Chicago Metropolitan Agency for Planning

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MEMORANDUM

To:	Regional Economy Committee
From:	CMAP Staff
Date:	Thursday, November 14, 2024
Subject:	Climate Action Plan for the greater Chicago area
Purpose:	Provide update on the Climate Action Plan for the greater Chicago area
Action Requested:	Discussion

CMAP seeks to update the Regional Economy Committee on the development of the Climate Action Plan for the greater Chicago region by providing an overview of the planning process. This memo provides a brief overview of the project, including the scope, stakeholder engagement process, plan guiding principles, greenhouse gas inventory, and key emissions drivers and trends in the building and industrial sectors.

During the meeting, members will be engaged to understand where the region can lead, where to focus our efforts, and the biggest challenges associated with decarbonizing transportation. Members may prepare for the meeting by contemplating the following discussion questions:

- What decarbonization strategies are essential?
- What characteristics or assets could make the region a leader in transitioning to a clean economy?
- What are the greatest decarbonization opportunities in the region? What are the greatest challenges?

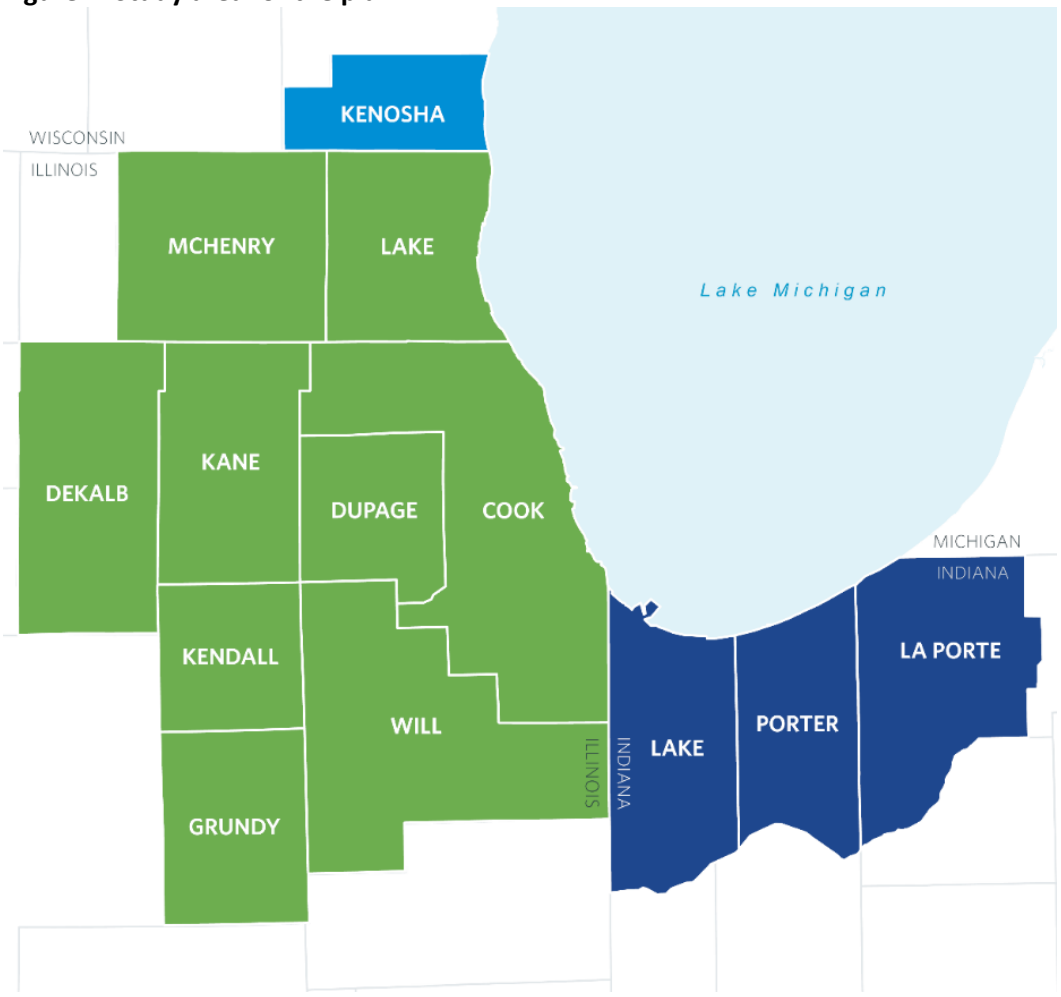
Project overview

