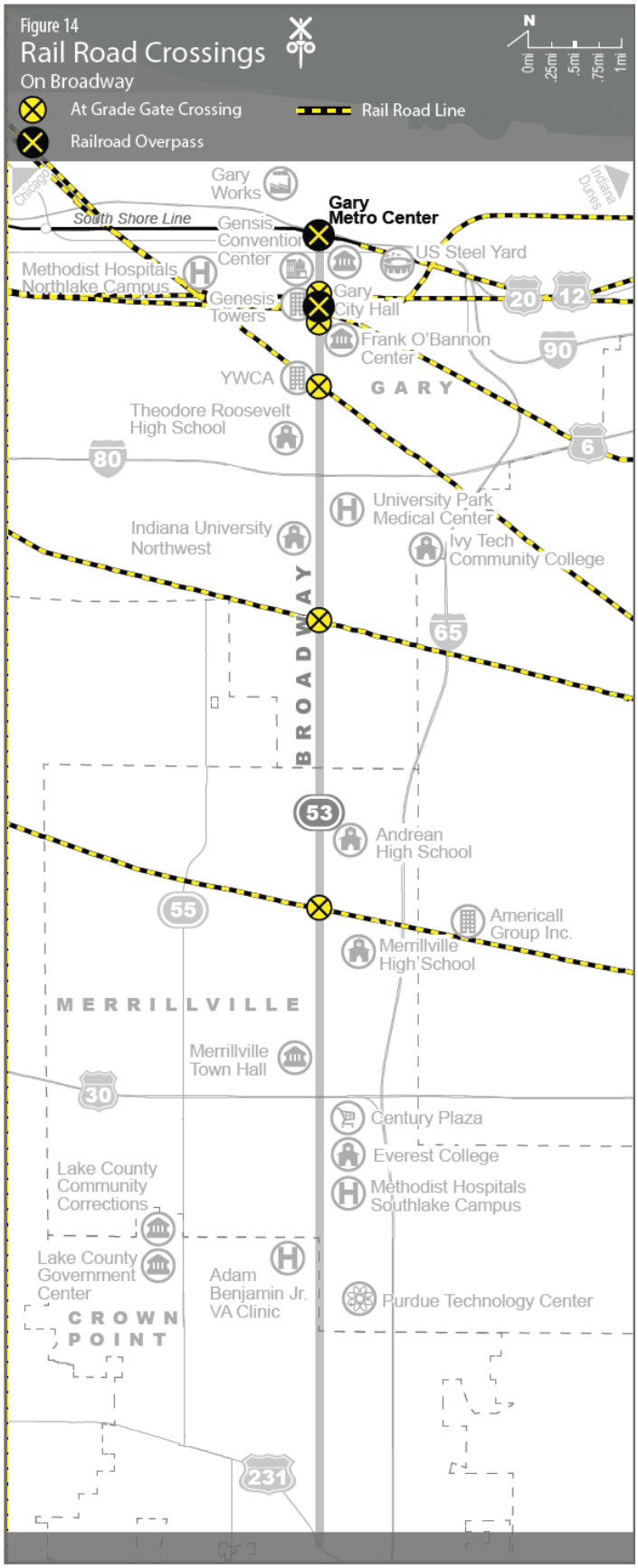


Figure 14
Rail Road Crossings
On Broadway
At Grade Gate Crossing
Railroad Overpass
Rail Road Line
N
0mi .25mi .5mi .75mi 1mi
Chicago
Indiana Dunes
South Shore Line
Gary Works
Gary Metro Center
Gensis Convention Center
US Steel Yard
Methodist Hospitals Northlake Campus
Genesis Towers
Gary City Hall
Frank O'Bannon Center
YWCA
GARY
Theodore Roosevelt High School
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Indiana University Northwest
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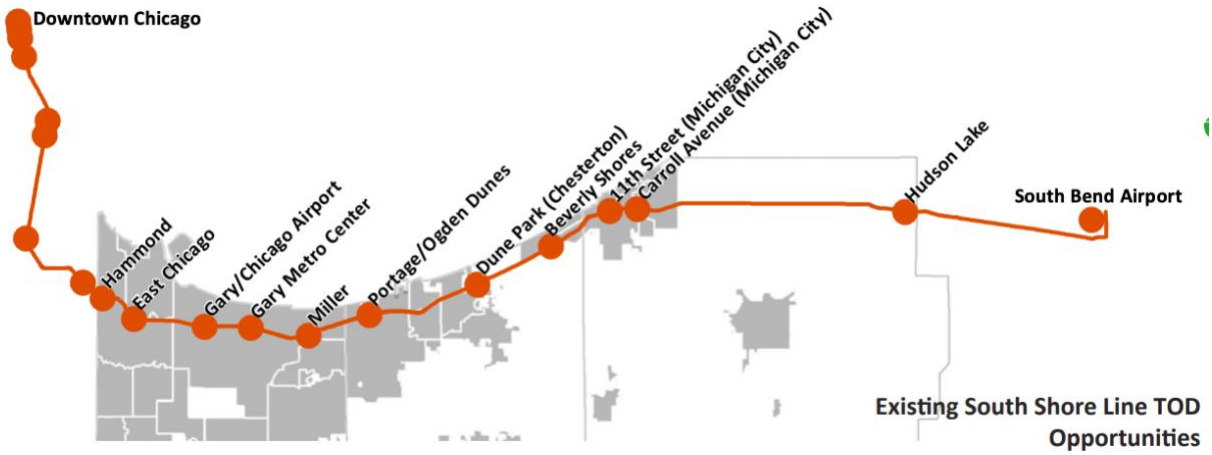
BROADWAY
Andrean High School
Americall Group Inc.
Merrillville High School
MERRILLVILLE
Merrillville Town Hall
Century Plaza
Everest College
Lake County Community Corrections
Methodist Hospitals Southlake Campus
Lake County Government Center
Adam Benjamin Jr. VA Clinic
Purdue Technology Center
CROWN POINT
20
12
90
6
80
65
53
55
30
231

Figure: Livable Broadway Plan (2015), pg. 17. Source: https://www.gptcbus.com/wp-content/uploads/2018/01/livablebroadwayplan.pdf

Alternatively, the city should prioritize transit oriented development (TOD) and pursue development projects, create jobs, and provide services within walkable distance from the South Shore commuter station and regional and local bus station.



Source: https://nirpc.org/wp-content/uploads/2017/02/CRP_Summary_Corrected_02_2017_Compressed.pdf

