PRIORITY CLIMATE ACTION PLAN FOR THE CHICAGO METROPOLITAN STATISTICAL AREA

2024

Metropolitan Mayors Caucus | CMAP

Contents

Chicago Metropolitan Statistical Area Priority Climate Action Plan

The purpose of this Priority Climate Action Plan is to articulate plans for strategic climate action that will support equitable investment in policies, practices, and technologies that reduce pollutant emissions, create high-quality jobs, spur economic growth, and enhance the quality of life in the greater Chicago Metropolitan Statistical Area.

The intent of the Priority Climate Action Plan (PCAP) is to enable jurisdictions throughout the Chicago Metropolitan Statistical Area (MSA) to seek federal funding under the United States Environmental Protection Agency's (EPA) Climate Pollution Reduction Grants (CPRG) Implementation Grant General Competition and other funding streams, as applicable to implement Priority Green House Gas (GHG) Reduction Strategies. The strategies contained herein should be construed as broadly available to any entity within the Chicago MSA eligible to receive funding.

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We appreciate the partnership of the Northwestern Indiana Regional Planning Commission (NIRPC) in developing the PCAP. Both CMAP and NIRPC will continue to collaborate to complete the Comprehensive Climate Action Plan (CCAP) in June 2025. The Metropolitan Mayors Caucus also enjoyed collaboration with the Southeastern Wisconsin Regional Planning Commission (SEWRPC), the City of Chicago, City of Aurora, City of Geneva, DuPage County, the Illinois Environmental Protection Agency, Kane County, City of Kenosha, City of Naperville, and Village of Oak Park to plan the PCAP process. The Kankakee-Iroquois Regional Planning Commission (KIRPC) and State of Wisconsin expressed their support and willingness to collaborate. Many other local government agencies, private sector and civic organizations were engaged in and supportive of the PCAP process as described in the Stakeholder Engagement *Section 1.3.3.*

The Metropolitan Mayors Caucus is deeply grateful to the EPA who has made this extraordinary opportunity for coordinated, strategic, and inclusive climate action available, not just to the region, but to states, metropolitan regions, tribes, and territories across the United States. The EPA made a dazzling number of rich technical resources, tools and support available to all organizations developing PCAPs for the Planning Phase of the Climate Pollution Reduction Grant Program. Without the guidance and deep technical expertise of the EPA both nationally and within EPA's Region 5, the Priority Climate Action Plan would not have been possible in this short amount of time. Efforts made by EPA's CPRG team to train and support public leaders at state, local, and tribal levels will have an enduring impact on our nation's ability to meaningfully address the climate crisis while supporting thriving communities.

The Metropolitan Mayors Caucus (Caucus), a non-profit regional council of governments inclusive of 275 municipalities in northeastern Illinois, is the lead agency for the Climate Pollution Reduction Planning Grant for the Chicago MSA. The Executive Board of the Caucus is strongly supportive of climate action and the Caucus' leadership role in regional climate action, especially under the leadership of Executive Board Chairman and Environment Committee Chairman Kevin Burns, Mayor of the City of Geneva.

The Caucus' membership has demonstrated both commitments and effective action as adopters of the Greenest Region Compact, the Caucus' sustainability pledge and program endorsed by 153+ municipalities, 5 counties and 10 sub-regional councils of government. Such comprehensive climate action planning, as required for the PCAP, would not be possible without their support and engagement.

Finally, we appreciate the National Oceanic and Atmospheric Administration (NOAA) who contributed substantially to prepare the Metropolitan Mayors Caucus and member municipalities to plan for strategic climate action. Because of NOAA's assistance in preparing the 2021 Climate Action Plan for the Chicago region, we are ready and able to lead the CPRG planning work for our region.

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Definitions and Acronyms

ADA – The Americans with Disabilities Act of 1990

BIL - Bipartisan Infrastructure Law

C2ES – Center for Climate and Energy Solutions

CAA – Community Action Agency

CAP – Climate Action Plan

CCAP - Comprehensive Climate Action Plan

CEJA - Illinois Climate and Equitable Jobs Act

CEJST – Climate and Economic Justice Screening Tool

CH4 – methane

CMAP - Chicago Metropolitan Agency for Planning

CO2 – carbon dioxide

CO2e - carbon dioxide equivalent

CPRG – Climate Pollution Reduction Grants

CURB - Climate Action for Urban Sustainability tool

DACs – disadvantaged communities

DER – distributed energy resources

DOE – Department of Energy

DOE Communities LEAP – Department of Energy Communities Local Energy Action Program

eGRID - U.S. EPA Emissions & Generation Resource Integrated Database

EJScreen – U.S. EPA Environmental Justice Screening and Mapping Tool

EPA – U.S. Environmental Protection Agency

eTRU - Electric Transport Refrigeration Unit

EV – electric vehicle

EVCS – electric vehicle charging station

FLIGHT - U.S. EPA Facility Level Information on GreenHouse gases Tool

GHG – Greenhouse gas

GHGRP - U.S. EPA Greenhouse Gas Reporting Program

GPC - Global Protocol for Community-Scale Greenhouse Gas Emission Inventories

GRC – Greenest Region Compact

GWP - Global Warming Potential

HFC – hydrofluorocarbons

HUD - United States Department of Housing and Urban Development

ICC - International Code Council

IEPA - Illinois Environmental Protection Agency

IL – Illinois

IN – Indiana

IPCC - Intergovernmental Panel on Climate Change

IRA – Inflation Reduction Act

IREC – Interstate Renewable Energy Council

ITS – intelligent transportation system

KIRPC - Kankakee-Iroquois Regional Planning Commission

LGGIT - U.S. EPA's Local Greenhouse Gas Inventory Tool

LIDACs - Low Income / Disadvantaged Communities

MEEA – Midwest Energy Efficiency Alliance

MMTCO2e - million metric tons of carbon dioxide equivalent

MSA - metropolitan statistical areas as defined by the U.S. Census 2020 MSA population.