The Metropolitan Mayors Caucus (MMC), CMAP, and Northwestern Indiana Regional Planning Commission (NIRPC) are partnering to update and expand existing regional climate mitigation plans to address greenhouse gas (GHG) emissions and establish reduction measures throughout the greater Chicago region, including parts of Illinois, Indiana, and Wisconsin (Figure 1). The work is supported in part by a Climate Pollution Reduction Grant, a U.S. Environmental Protection Agency initiative to provide funding to states and metropolitan areas to develop and implement plans to reduce GHG emissions. CMAP is leading the development of a comprehensive climate action plan, with assistance from MMC to develop a workforce planning analysis and NIRPC to engage northwest Indiana stakeholders.

By fall of 2025, the plan must engage a broad array of stakeholders, estimate the effectiveness of potential reduction measures, and lay out a strategy to address all significant GHG sources, sinks, and sectors. The overarching goal is to define the steps needed for the greater Chicago region to achieve the national goals of 50-52 percent below 2005 levels by 2030 and net-zero emissions no later than 2050. Per grant requirements, the plan will identify GHG reduction targets and establish targets for each sector. It will also assess the benefits that could be achieved through the reduction of criteria air

pollutants as well as co-benefits to low income and disadvantaged communities that are marginalized, underserved, and overburdened by pollution (Figure 2).

Figure 1. Study area for the plan



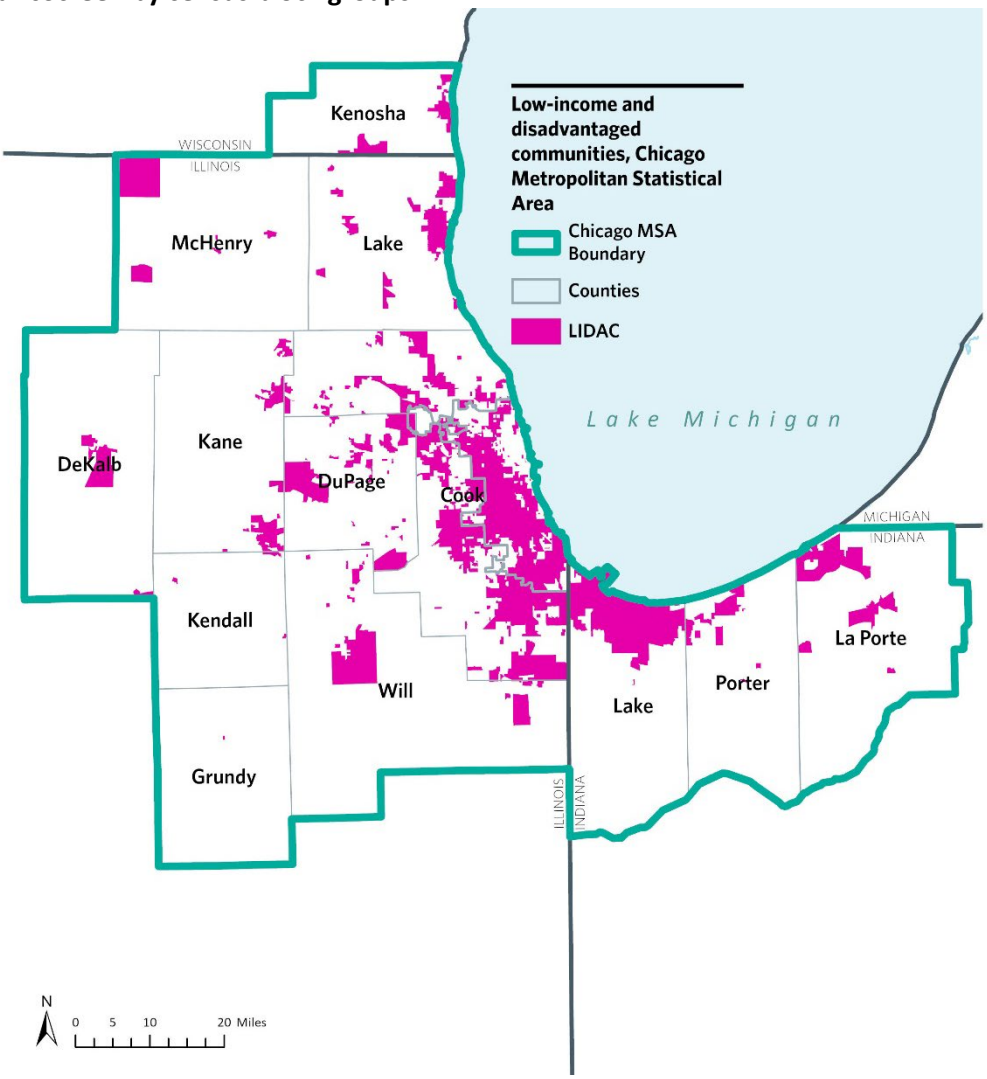
Source: CMAP, 2024.