By doing so, residents can both eliminate unnecessary vehicular travel, which reduces emissions, and the city can also make such jobs and services accessible to a sizeable portion of the population that does not have a personal vehicle and experiences limited mobility.

7. Recommendations

1. Utilize railroad right of ways to develop bike paths. Develop on road bike facilities within the Broadway corridor.
2. Buildings in the Broadway corridor have the highest rates of blight and vacancy and these high vacancy areas are (simultaneously) the best located in terms of access to transit and transportation infrastructure. It is recommended that these buildings be redeveloped and rehabilitated to take advantage of this proximity to transit and transportation.
3. Reroute heavy truck traffic to avoid local streets and residential areas.
4. Add propane refueling sites along I-94 to make it 'corridor ready' for that alternative fuel source. Add refueling sites for remaining alternative energy fuels (hydrogen and liquid natural gas) for a 'corridor pending' designation of those fuels.
5. Provide education to the larger community about alternative fuel vehicles
6. Increased E85 (composed of 85% ethanol alcohol and 15% gasoline) fueling stations. There are over 30 of the stations in Cook County. Ethanol's greenhouse gas (GHG) emission intensity significantly less than gasoline. Approximately 11 million flex-fuel vehicles on the road in North America can run on E85 fuel. A recent GM study found

that roughly 70% of its flex fuel vehicle owners did not know that they could use E85 fuel, and fewer than 10% do use E85 (Chicago Clean Cities)