MTC02e - metric tons of carbon dioxide equivalent

MWRD - Metropolitan Water Reclamation District of Greater Chicago

NEI - National Emissions Inventory

NEVI - National Electric Vehicle Infrastructure formula program

NIRPC - Northwestern Indiana Regional Planning Commission

NOAA - National Oceanic and Atmospheric Administration

NREL - National Renewable Energy Laboratory

PACE - property assessed clean energy

PCAP - Priority Climate Action Plan

POTW - publicly owned treatment works

R&D – research and development

RE – renewable energy

Ref – reference

RFCW – RFC West, an eGRID subregion

RMI – Rocky Mountain Institute

RTA – Regional Transportation Authority

SEWRPC - Southeastern Wisconsin Regional Planning Commission

SF6 - sulfur hexafluoride

SIT – U.S. EPA State Inventory Tool

SLOPE - State and Local Planning for Energy platform

SOV – single-occupancy vehicle

TPIS - Truck Parking Information System

USDA - United States Department of Agriculture

USDOT – United States Department of Transportation

VMT – Vehicle Miles Traveled

WI - Wisconsin

Yrs - years

1 Introduction

1.1 CPRG overview

As a part of the Inflation Reduction Act, the U.S. Environmental Protection Agency (EPA) is implementing the historic the Climate Pollution Reduction Grant program in partnership with states, local governments, territories and tribes to ensure the health and well-being of Americans and to support global initiatives to mitigate climate impacts through the reduction of greenhouse gas emissions and other harmful air pollutants.

1.1.1 Phase 1 – Planning

The Climate Pollution Reduction Grant program is providing funds to 46 states and some 67 of the nation's largest MSAs to develop and implement plans for achieving CPRG objectives. The Metropolitan Mayors Caucus was awarded a $1 million Planning Grant to complete the planning requirements of CPRG for the Chicago MSA over a four-year period beginning in 2023. This PCAP is the first of these CPRG planning products.

The State of Illinois was awarded a $3 million Planning Grant to complete the planning requirements of CPRG for the State over a similar timeframe. The State of Wisconsin and the State of Indiana also accepted CPRG Planning Grants. Successful completion of these complementary regional and state PCAPs allows jurisdictions covered by these plans to be eligible to compete for grants through the $4.6 billion CPRG Implementation Grant Program.

Each state and MSA participating in the CPRG Planning grant program must complete these three climate planning products. The Metropolitan Mayors Caucus (Caucus) is collaborating with CMAP and NIRPC to produce these elements for the Chicago MSA following this timeline:

1. **Priority Climate Action Plan (PCAP),** due March 1, 2024
2. **Comprehensive Climate Action Plan (CCAP),** due June 2025
3. **Status Report,** due June 2027

The Caucus has led in the production of this document, the PCAP.

CMAP will lead in developing the CCAP. This narrative report will provide an overview of the region's significant GHG sources/sinks and sectors, establish near-term and long-term GHG emission reduction goals, and provide strategies and measures that address the highest priority sectors to meet those goals. The CCAP will include a comprehensive inventory of emissions and sinks for the following sectors: industry, electricity generation and use, transportation, commercial and residential buildings, agriculture, natural and working lands, and waste and materials management.

CMAP will collaborate with the Caucus to produce the Status Report.

1.1.2 Phase 2 – Implementation

The Priority GHG Reduction Strategies identified by the PCAP guide the eligibility of proposed projects for competitive CPRG Implementation funding, subject to review by the EPA. Any eligible jurisdiction within the Chicago MSA may apply for CPRG Implementation funding for projects that address Priority GHG Reduction Strategies in either this PCAP, or their respective state plan – Illinois, Indiana, or Wisconsin.

The U.S. EPA Notice of Funding Opportunity for CPRG Implementation Grants describes eligible applicants: states, municipalities, air pollution control agencies, tribes, territories, and groups thereof. Lead organizations that directly received a CPRG planning grant, including the Caucus are eligible to apply for an implementation grant.

1.2 PCAP Overview

This PCAP for the Chicago MSA includes these elements:

- **Greenhouse Gas (GHG) Inventory** – a comprehensive accounting of greenhouse gas emission sources and sinks
- **Priority GHG Reduction Strategies**– a subset of the Complete List of GHG Reduction Strategies for which specific measures and their GHG reduction impacts are quantified. These Strategies are likely to be implemented with the 5-year CPRG period.
- **Low Income / Disadvantaged Communities (LIDAC) Benefits Analysis** - identification of low income and disadvantaged communities and analyses of impacts from implementation of GHG Reduction Strategies
- **Intersection with Other Funding Availability**
- **Review of Authority to Implement Each GHG Reduction Strategy**
- **Next steps –** includes a full list of GHG Reduction Strategies for long term implementation.

  In addition, the 2021 Climate Action Plan for the Chicago Region provides additional elements that may inform policymakers and stakeholders. As this CAP was completed prior to CPRG, these elements are not inclusive of the entire Chicago MSA but are helpful for reference and for understanding the GHG Reduction Strategies included in this PCAP.
- **GHG emission projections**
- **GHG reduction targets**

Additional information on the PCAP elements can be found in EPA's CPRG: Formula Grants for Planning, Program Guidance for States, Municipalities, and Air Control Agencies.

Additionally, supplemental information follows in *Appendices A-G.*

1.3 Approach to Developing the PCAP

The CPRG program offers the greater Chicago region the opportunity to build upon fundamental climate action planning while extending the breadth and scope of previous plans for greater emissions reduction impacts and greater benefits to communities. Engagement of diverse jurisdictions and stakeholders across the state lines sparked innovation and collaboration to significantly reduce GHG emissions. The diversity of community types and size across the 14 counties stretched our thinking about climate action at this scale.

The CPRG Implementation grants offer an enormous opportunity to implement priority actions at an expansive scale. This prospect greatly influenced the development of the PCAP and the selection of Priority GHG Emission Strategies. The rapid timeline for CPRG planning reflects the urgency of the climate crisis and underscores the imperative of quick, coordinated action to mitigate climate change.

1.3.1 Existing Climate Action Plans

To create the Chicago MSA PCAP, the team drew on existing climate action plans prepared for localities in the MSA.

The Metropolitan Mayors Caucus (Caucus) developed the first Climate Action Plan for the Chicago Region (CAP) with assistance from the National Oceanic and Atmospheric Administration (NOAA) in 2021. The European Union and the Global Covenant of Mayors mentored the Caucus to create the plan as one of 3 model regional climate action plans in the United States. The CAP was recognized with several awards including a Climate Leadership Award through the Center for Climate and Energy Solutions (C2ES), awards from American Planning Association at both the national and state level, an award from the American Society of Landscape Architects, Illinois Chapter, as well as one from the Morton Arboretum.

The Climate Action Plan for the Chicago Region was based on the 2015 GHG inventory conducted by the Chicago Metropolitan Agency for Planning (CMAP) for the 7-county metropolitan region. The CAP addresses equity, mitigation, and adaptation. It identifies 8 climate mitigation (GHG Reduction) objectives and 42 GHG reduction strategies. These objectives form the framework for the strategies of the PCAP. All CAP strategies are included in the PCAP, and some were split into more precise strategies to suit further planning and regional implementation approaches.