Stakeholder engagement

Stakeholder engagement will leverage the expertise from different organizations to create strategies that are effective, achievable, and equitable and build momentum to implement the plan. The project team will engage stakeholders through a project steering committee, working groups, and other initiatives. These groups will represent implementing partners, subject matter experts, and community organizations.

Steering committee. The steering committee includes regional implementers, subject matter experts, and leaders from impacted communities across the 13-county planning area. The steering committee held its first meeting on June 11, 2024, and will focus on plan development and implementation. Members will not vote on the plan. Rather, they will serve as resources to inform its development. Nine committee members will serve as representatives of the working groups and CMAP Climate Committee. More members will be invited to serve as representatives on the working groups, if interested.

Figure 2. Low-income and disadvantaged communities in the planning area, defined by CEJST and EJScreen by census block groups



Source: CEJST, November 2022, and EJScreen, June 2023, via IRA Disadvantaged Communities Map.

Working groups and workshops. Supporting the steering committee's work will be four working groups and a series of workshops – each with their own sector or stakeholder focus. Working groups will be responsible for reviewing and proposing strategies, goals, and targets, sharing data and resources, and providing guidance on messaging. The working group's efforts to craft reduction strategies will run parallel to one another as well as similar efforts in topical workshops or focus groups on a variety of topics that could include energy generation, freight, agriculture, water and wastewater. The three sector working groups held their first meetings in July, the equity working group will be convened on September 11, 2024.

Existing committees. NIRPC's Environmental Management and Policy Committee, MMC's Environment Committee, this Committee, as well as CMAP's Climate Committee, Transportation Committee and Community Alliance for Regional Equity will be involved in proposing and considering GHG reduction strategies. The project team will continue to coordinate and collaborate with the States of Illinois, Indiana, and Wisconsin to minimize redundancies in outreach and maximize consistency in the analysis and conclusions of the respective plans.

Community engagement. Low-income and disadvantaged communities are already grappling with worst effects of climate change. The project team will center these voices in the planning process to ensure that the plan reflects community priorities and challenges. Community engagement efforts will focus on communicating with residents about GHG emission reduction measures and opportunities for their communities; identifying and incorporating community priorities into the plan; and understanding how communities will positively or negatively be impacted by the clean energy transition (lower utility bills, less air pollution, etc.).

Additional efforts. CMAP is also partnering with ComEd and the Respiratory Health Association on a separate project to explore how the region can fully decarbonize the transportation sector by 2050 and its impacts on the electrical grid. As a recipient of a Clean Energy to Communities (C2C) In-Depth Technical Assistance contract funded by the Department of Energy and administered by the National Renewable Energy Laboratory, our region will receive technical assistance from Argonne and Oak Ridge National Laboratories to better understand the types and scale of action needed to foster a clean energy transition. While focused on transportation, it represents a significant opportunity to connect regional and electric grid planning.