7. Significant reduction in emissions from snow-plows and other vehicles that are major sources of diesel fuel
8. Adopt a 'complete' streets policy. Increase the number of 'complete' streets in the city to _____.
9. Another key barrier to electrification are fees that penalize owners of electric vehicles such as Indiana's $150 annual fee for electric vehicles and $50 for hybrids and pHEV's. Removing such fees may incentivize, or at least remove disincentives, from electric vehicle ownership.
10. Establish a solar/electricity hybrid carport and charging stations in the city to incentivize electric vehicle use and ensure public accessibility to charging stations. Ensure that such stations are community-owned and not tied to proprietary software.
11. Construct the remaining sections of the Marquette Greenway Trail (Grand Blvd to Cline Ave) by _____.
12. Join the Electric Highway Coalition. The only part of Indiana that is not a part of the Electric Highway Coalition is Northwest Indiana, where NIPSCO is the primary energy provider.
13. Identify existing roads for road diets whereby roadways are reconfigured to accommodate bike lanes, sidewalks, multi-use paths and off-street parking. Especially major transportation routes like US 12/20.
14. Install public transit stops at hospital or health care providers. Explore opportunities for partnership between Methodist North Lake Hospital transportation services and public transit providers. Hospitals are the largest employers in Lake County (Methodist, St. Mary, Franciscan, etc.). It would provide Gary residents with significantly increased access to employment opportunities as well as health care access.
15. Develop opportunities for eco-tourism in the natural lands around the airport which both promote conservation as well as promote the airport's economic development by providing visitors with outdoor recreational activities during layovers and for employees and staff.
16. Establish a bike-share program to provide residents with energy efficient transportation and recreational activities.
17. Replace four way intersections with traffic circles which are known to be highly effective and energy-efficient.
18. Establish a municipal ride-share program for city employees to use for their commute to work. Incentivize carpool commutes with a commuting rewards program.
19. Adopt a no-idling policy for city vehicles.
20. Prioritize the cleanup and reuse of contaminated sites in the vicinity of the airport when planning expansion projects. Continue to protect and conserve natural habitats like wetlands.

References:

https://www.epa.gov/transportation-air-pollution-and-climate-change/carbon-pollution-transportation#:~:text=%E2%80%8BGreenhouse%20gas%20(GHG)%20emissions,terms%20than%20any%20other%20sector.

Gary GHG Inventory Report

https://southshorecleancities.org/wp-content/uploads/2018/02/M2M-Flyer-Indiana-UPDATED-04.30.20.pdf

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https://www.wfyi.org/news/articles/epa-crews-wrap-cleanup-of-tainted-site-near-gary-airport

https://nirpc.org/wp-content/uploads/2021/03/NIRPC-NWI-2022-2026-Transit-Improvement-Program-DRAFT.pdf

https://www.gptcbus.com/wp-content/uploads/2018/01/livablebroadwayplan.pdf

https://gary.gov/redevelopment/wp-content/uploads/sites/2/2020/06/CoG-Bike-Masterplan-RFQ-6.26.20.pdf

Ch. 7: Waste

Overarching Goals:

1. **Explore methane capture from landfills for energy generation**
2. **Reduce waste, especially from commercial and industrial sectors**
3. **Prioritize local food programs to reduce food waste and increase access to healthy food**

Background:

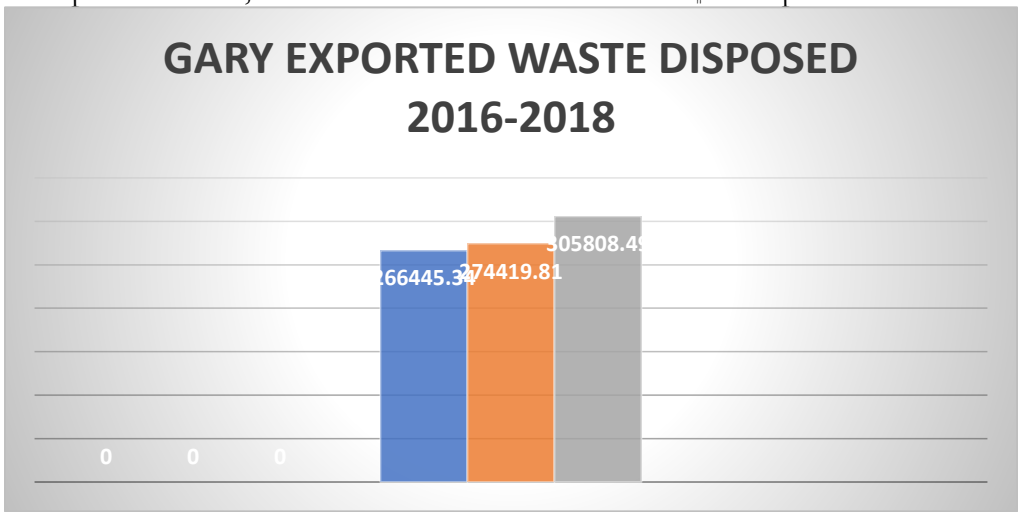
Disposal of waste accounts for 1% of community emissions in Gary, not including industrial sources. With industrial sources omitted, solid waste accounts for approximately 12% of community-wide greenhouse gas emissions in Gary. 131,952 $MTCO_2e$. To put this into perspective, to avoid those emissions, 6,412 garbage trucks worth of waste would need to be recycled instead of landfilled.

At the city operations level, solid waste is the largest culprit of greenhouse gas emissions at over 39%. Wastewater treatment is the second-highest source of emissions, at about 27%. While wastewater treatment emissions are projected to decrease 50% by 2030 due to energy efficiency updates, solid waste is not projected to decline unless the city acts.

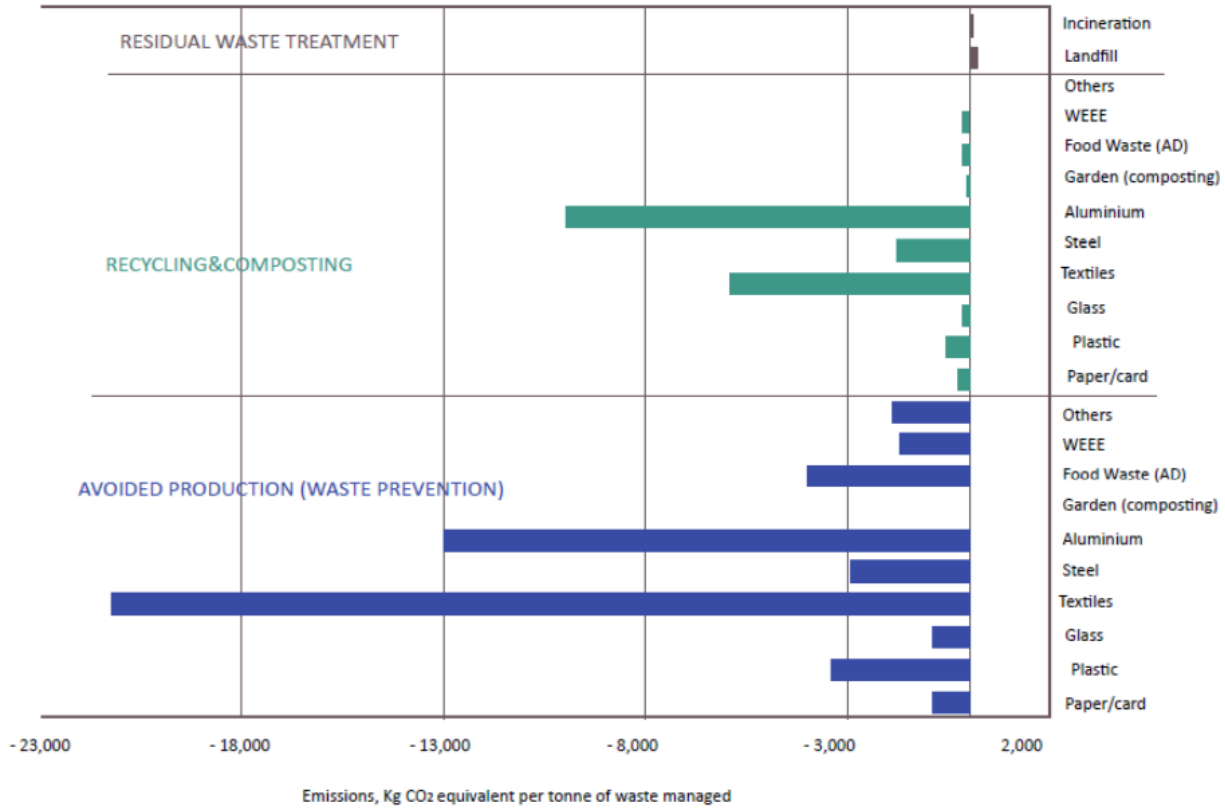
There are numerous benefits of reducing waste Gary:

1) Fewer waste collection vehicles results in less traffic, better roads and air quality
2) Less solid waste in landfills can improve public health by reducing exposures to methane gas and toxic stormwater runoff that can contaminate groundwater and surface water
3) Reduced risk of trash ending up in public spaces

As shown in the chart below, waste reduction is not currently incentivized in Gary, as exported waste disposed has increased from 2016 to 2018. Waste disposal is also very costly from a financial standpoint: in 2021, trash fees to residents increased to $22.75 per month.



As shown in the figure below, avoided waste production is the most effective strategy to reduce greenhouse gas emissions from the waste sector by directly targeting emissions at their source.



The highest impact Gary can have on reducing its operation emissions is through using technology, policy, and collaboration to make solid waste facilities more sustainable. The initial focus of this chapter is primarily recommendations for local government officials to enact. We then turn to strategies to reduce commercial and industrial waste. As more businesses are interested in developing sustainability policies, there is likely interest in reducing waste from cost and public perception perspectives in this sector.

Municipal Waste to Energy

According to the EPA's Landfill Gas Energy Projects database, the Gary Sanitary Landfill has low potential for waste-to-energy projects. The landfill has 3,769,000 tons of waste and has been closed since 1997. Several other municipalities in Indiana, denoted below, have implemented waste-to-energy systems. For Gary to reduce harmful landfill emissions and improve conditions for surrounding residents, the City could collaborate with Lake County, the municipal waste contractor, and NIPSCO to conduct a waste-to-energy project. Even if the project does not take place within City limits, Gary could tap into the benefits of local energy generation and cost savings over time.

Examples Nearby:

Indy High BTU Renewable Natural Gas Plant. This plant, created in 2020, converts landfill gas from the Southside Sanitary Landfill in Indianapolis into about 8 million gallons of renewable natural gas (RNG) per year. The RNG is turned into liquefied natural gas by the company Kinetrex, which it then sells to Midwest transportation fleets.

The Town of Munster, in partnership with Energy Systems Group, completed a $4.3 million beneficial-use electricity generation project for the Centennial Park closed landfill. The power generated is sold part of NIPSCO's renewable feed-in-tariff program. Capturing landfill gases and converting it produces 1.1 MW of electricity.

Newton County Renewable Energy Business Park – Direct Use Project in Brook, Indiana. The Newton County landfill (49.4 million ton landfill) generates enough energy to support a newly developed business park and provides energy to a local manufacturer of egg cartons. The landfill is owned by Republic Services and the project was created in partnership with CPL Systems and Cornerstone Environmental Group.

Costs of a landfill gas project depend on the size, location, and layout of the landfill. Typically, one million tons of landfill waste produces about 432,000 cubic feet of landfill gas per day, enough to produce .78 MW of electricity or 216 MMBtu of heat. When calculating the benefits of such a project, one must consider tax credits, carbon credits, and electricity cost savings. Job creation is another benefit of these projects, including construction jobs and associated economic development from direct-use projects like the Newton County example above.

Reduce waste, especially from commercial and industrial sectors

The U.S. Steel Gary Works Waste Landfill is the largest source of community emissions in the waste sector, producing 3687.01 metric tons of methane in 2017. This is equivalent to the amount of energy needed to power over **18,000 homes per year.**

Opportunities exist for the industrial sector in Gary to partner with the City to repurpose waste products. Slag steel, a by-product of the steel making industry, may be used in landfill covers to sequester greenhouse gas emissions. Steel slag is typically stockpiled at steel plants and is eventually sent to slag disposal sites if it cannot be recycled.