Uniquely, the 2021 CAP was tailored for municipal action to serve the municipal members of the Metropolitan Mayors Caucus who embraced regional leadership on climate action early. To be more expansive in GHG reduction and to be more inclusive of regional jurisdictions and stakeholders, the GHG reduction strategies for the PCAP plans for engagement of transit agencies, water utilities and other local and regional governments.

Many high-quality climate action plans produced by constituent communities provided important inputs into the PCAP. The City of Chicago crafted its 2022 Chicago Climate Action Plan with a vision of justice and equity. The Chicago plan is based on its 2017 GHG inventory and developed GHG reduction strategies around 5 pillars. The recent and robust stakeholder engagement of the Chicago plan informs the PCAP. Other municipal climate action plans that inform the PCAP include the Village of Oak Park's Climate Ready Oak Park, the Village of Northbrook's Climate Action Plan. Kane County has completed the draft Kane County Climate Action Plan at the time of this publication.

Northwestern Indiana Regional Planning Commission (NIRPC) created the Northwest Indiana Climate Action Framework with GHG reduction strategies in 7 focus areas. The plan is based on their 2017 GHG inventory and provides critical insights for the PCAP to serves NW Indiana given their unique industrial economy. NIRPC's draft long-range plan, NWI 2050+, provides an emissions profile and recognizes the need to reduce emissions and prepare for climate change.

The Chicago Metropolitan Agency for Planning (CMAP) has done fundamental work to prepare for climate action planning including GHG inventories every 5 years since 2010. The most recent 2019 Chicago Regional GHG inventory also led to local emissions profiles that enable local climate planning. Recognizing the scale and urgency of climate change, ON TO 2050, the region's long-range plan adopted in 2018 and updated in 2022, establishes goals and strategies for the CMAP region to both intensify mitigation efforts and prepare for the current and projected impacts of climate change. CMAP's Strategic Direction (2023) defines the agency's five-year plan to advance the recommendations of ON

TO 2050. One of its three goals is "a region that takes action to mitigate and adapt to the impacts of climate change and preserve high-quality water resources."

1.3.2 PCAP Team

The Metropolitan Mayors Caucus has led the preparation of the Priority Climate Action Plan for the Chicago MSA.

CMAP has contributed invaluable assistance in the completion of the greenhouse gas inventory for the Chicago MSA on which priority GHG reduction strategies are based. CMAP also contributed the Low Income and Disadvantaged Communities Analysis portion of this PCAP and identified additional regional GHG reduction strategies to improve upon the Climate Action Plan for the Chicago Region. CMAP quantified many of the Priority GHG Reduction Strategies. CMAP also completed the Quality Assurance Project Plan (QAPP) as required by the CPRG program.

NIRPC contributed GHG data and guided in selection of priority strategies. Illinois Environmental Protection Agency coordinated in the development of the PCAP and covers important Priority GHG Reduction Strategies not included in this PCAP.

1.3.3 Stakeholder Engagement

Robust stakeholder engagement in the recent creation of the Climate Action Plan for the Chicago Region, the 2022 Chicago Climate Action Plan, Northwest Indiana Climate Action Framework, and other climate planning referenced above provided a solid foundation for the development of the PCAP. The Climate Action Plan for the Chicago Region engaged 270 people from 175 organizations including 53 diverse municipalities in the Chicago region, of which 16 are environmental justice communities (LIDAC). The City of Chicago gathered input from 2,100 residents and Kane County has gathered input from 1,100 residents to create their respective climate action plans.

The Caucus utilized the Environment Committee, comprised of municipal representatives and allies from throughout the region, to educate and solicit input about the CPRG program and PCAP development. Members of the Environment Committee include mayors, other elected officials, municipal staff, citizen commissioners and allies from other branches of government and the civic community. Low income and disadvantaged communities throughout the region are well-represented on the Environment Committee. Stakeholder engagement to develop the PCAP are summarized here:

May 16, 2023, the Environment Committee of the Metropolitan Mayors Caucus held a meeting to discuss CPRG. More than 50 municipal officials and civic leaders attended the online meeting.

May 23, 2023, CMAP hosted a meeting of the County Chairpersons representing the 7-county region. CPRG information was presented and discussed.

December 6, 2023, CMAP announced that Climate Action Townhall through its newsletter, received by 24,000 people, and created an online survey to solicit implementation project ideas and foster collaboration.

*December 18, 2023***,** CMAP and the Caucus jointly hosted the Climate Action Townhall with Illinois EPA and NIRPC participating as presenters. One-hundred and sixty people from throughout the MSA attended.

January 16, 2024, the Environment Committee of the Metropolitan Mayors Caucus held a meeting to help prioritize GHG reduction strategies and hear presentations from likely applicants for CPRG

Implementation funding. More than 60 stakeholders attended and gave input into the development of 5 potential implementation projects. The online engagement tool, *Mentimeter,* was used to solicit feedback and rank project ideas.

February 24, 2024, The Caucus used an online survey to solicit stakeholder feedback on the draft Priority GHG Reduction Strategies. Seventeen respondents generally concurred with draft strategies, and a few made helpful comments.

A sign-on letter requesting that an e-bike incentive program be covered as a Priority GHG Reduction Strategy was received by CMAP, the Caucus and the City of Chicago. This letter was signed by:

350 Chicago
Active Transportation Alliance
Better Streets Chicago
Chicago Cycling Club
Chicago Family Biking
Chicago, Bike Grid Now!
Climate Reality Project: Chicago Metro Chapter
Elgin Community Bikes
Environmental Law & Policy Center
Equiticity
Friends of Cycling in Elk Grove
Go Green Illinois
Light Up Lawndale
Little Village Environmental Justice Organization
Major Taylor Cycling Club of Chicago
McHenry County Bicycle Advocates
McHenry County Century Ride
Metropolitan Planning Council
Natural Resources Defense Council
Northwest Center
Respiratory Health Association
Ride Illinois
Sierra Club Illinois Chapter
West Town Bikes NFP

The very short PCAP timeline and the large scale of the PCAP project prohibited more extensive and in-person stakeholder engagement across the Chicago MSA. Stakeholder engagement will continue and will deepen over the next CCAP planning phase of CPRG.