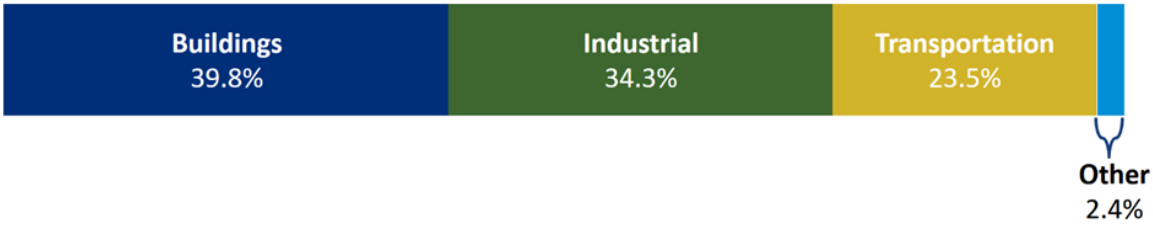
Greenhouse gas inventory

Identifying and quantifying GHG emissions sources and sinks is critical to the climate action planning process. A GHG inventory helps the region tailor reduction strategies to fit existing conditions, conduct benefit analyses, and both set and track progress toward emission reduction targets. The GHG inventory was developed in accordance with USEPA guidance through the development of the Priority Climate Action Plan and further refined for the plan.

The 2020 Greenhouse Gas Inventory[1] covers emissions across 13 counties and from eight sectors: transportation, residential, commercial and institutional buildings, industrial, agriculture, waste, and wastewater. It also estimates carbon dioxide equivalent (CO2e) removed due to carbon sequestration of trees, forestlands, and wetlands within the region.[2]

In 2020, the 13 counties produced approximately 166 million metric tons of carbon dioxide equivalent (MMT CO2e) of GHG emissions. Figure 3 provides the greenhouse gas emissions inventory for the planning area, broken down by the following sectors: buildings, industrial, transportation, and other. Carbon sequestration is estimated to reduce emissions by 2.74 MMT CO2e annually. Given the Regional Economy committee's charge, the region's building and industrial emissions are described in more detail.

Figure 3. Greenhouse gas emissions in the greater Chicago area by sector, 2020

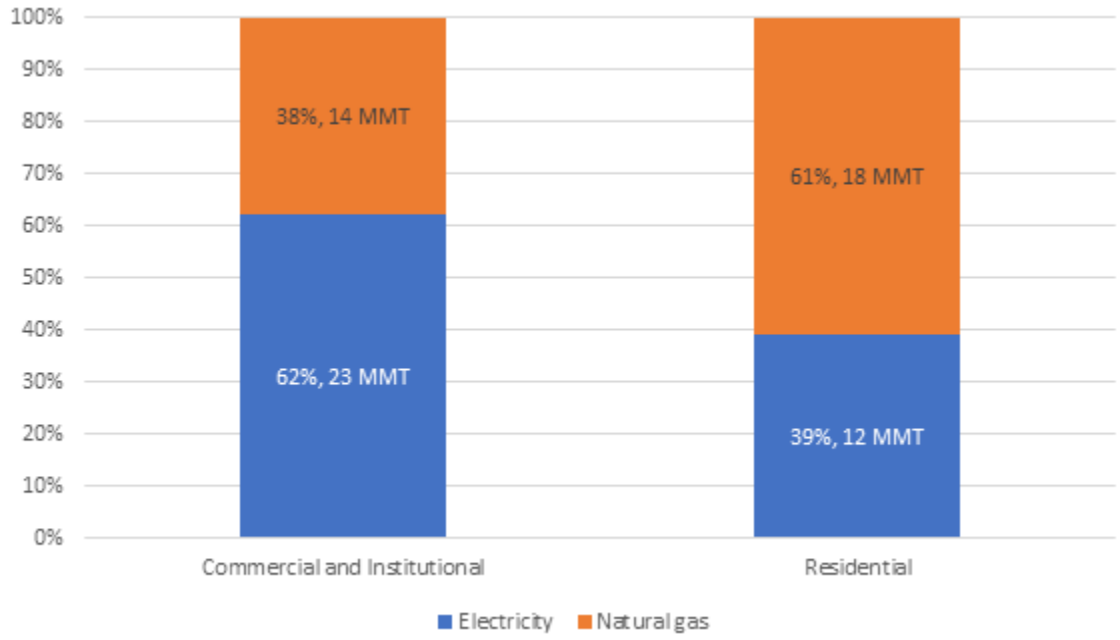


Source: CMAP, 2024.