U.S Steel, in its 2019 Sustainability Report, notes that slag steel can be used for several purposes that would be of interest to municipal governments: cement manufacturing, sub-base for road construction, landfill cover, and phosphorous removal in wastewater treatment.

Another steelmaking by-product, fly ash, when mixed with lime and water, forms a compound with properties similar to cement and may be used to replace cement in concrete for development and city projects. Potential partners: Ozinga Cement, Carmeuse Lime, U.S. Steel

a. Advantages of using fly ash in concrete include: cold weather resistance, water cement ratio can be reduced, reduced CO2 emissions, reduced cost
b. Example Ordinance requiring fly ash in cement mix: Fargo, ND:

i. Cements shall meet the following requirements unless written approval is provided by the Engineer. Specification ASTM C 150 ASTM C 595* ASTM C 1157 Requirement Types I or II Types GU, MS and HS Types GU, MS or HS * Slag cement and fly ash content shall be a maximum of 30% and a maximum total replacement of 40% with ternary cementitious mixtures. All mixes shall include a maximum of 620 lbs. total cementitious content including fly ash or slag cement. At least 20% of the total cementitious content, by mass, shall be fly ash or slag cement.

Targets:

- Decrease the amount of waste sent to the Landfill by 20% from the 2017 baseline by 2030 and 50% from the 2017 baseline by 2040
- Reduce city-government generated solid waste by 50% by 2030

Actions:

- Create voluntary plastic-reduction program and outreach for local restaurants and businesses
- Rework municipal composting system with the intention to produce compost that can support the growing gardening movement in Gary
- Increase waste education for municipal employees and the greater public
- Advocate for an operational policy that requires all city events to meet zero waste standards. Adopt a zero waste policy for departmental events
- Create partnerships to recycle and repurpose industrial waste
- Establish a Towards Zero Waste Certification program to provide education to food retailers and restaurants on strategies to reduce waste and promote businesses that receive certification

Increase recycling program participation by local government, businesses, and citizens

Targets:

- **Divert 10% of local food waste from landfill by 2030**
- **Increase community-wide recycling rate to 20% by 2030**

The EPA estimates that 75 percent of our municipal solid waste can be either recycled or composted. Gary's city-wide recycling rate is only about 11 percent. Increasing recycling does more than just helping the environment: it is also an opportunity for economic development. Business-as-usual waste practices such as collection, incineration, and landfilling require on average 6 jobs per 10,000 tons of waste. Collecting and recycling waste, however, requires 18 jobs on average per 10,000 tons of materials. Manufacturing recovered materials for new uses further adds to the number of potential jobs.

Like in many other cities, the municipal costs for garbage collection in Gary are greater than its costs for recycling services. Recycling extends the life of landfills and reduces greenhouse gas emissions from landfills as waste decomposes. Available landfills are filling up and carry high maintenance

costs years after they've reached capacity. Diverting waste from landfills by recycling it instead also helps reduce municipal costs for garbage collection.

Gary's Recycling Department is working to reduce waste collection and is proposing education programs about the importance of Reduce, Reuse and Recycle. They provide free recycle bins, e-waste recycling, educational services, annual Household Hazardous Waste Days, twice-monthly Brown Bag Collection for leaves and grass to be composted, waste tire drop-off and free document shredding services for Gary residents. Recycling is encouraged in municipal office buildings and recycling bins are distributed to all City of Gary offices.

The Recycling Department holds education campaigns and periodic competitions throughout the year to raise awareness around recycling and increase employee engagement. Examples include National Recycling Day education at City Hall, the annual shoe donation competition, and presence at city events such as Household Hazardous Waste Collection Day and the Clean Water Celebration.