1.3.4 Identifying and Quantifying GHG Reduction Strategies

The 2021 Climate Action Plan for the Chicago Region compiled GHG reduction strategies (called Mitigation Strategies). Forty-two strategies were identified and categorized into eight Mitigation (GHG Reduction) Objectives based on these inputs:

- Analysis of 31 local sustainability plans and 25 municipal climate action plans from the United States cities and Europe.

- Use of the CURB (Climate Action for Urban Sustainability) tool to categorize and evaluate actions.
- Input from 270 stakeholders representing 175 organizations.

Mitigation strategies in the 2021 CAP were tailored for municipal action to serve the municipal members of the Metropolitan Mayors Caucus who embraced leadership on climate action early.

Strategies (renamed GHG Reduction Strategies) compiled for the PCAP are more inclusive of regional jurisdictions and more expansive in GHG reduction potential. While the short timeframe prohibited thorough stakeholder engagement, input and ideas were solicited as described above and incorporated. CMAP also conducted its own review of 20 climate action and sustainability plans including 9 not reviewed for the CAP. CMAP staff also convened in-house subject matter experts to evaluate strategies and identify new ones. Notable additions include strategies related to transit, vehicle traffic, freight, and industry.

The Complete List of GHG Reduction Strategies contains 67 strategies organized into 8 GHG Reduction Objectives. These objectives are:

1. Demonstrate Leadership
2. Decarbonize Energy Sources
3. Optimize Building Energy
4. Implement Clean Energy Policies
5. Decarbonize Transportation
6. Reduce Vehicle Miles Traveled
7. Manage Water and Waste Sustainably
8. Sustain Ecosystems to Sequester Carbon

Priority Strategies are categorized in context of their overarching Objective and highlighted in the Complete List of GHG Reduction Strategies (in blue). See Complete List of GHG Reduction Strategies *Section 6.*

Many additional GHG Reduction Strategies are offered as guidance to all stakeholders in the Chicago MSA for planning and implementation beyond the scope of PCAP. These additional strategies will serve as a foundation for further planning, stakeholder engagement and refinement in the CCAP.

Priority GHG Reduction Strategies are exclusively selected as vehicles to allow eligible organizations within the Chicago MSA to apply for CPRG Implementation Grants. CMAP led stakeholder engagement to solicit CPRG Implementation project ideas as the foundation for the selection of Priority GHG Reduction Strategies. An online survey was widely distributed beginning December 6, 2023, and remained open through the end of January 2024. A total of 25 responses were received. Follow up conversations with these stakeholders allowed scoping of viable project ideas and the forming of coalitions to champion Priority GHG Reduction Strategies.

Project ideas were evaluated for consistency with CPRG program priorities. These criteria included subjective evaluation of:

- Benefits to low income and disadvantaged communities (LIDAC)
- Feasible implementation in 5 years
- High or highly effective GHG reduction potential
- Innovation and potential for transformation

- Funding gaps or funding insufficiency prohibiting the project from advancing without CPRG funding

Both CMAP and the Caucus met with key constituents to brainstorm to conceive CPRG implementation projects and guide in the identification of enabling priority reduction strategies. These include:

- A coalition of counties and municipalities led by Kane County
- American Lung Association
- Chicago-Area Wastewater Utility Consortium led by Wheaton Sanitary District
- City of Chicago
- Chicago Public Schools, Chicago Park District, Chicago Housing Authority
- ComEd
- Cook County
- County transportation planners
- Drive Clean Indiana
- Governors State University
- Illinois Brotherhood of Electrical Workers Local 701
- Illinois Alliance for Clean Transportation
- Illinois Landscape Contractors Association
- Lake County
- Lake Michigan Air Directors Consortium (LADCO)
- Metropolitan Planning Council
- Metra commuter rail
- Regional Transportation Authority
- Sub-regional councils of government

In addition, advocates representing electric micromobility, food waste, and circular economy interests contributed ideas for priority reduction strategies.

Strategies from the draft Complete list of GHG Reduction Strategies were refined and adapted to sufficiently address the projects that constituent groups intend to propose for CPRG Implementation funding. With further coordination and another online survey (February 24, 2024) the 13 Priority GHG Reduction Strategies were finalized. These are presented in *Section 5,* Priority GHG Reduction Strategies.

Many GHG reduction strategies of great importance to the region are not named “Priority GHG Reduction Strategies” in this PCAP. To clarify, Priority GHG Reduction Strategies included in the PCAP are so defined because they will enable projects that meet CPRG criteria to compete for CPRG implementation funding.

Important strategies to electrifying transportation through policy and investment are not included because there are several other robust funding opportunities available beyond CPRF. These include NEVI funds from the U.S. Joint Office of Energy and Transportation, NEVI funds through federal and State grants, vehicle rebates from the State of Illinois, and rebates through ComEd’s Beneficial Electrification program. Important investments in active transportation to reduce vehicle miles traveled are not included because they cannot be completed in the CPRG timeframe and cannot demonstrate high GHG reductions through mode shift. Building energy policies are a regional priority but are not included as priorities because other sources of federal funding through Department of Energy are available and in fact, have been awarded to the Chicago area. Any eligible jurisdiction within the Chicago MSA may apply for CPRG grant funds to address Priority Strategies that alternatively appear in their respective state PCAPs - Illinois, Indiana, or Wisconsin.

Other strategies are included as Priority GHG Reduction Strategies at the request of project champions, despite relatively modest GHG reduction potential, or access to other funding sources. Helping low- and moderate-income households access energy efficiency and electrification benefits is one of these championed project ideas. Therefore, BE1 and BE2 strategies for residential energy efficiency and residential electrification were elevated as priorities. Similarly, constituents expressed strong support for an e-bike rebate program proposal. Therefore, VMT11 for electric micromobility systems was elevated as a priority.

Each of the 13 Priority GHG Reduction Strategies were analyzed and quantified for CPRG program compliance. At least one representative *measure* was chosen for each Priority Strategy and that measure was quantified using tools and models available from U.S. EPA, the National Renewable Energy Laboratory (NREL), the Rocky Mountain Institute (RMI), and others. ComEd used its own validated modeling tool for energy efficiency and electrification strategies. CMAP conducted thorough quantification exercises for nine of the priority measures. Organizations championing future CPRG projects conducted additional quantification exercises. Quantification results are presented in *Section 5* and full methodology is described in *Appendix A.*

The key purpose of the quantification exercise is to demonstrate GHG reduction potential and validate the selection of these thirteen Priority GHG Reduction Strategies.