Building emissions

Composed of residential, institutional, and commercial buildings, this sector's emissions are generated from electricity and natural gas consumption from space and water heating and cooling, refrigeration, ventilation, lighting, and electronic appliances. According to the 2020 GHG inventory, the building sector produced 67.4 MMTCO2e, accounting for 39.8 percent of all inventoried emissions.[3] Approximately 22 percent of all emissions are from commercial and institutional buildings and 18 percent are from residential buildings. Within the commercial and institutional building subsector, most emissions derive from electricity usage, whereas most residential building emissions derive from natural gas usage (Figure 4).

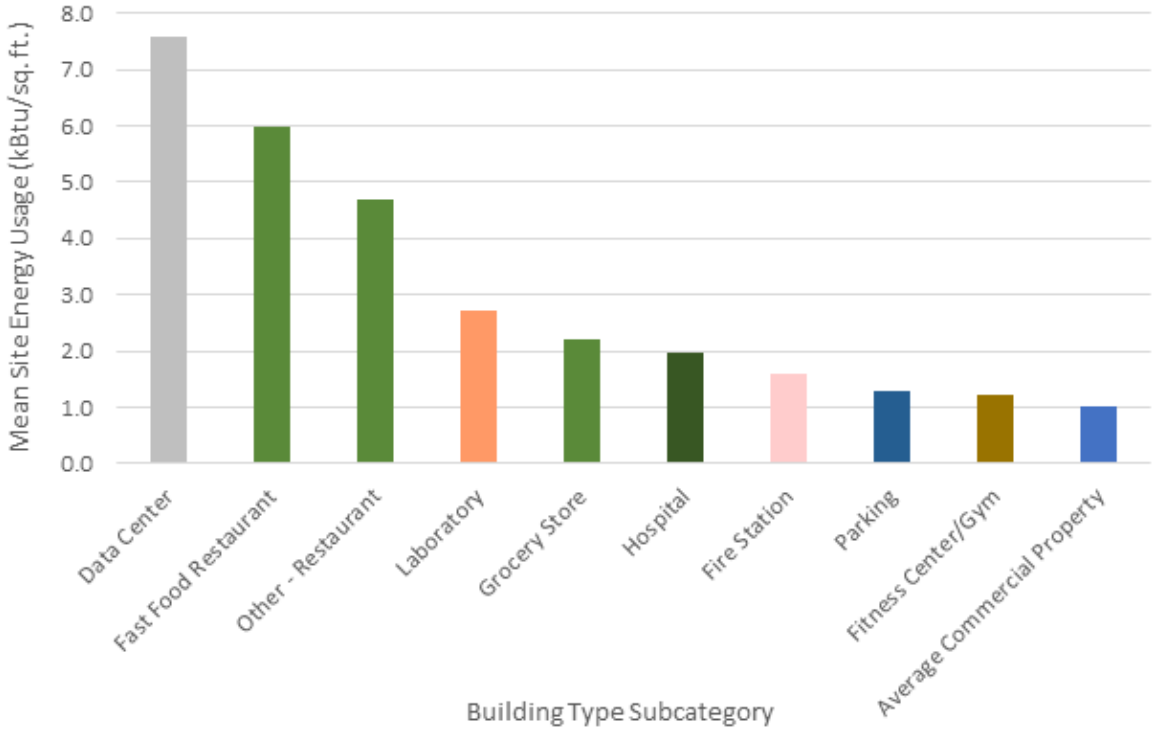
Figure 4. Building GHG emissions by subsector and source in the planning area, 2020



Source: National Renewable Energy Laboratory, 2024.