Actions:

- Place recycling containers next to trash cans in public areas and local schools
- Implement a special event recycling program. Require recycling at any events that require a City permit
- Work with Recycling Department, Public Works, and potentially US Steel to develop and implement a strategy to properly recycle waste tires
- Rebuild the inventory of households that participate in curbside recycling

Equity Considerations:

- Barriers may exist to accessing recycling and composting programs, including user fees, housing type, and language barriers. Recycling and composting program expansions should ensure those in apartments and public housing may also use these services.
- Prioritize reducing waste fees for low-income households

Prioritize local food programs, leading to health, waste reduction, and economic benefits

Targets:

- **Food insecurity in Gary is reduced 20% by 2030, compared to the 2017 baseline**

EPA estimates that in 2018, food ended up in landfills (24%) and combustion facilities (22%) more than any other single material in everyday trash. Since 20% of the US's total methane emissions come from landfills, reducing food waste is a key strategy to our individual contributions to climate change. Methane gas is 22 to 25 times more potent as a greenhouse gas than carbon dioxide. Food availability is also a critical issue with respect to well-being and equity. In 2010, **31%** of the food supply in the United States went uneaten, equaling **133 billion pounds.**

This is important to Gary due to the relatively high proportion of its citizens who experience food insecurity. Food insecurity occurs when households have trouble providing food to all family members because of lack of the ability to pay. Food insecurity is especially common in households with incomes near or below the poverty line, households with children headed by a single parent, Black and Hispanic households, and households in cities.

As of 2018, nearly 75,000 residents of Lake County were food insecure, over 15% of the population. This percentage was expected to increase to almost 19% in 2020. There is no major chain grocer within Gary and the limited food options are often convenience stores and fast food chains. According to the USDA, 14 of the 24 food deserts in Lake County are in Gary. Over 1/3 of the population lives over a mile from a supermarket or grocery store. As explained in the Air Quality chapter, a high percentage of Gary residents do not own personal vehicles, making access to fresh and healthy food even more of a challenge. Healthy food access reduces the incidence of diabetes and other diet-related diseases.

Actions:

- Continue to implement recommendations from the Local Food, Local Places Action Plan
- Collaborate with produce producers to provide additional produce for visitors to farmers markets using SNAP
- Encourage organizations, businesses, and faith organizations to join the EPA's Food Recovery Challenge
- Repurpose blighted land for urban farming

Key Partners:

- NWI Food Council
- USDA

- Food Bank of Northwest Indiana

Complimentary Initiatives and Plans:

- Local Food, Local Places Plan
- Rotary Fresh Start Farm & St. Mary of the Lake Community Garden
- Gary Urban Farms Initiative
- Faith Farms

Image: Rotary Fresh Start Farm & St. Mary of the Lake Community Garden

Faith Farms:

Faith Farms shows how local food production can jump start economic opportunity, provide environmental benefits, and create opportunities for education about healthy food. Led by Progressive Community Church senior pastor Curtis Whittaker, his wife, LaShawn, and a team of volunteers, produces 15,000 pounds of food each year on previously blighted land. The farm gives away 10% of its food to those in need and 20% to volunteers. Faith Farms also is starting an education program to teach young people to produce and sell food.

City Accomplishments: Taking Climate Action:

Gary, the recycling department offers services such as e-recycling and waste tire drop-off to make it easier for residents to responsibly dispose of materials in accordance with state laws.
Free electronic recycling drop off is offered at the Recycling Department M-F

The Recycling Department holds education campaigns and periodic competitions throughout the year to raise awareness around recycling and increase employee engagement. Examples include National Recycling Day education at City Hall, the annual shoe donation competition, and presence at city events such as Household Hazardous Waste Collection Day and the Clean Water Celebration.

During the Household Hazardous Waste Collection event, residents dispose of items like outdated medications, cleaning agents, oil-based paint, chemicals, medical needles, household batteries, carpet cleaner, fluorescent bulbs, shoe polish, pet supplies, etc.

The Mayor's Office of Constituent Services (MOCS) has planned the City's annual Blight Buster Day for several years and continues to look for volunteers each year to help rid the city of debris, clean vacant lots and to cut grass

GSD is working to reduce demand for electricity and natural gas in its wastewater treatment facilities and modernizing equipment

Sources:

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