1.4 Scope of the PCAP

This PCAP serves the entire Chicago-Naperville-Elgin, IL-WI-IN MSA, including Illinois counties Cook, DeKalb, DuPage, Grundy, Kane, Kendall, Lake, McHenry and Will; Indiana counties of Lake, Porter, Jasper, and Newton; and the Wisconsin county of Kenosha. It has a total population of 9,618,502. The Chicago MSA is the third largest among 67 MSA's eligible to receive a Phase 1 Planning Grant through the CPRG program.

The **Chicago metropolitan statistical area** includes part of Wisconsin and Indiana.

The Priority Actions are guided by the needs of the constituents and capability of jurisdictions within the region to reduce emissions from these sectors:

1. transportation
2. residential electricity and natural gas usage
3. commercial, (electricity and natural gas usage)
4. industrial (electricity usage, natural gas usage
5. industrial processes
6. energy generation agriculture
7. waste
8. wastewater

The PCAP considers existing authorities and capacity of the jurisdictions eligible for CPRG Implementation funds including municipalities, counties, transit agencies, water utilities, and groups thereof and the metropolitan planning organization to implement priority climate actions, often in partnership with others in the private and civic sectors. Each Strategy is paired with both "Key Implementers" and "Authority to Implement" as a planning aid. The Chicago MSA PCAP is coordinated with relevant State PCAPs, references state authority and implementation partnership but does not identify strategies for state implementation.

Greenhouse gas reduction strategies include a range of actions that can be undertaken by local and regional government agencies including policies, programs, and capital projects. Strategies identify needs for collaboration and partnership across jurisdictions and with the private sector.

2 Greenhouse Gas (GHG) Inventory

To inform the development of the Chicago MSA PCAP, CMAP completed a greenhouse gas (GHG) emissions inventory for the 14 counties in the Chicago MSA (*2020 Chicago MSA inventory*).

This section provides an overview of the methodology used to develop the inventory and details 2020 GHG emissions by both sector and relevant subsectors, reports total and per-capita emissions by county, and reflects upon previous GHG inventories and trends.

The process by which emission sources and sinks are identified and quantified within the planning geography is critical to the climate action planning process and will help the region identify and assess GHG reduction measures, conduct benefit analyses, and both set and track progress toward its emission reduction targets. The GHG inventory was developed in accordance with U.S. Environmental Protection Agency (EPA) guidance provided via the Climate Pollution Reduction Grant program, as reflected in the *Appendix C.*

2.1.1 Methodology - Underlying data

The 2020 Chicago MSA Greenhouse Gas Inventory includes 2020 county-level emissions data for three major GHGs: carbon dioxide, methane, and nitrous oxide. CMAP chose the year 2020 because it was the most recent year available across the geography.[1] CMAP also reviewed past inventories for northeastern Illinois (2019) and northwestern Indiana (2017).

The 2020 Chicago MSA Greenhouse Gas Inventory covers emissions from eight sectors: transportation residential electricity and natural gas usage), commercial, (electricity and natural gas usage), industrial (electricity usage, natural gas usage, and emissions from industrial processes), energy generation, agriculture, waste, and wastewater. It also estimates carbon dioxide equivalent (CO2e) removed due to

[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.

carbon sequestration of trees and forestlands within the region.[2] Table 1 lists the GHG inventory sectors and their data sources.

Table 1. Greenhouse gas inventory sectors and data sources

Sector	Source
Transportation	National Emissions Inventory (NEI)
Residential: Natural gas	DOE/NREL SLOPE Tool
Residential: Electricity	DOE/NREL SLOPE Tool and RFCW eGRID rates
Commercial: Natural gas	DOE/NREL SLOPE Tool and RFCW eGRID rates
Commercial: Electricity	DOE/NREL SLOPE Tool
Industrial: Natural gas	DOE/NREL SLOPE Tool
Industrial: Electricity	DOE/NREL SLOPE Tool
Industrial: Processes	EPA Greenhouse Gas Reporting Program (EPA GHGRP)
Energy generation	EPA Greenhouse Gas Reporting Program (EPA GHGRP)
Agriculture	EPA State Inventory Tool (SIT) scaled with USDA cropland acreage
Waste	EPA FLIGHT Tool/EPA GHGRP
Wastewater	MWRD data scaled with U.S. Census population data

Source: CMAP, 2024.

2.2 Emissions calculation by sector

To calculate emissions for each sector, CMAP used the U.S. EPA's Local Greenhouse Gas Inventory Tool (LGGIT) for community-wide inventories, following guidance outlined in the U.S. EPA Climate Pollution Reduction Grant Program.[3]

Commercial, residential, and industry sector stationary energy emissions include emissions resulting from grid-supplied electricity and natural gas used for heat, steam, cooling, and other processes. Calculations for these emissions used data on electricity and natural gas fuel consumption supplied by the Department of Energy (DOE) and National Renewable Energy Laboratory (NREL)SLOPE tool,[4] as well as the U.S. EPA Greenhouse Gas Reporting Program (GHGRP).[5] Emissions from electricity used in the region were calculated using the U.S. EPA Emissions and Generation Resource Integrated Database (eGRID),[6] which discloses environmental characteristics of electricity generated in the multi-state electrical transmission region.

[2] This inventory does not include emissions from interregional aviation. Additional carbon sinks will be explored during the CCAP.

[3] U.S. EPA, 2023, Climate Pollution Reduction Grant Program, GHG Inventory guidance, https://www.epa.gov/inflation-reduction-act/cprg-tools-and-technical-assistance-greenhouse-gas-inventory

[4] SLOPE, or State and Local Planning for Energy platform, is available at https://www.energy.gov/scep/slsc/state-and-local-planning-energy-slope-platform

[5] The U.S. EPA GHGRP requires reporting of greenhouse gas data and other relevant information from large GHG emission sources, fuel and industrial gas suppliers, and carbon dioxide injection sites in the United States. See https://www.epa.gov/ghgreporting

[6] eGrid is available at https://www.epa.gov/egrid

The Chicago MSA is part of the RFCW eGRID subregion which extends into Indiana, Ohio, and West Virginia.[7] In 2021, electricity in this eGRID was produced by several different sources: natural gas (27.7 percent), coal (35.6 percent), and nuclear (28.5 percent).[8] Compared to the rest of the nation, the RFCW eGRID's fuel mix includes significantly larger contributions from both nuclear and coal, and less in natural gas. Notably, wind, solar, and geothermal represent a much smaller portion of the region's fuel mix (5.5 percent combined) than the national average (12.4 percent). Methods for analyzing different portions of the MSA region, such as the smaller ComEd region, accounting for local variations in energy generation, were not available for the entire region at the time the inventory was conducted.