Building emissions can be attributed to building square footage, building type and technology, and development patterns. Some buildings inherently have higher energy demands given their uses, with the region's most energy-intensive commercial building types being data centers (eight times more energy intensive than the average commercial building in the region per square foot) and fast-food restaurants (six times more energy intensive than the average commercial building per square foot) (Figure 5).[4]

Figure 5. Nine most energy-intensive commercial property types by mean energy usage per square foot, 2018-2022



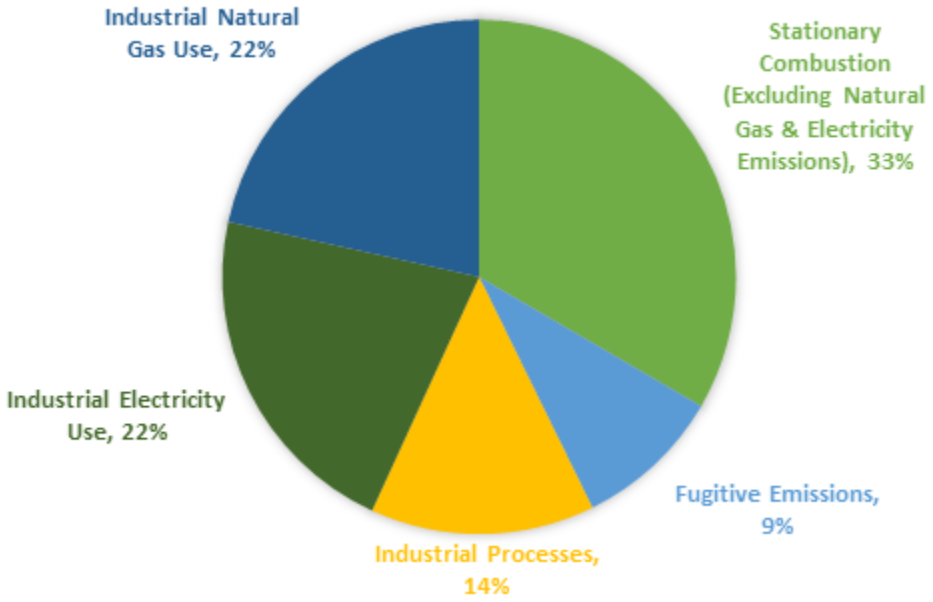
Source: USEPA, ENERGY STAR Portfolio Manager Data Explorer, 2018-2022.

A building's GHG emissions reflect the emissions profile of the electric utilities supplying buildings with power. The energy mix of the planning area is roughly 64 percent coal and natural gas, 28 percent nuclear, and eight percent renewables.[5] While most electricity is generated off-site today, that dynamic is beginning to change as more solar, wind, and other renewable sources are generated on-site. Similarly, new development may either opt out or be precluded from connecting to natural gas infrastructure to promote building electrification. Only 11 percent of residential buildings are all electric in Illinois and Wisconsin, compared to 19 percent in Indiana and 25 percent nationally.[6]

Industrial emissions

According to the 2020 GHG inventory, the industrial sector produced 58.16 million metric tons of carbon dioxide equivalent (MMT CO2e), accounting for 34 percent of all inventoried emissions.[7] In the planning area, one third of the industrial sector's emissions come from stationary combustion (on-site processes that generate heat and energy). The sectors that produce the most on-site industrial emissions—including stationary combustion and process and fugitive emissions—are iron and steel production, petroleum refineries, chemical production, and lime production.

Figure 6. Industrial GHG emissions in the planning area by subsector, 2020 (MMT CO2e)