Emissions for the transportation sector were calculated using results from the National Emissions Inventory (NEI),[9] and captured mobile sources, including on-road emissions, non-road equipment, locomotives, and commercial marine vessels.

Emissions from the waste sector were calculated using the U.S. EPA Facility Level Information on Greenhouse Gases Tool (FLIGHT),[10] a publicly accessible database that reports on large GHG emissions sources. The FLIGHT tool reports carbon dioxide, methane, and nitrous oxide emissions in CO2e using the Global Warming Potential Values,[11] which allows for comparisons of global warming impacts of different gases. These values were informed by a report by the Intergovernmental Panel on Climate Change (IPCC). The Chicago MSA Greenhouse Gas Inventory uses the conversion values from the IPCC's fifth assessment report. However, the FLIGHT tool uses values from the IPCC fourth assessment report, which differ from the conversion values used in this inventory. As a result, these values were converted to raw emissions values and then into CO2e using the fifth assessment report rates for this inventory.

Emissions associated with biogas emissions from wastewater treatment facilities within the MSA region were calculated and scaled based on data provided by the Metropolitan Water Reclamation District (MWRD). This data was utilized to calculate kilograms of methane and nitrous oxide per person for the CMAP region. Since data from all wastewater treatment plants in the region were not available, CMAP used MWRD methane and nitrous oxide per-person rates to scale wastewater sector biogas emissions to the MSA level based on county population totals from the 2020 U.S. Census.

Agriculture emissions from fertilizer consumption are scaled from the agriculture module of the U.S. EPA State Inventory Tool (SIT).[12] This dataset lists total nitrogen consumption in metric tons by state. After state-level data was calculated, it was downscaled to the county level using the proportion of state cropland acreage found within each of the counties in the MSA region. Total cropland acres in each relevant county and state were downloaded from the U.S. Department of Agriculture (USDA)'s QuickStats database.[13]

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[7] The 27 eGRID subregions in the U.S. are defined by EPA using data from the Energy Information Administration (EIA) and the North American Electric Reliability Corporation (NERC). The subregions are defined to limit the amount of imports and exports across regions in order to best represent the electricity used in each of the subregions.

[8] U.S. EPA eGRID 2021 Power Profiler for RFCW. Accessed on January 25, 2024: https://www.epa.gov/egrid/power-profiler#/RFCW

[9] NEI is available at https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei

[10] FLIGHT is available at https://ghgdata.epa.gov/ghgp/main.do?site_preference=normal

[11] More information about Global Warming Potential Values can be found at https://www.epa.gov/ghgemissions/understanding-global-warming-potentials

[12] SIT is available at https://www.epa.gov/statelocalenergy/state-inventory-and-projection-tool

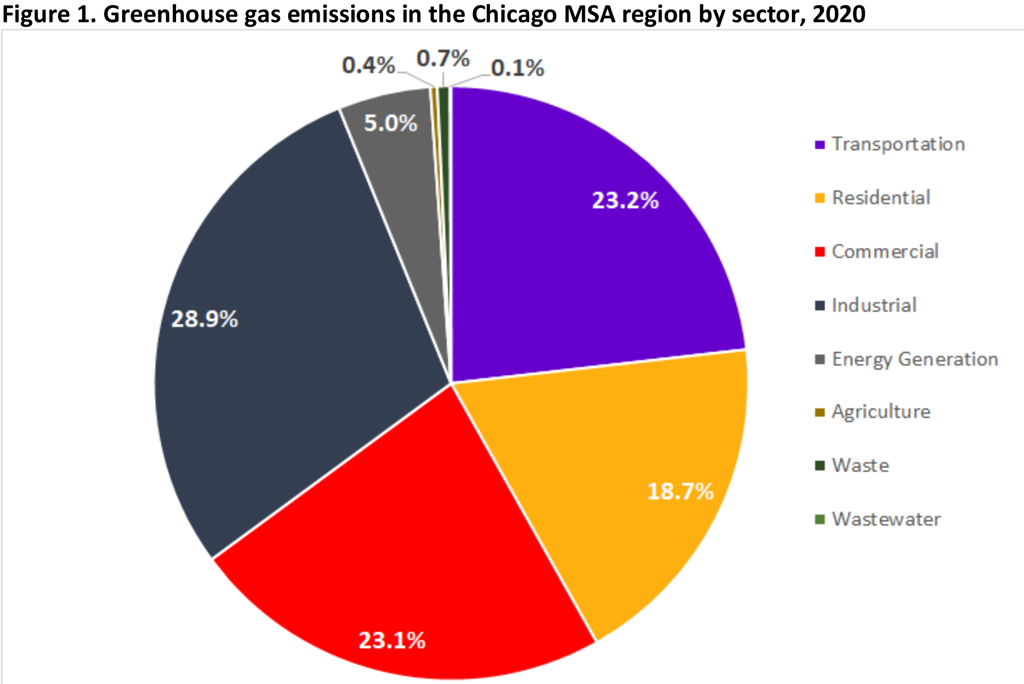
[13] Crop acreage by state and county can be found at https://quickstats.nass.usda.gov/

All emissions within the inventory are expressed in million metric tons of carbon dioxide equivalent (MMTCO2e). *Appendix C* provides more information on the methodology used to convert emissions across the various sectors included in this inventory into this standard format.

2.3 2020 Chicago MSA Greenhouse Gas Inventory

In 2020, the 14 counties in the Chicago MSA produced approximately 160 million metric tons of carbon dioxide equivalent (MMTCO2e) of GHG emissions. Figure 1 provides the greenhouse gas emissions inventory for the Chicago MSA region, broken down by the following sectors: transportation, residential buildings, commercial buildings, industry, energy generation, agriculture, waste, and wastewater. Figure 2 provides the same information, broken down by subsector and highlights the relative contributions of electricity and natural gas across the building sectors. Figure 3 rank orders the subsectors based on greatest to least share of the total inventory.

Figure 1. Greenhouse gas emissions in the Chicago MSA region by sector, 2020

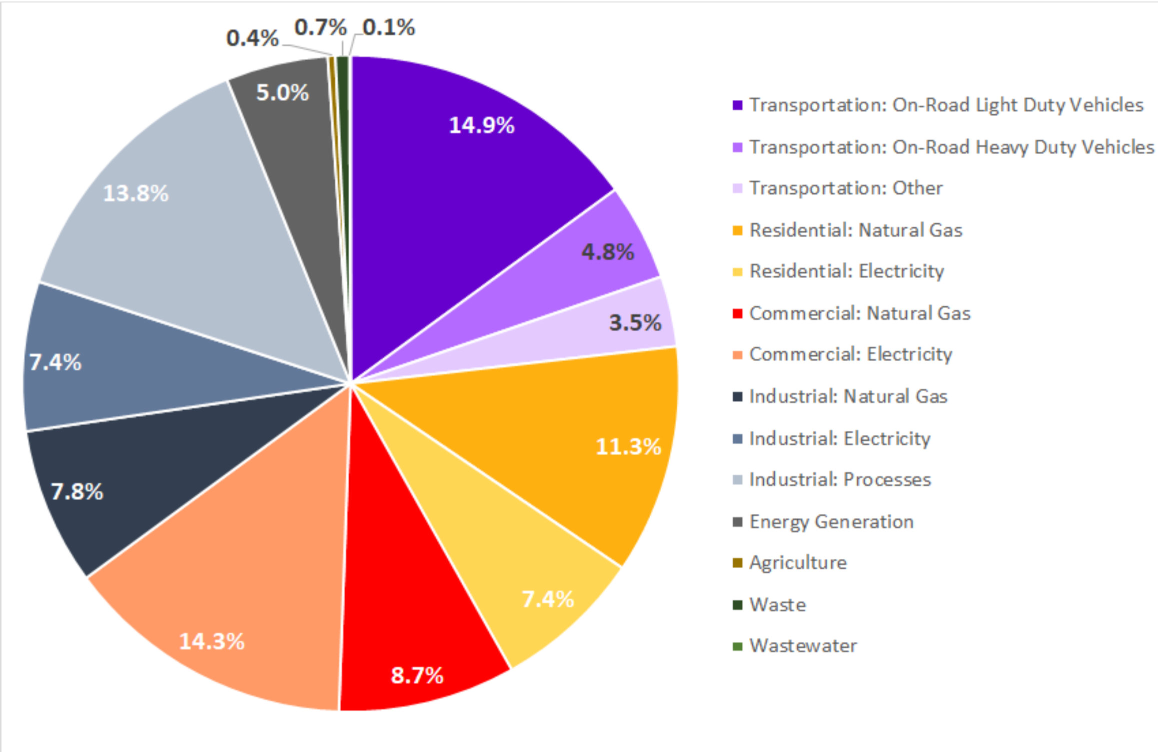


Source: CMAP, 2024.

The MSA's GHG inventory shows that two prominent emission sectors — industry and transportation — comprise over 50 percent of total emissions. This is likely due to the region's important role as national transportation and manufacturing hubs. The Chicago region is home to 10 interstate highways, 6 Class I railroads, one of the nation's busiest air-cargo hubs, and the only maritime connection between the St. Lawrence Seaway and the Mississippi River system. These transportation resources directly produce greenhouse gas emissions and make the region an ideal location for industry. The Chicago region's current and historical role as manufacturing and transportation centers, combined with its dependance on fossil fuels, make the region a major contributor to the United States' total GHG output.

Approximately 23 percent of regional emissions come from transportation. On-road transportation, which includes public and private cars, buses, and trucks, is overwhelmingly the largest source of transportation emissions (85 percent) and is the single largest subsector overall. Approximately 64 percent of transportation emissions come from light duty vehicles, such as private cars, SUVs, and small trucks. An additional 21 percent of transportation emissions come from heavy duty vehicles such as large trucks. See Figure 2 for more detail. Other transportation sources include non-road equipment, locomotives, and commercial marine vessels.

Figure 2. Greenhouse gas emissions in the Chicago MSA region by subsector, 2020



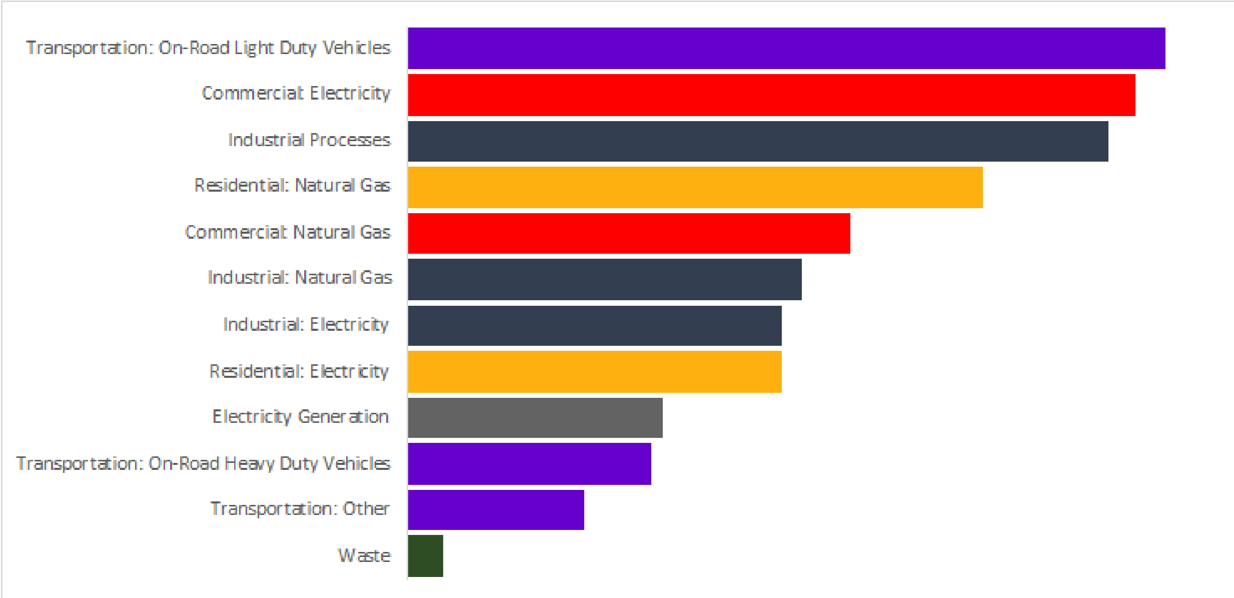
Source: CMAP, 2024.

Industrial emissions from electricity and natural gas use and processes account for 28.9 percent of the MSA's total emissions. Within industry, natural gas use accounts for approximately 27 percent and electricity use accounts for about 25 percent of GHG emissions. Industrial processes account for approximately 48 percent of all industry sector GHG emissions. Approximately 81 percent of industrial process emissions are a result of iron and steel production. See Figure 2, below. Only three counties within the Chicago MSA region (Lake County, IN; Porter County, IN; and Cook County, IL) produce emissions from iron and steel production.