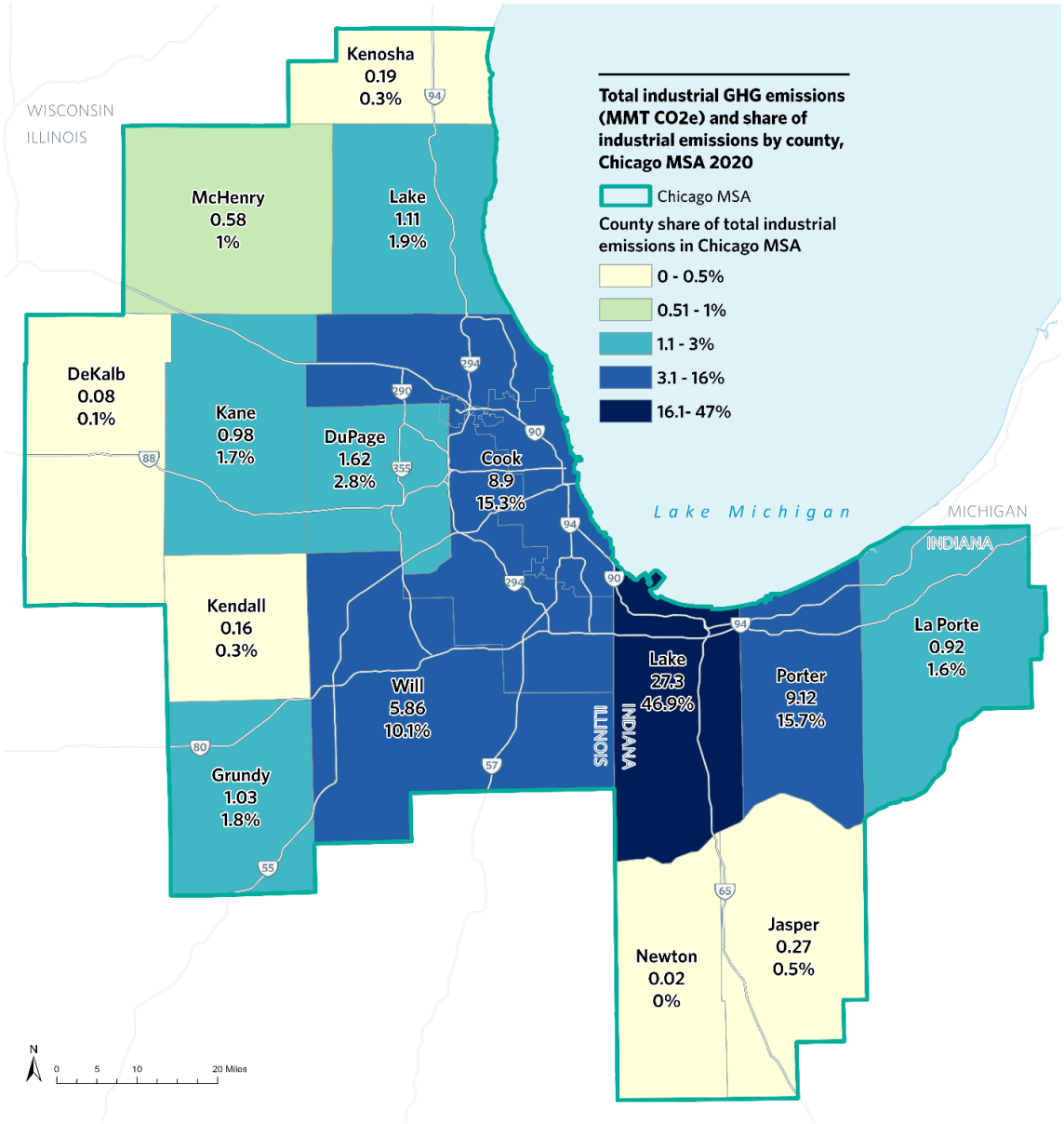


Source: CMAP, 2024.

Across the planning area, three counties account for over 78 percent of industrial emissions: Lake County, IN, at 46.9 percent; Porter County, IN, at 15.7 percent; and Cook County, IL, at 15.3 percent (Figure 7). This pattern reflects the regional concentration of industrial activities around navigable waters like Lake Michigan, Lake Calumet, the Illinois and Michigan Canal, and the Chicago and Sanitary Ship Canal as well as freight transportation infrastructure, including the intermodal facilities near O'Hare International Airport and in southern Cook County, and ports like the Illinois International Port District and others in northwest Indiana.

Activities in many freight-dependent industries related to manufacturing, construction, and retail trade have a direct influence on transportation sector emissions. Industries benefit from proximity to freight transportation infrastructure across modes and networks for regional, national, and global goods movement. For example, existing steel mills co-locate with ports, freight railways, and highways. Relatedly, the region's role as a freight transportation hub is reflected in associated commercial building emissions from warehousing and distribution centers.

Figure 7. Industrial GHG emissions in the planning area by county (MMT CO2e and percent), 2020



Source: CMAP, 2024.

Key emissions drivers and national trends

Building and industrial emissions are influenced by several types of drivers, which are expected to change over time in ways that could either increase or decrease emissions:

- **Baseline regional conditions.** Regional conditions drive the amount and intensity of industrial and commercial building emissions. These include population, employment, age of existing building stock, amount of economic activity and the corresponding new construction and redevelopment, economic shifts from manufacturing to a service-based economy, land use and development patterns, and the location of employment centers.

- **Technology.** Technological changes and advances in the building industry and industrial processes will impact future emissions. For buildings, advancements in appliance energy

efficiency and building technology (e.g., heat pumps and building energy management systems) reduce the need for natural gas while also reducing the demand for electricity.

For industry, more efficient production methods and low- to zero-emissions technologies and energy sources could change emissions. Hard-to-abate emissions in key industries like chemical production have begun to be reduced through carbon capture, utilization, and storage strategies, although these technologies need further development.

- **Development and building standards.** Zoning and subdivision codes influence building emissions by regulating land use and development patterns. Building codes regulate the materials that comprise buildings, such as the amount of insulation required of the building envelope, the types of materials permissible for windows, and the minimum ventilation requirements.

- **Consumer demand and preferences.** Evolving consumer preference impacts building design and type. For example, since 1979, while the number of commercial buildings nationwide grew 56 percent, their total floor space increased nearly 90 percent, demonstrating a shifting preference for larger commercial buildings. Greater demand for and production of upstream materials (like lime and steel) and downstream products (like processed foods and automobiles) could lead to overall emissions increases, even as subsector decarbonization continues.

- **Costs.** Upfront cost can be a barrier to both industrial decarbonization and building efficient new construction and maintaining/rehabilitating existing buildings, despite long-term savings from reduced energy consumption.

  For buildings, this is particularly true for low- and moderate-income households. Upgrades to building envelopes to reduce energy loss, which are particularly needed in older buildings, can be even more costly than electrification. Government programs designed to reduce consumer costs have proliferated with the passage of the Inflation Reduction Act and state-level programs like Illinois Solar for All.

- **Changing climate conditions.** As the climate changes, warmer summer temperatures, extreme heat and cold events can drive greater energy consumption for heating and cooling and could impact industrial-related emissions.

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[1] Pandemic-related changes in transportation and energy consumption make 2020 an anomalous year for some datasets, but it is still a viable year for this analysis. The inventory is built using modeled and reported data from various time scales and geographies, which reduces the impacts of short-term fluctuations, such as those experienced in 2020. The inventory results are comparable to past efforts to study emissions in the region.
[2] Additional emission sources carbon sinks will be explored during the plan development process.
[3] The summary of building emissions includes a small amount of emissions from Jasper and Newton counties in Indiana. These counties have since been removed from the planning area.
[4] USEPA, "ENERGY STAR Portfolio Manager Data Explorer," accessed on July 12, 2024, https://portfoliomanager.energystar.gov/dataExplorer/.
[5] CMAP analysis of United States Environmental Protection Agency Emissions & Generation Resource Integrated Database (eGRID) 2020. These percentages are calculated for the RFC West eGRID subregion. The U.S. is divided into eGRID subregions that align with where electricity is generated and distributed, which provides a mechanism to understand the energy and emissions profile from the power plants that are supplying a given area.

[6] U.S. Energy Information Administration, "Residential Energy Consumption Survey (RECS) Dashboard," accessed July 12, 2024, https://experience.arcgis.com/experience/cbf6875974554a74823232f84f563253?src=%E2%80%B9%20Consumption%20%20%20%20%20%20Residential%20Energy%20Consumption%20Survey%20(RECS)-b1.

[7] The summary of industrial emissions includes a small amount of emissions from Jasper and Newton counties in Indiana. These counties have since been removed from the planning area.