Emissions from commercial and residential buildings are also notable, as shown in Figure 2. Commercial buildings, including institutional buildings, accounted for 23.1 percent of all emissions, while residential buildings accounted for 18.7 percent. This is likely due to the region's northern climate, leading to significant heating and cooling needs, as well as regional concentrations of older building stock. Within the residential buildings sector, natural gas use accounts for approximately 61 percent of emissions while electricity use accounts for 39 percent. Within the commercial buildings sector, natural gas use accounts for about 38 percent of GHG emissions while electricity use accounts for 62 percent.

Energy generation emissions, or emissions from the power sector not directly attributable to consumers, account for an additional 5 percent of emissions. Agriculture (0.4 percent), waste (0.7 percent), and wastewater (0.1 percent) are the smallest shares of the overall GHG emissions inventory, shown in Figure 2. Carbon sequestration, focused on trees and forestlands, removed an estimated 1.49 MMTCO2e in 2020.

Figure 3. Greenhouse gas emissions in the Chicago MSA region by subsector, listed in order of greatest to least share of the total inventory, 2020



Source: CMAP, 2024.

Emissions from electricity generation — serving residential, commercial, and industrial buildings — account for 34 percent of total emissions. Natural gas emissions associated with onsite residential, commercial, and industrial sector fuel use account for 28 percent of total emissions. Most emissions in the transportation sector are associated with gasoline and diesel.[14]

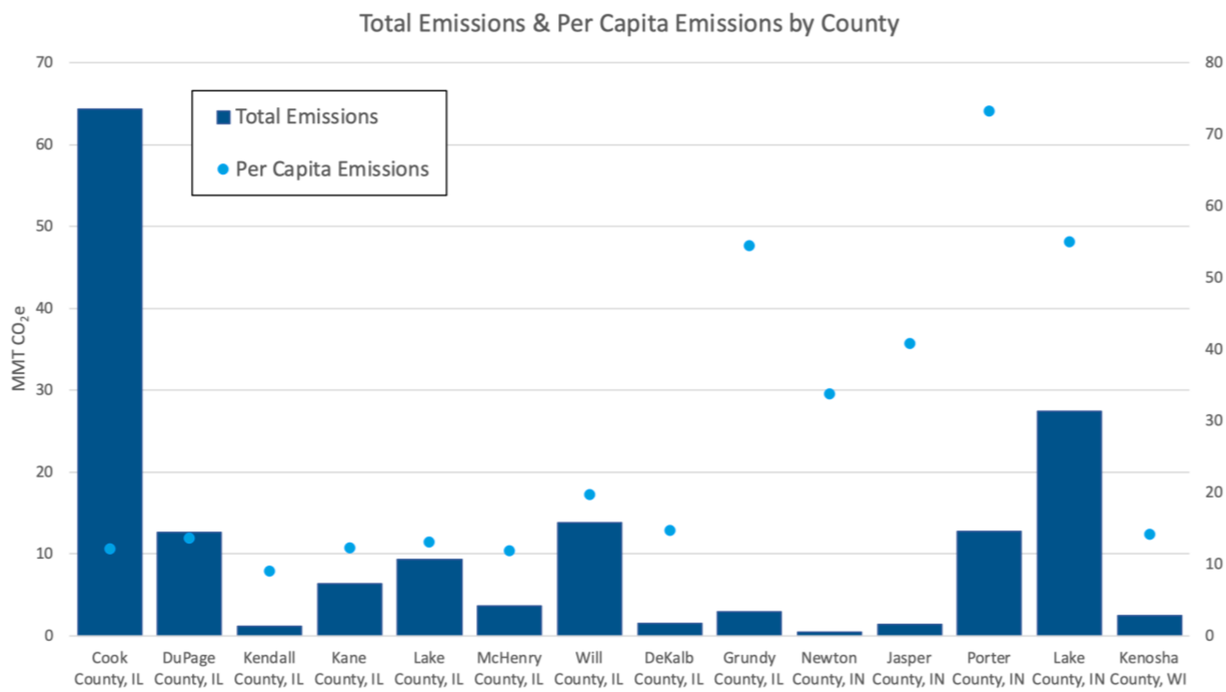
2.4 Results by county

Figure 4 and Table 2 provide total and per capita GHG emissions respectively at the county level for 2020. Notably, Cook County, IL generated the most emissions of any geography in the region by a significant margin (40 percent of total emissions, or 64.3 MMTCO2e), followed by Lake County, IN (17 percent, or 27.4 MMT C02e); Will County, IL (9 percent, or 13.8 MMT C02e), and DuPage County, IL (8 percent, or 12.7 MMT CO2e). Newton County, IN produced the least emissions (0.5 MMT C02e), followed by Jasper County, IN (1.3 MMT C02e).

On a per capita basis, Porter County, IN (73.2 MT C02e/person); Lake County, IN (55 MT C02e/person); and Grundy County, IL (54.4 MT C02e/person) produced the most emissions per capita. Kendall County, IL (9.04 MT CO2e/person); McHenry County, IL (11.8 MT C02e/person); and Cook County, IL (12.2 MT CO2e/person) were the most efficient.

[14] Electricity used to power electric vehicles cannot be attributed to the transportation sector at this time.

Figure 4. Greenhouse gas emissions in the Chicago MSA region, total and per capita, by county, 2020



Source: CMAP, 2024.

Table 2. Greenhouse gas emissions in the Chicago MSA region, total and per capita, by county, 2020

County	Total emissions (MMT C02e)	Total emissions (Percent)	Per capita emissions (MT C02e/person)
Cook County, IL	64.3	40%	12.2
DuPage County, IL	12.7	8%	13.6
Kendall County, IL	1.2	1%	9
Kane County, IL	6.3	4%	12.2
Lake County, IL	9.4	6%	13.1
McHenry County, IL	3.7	2%	11.8
Will County, IL	13.8	9%	19.8
DeKalb County, IL	1.5	1%	14.7
Grundy County, IL	2.9	2%	54.4
Newton County, IN	0.5	0%	33.8
Jasper County, IN	1.3	1%	40.9
Porter County, IN	12.7	8%	73.2
Lake County, IN	27.4	17%	55
Kenosha County, WI	2.4	1%	14.1

Source: CMAP, 2024

2.5 Results by state

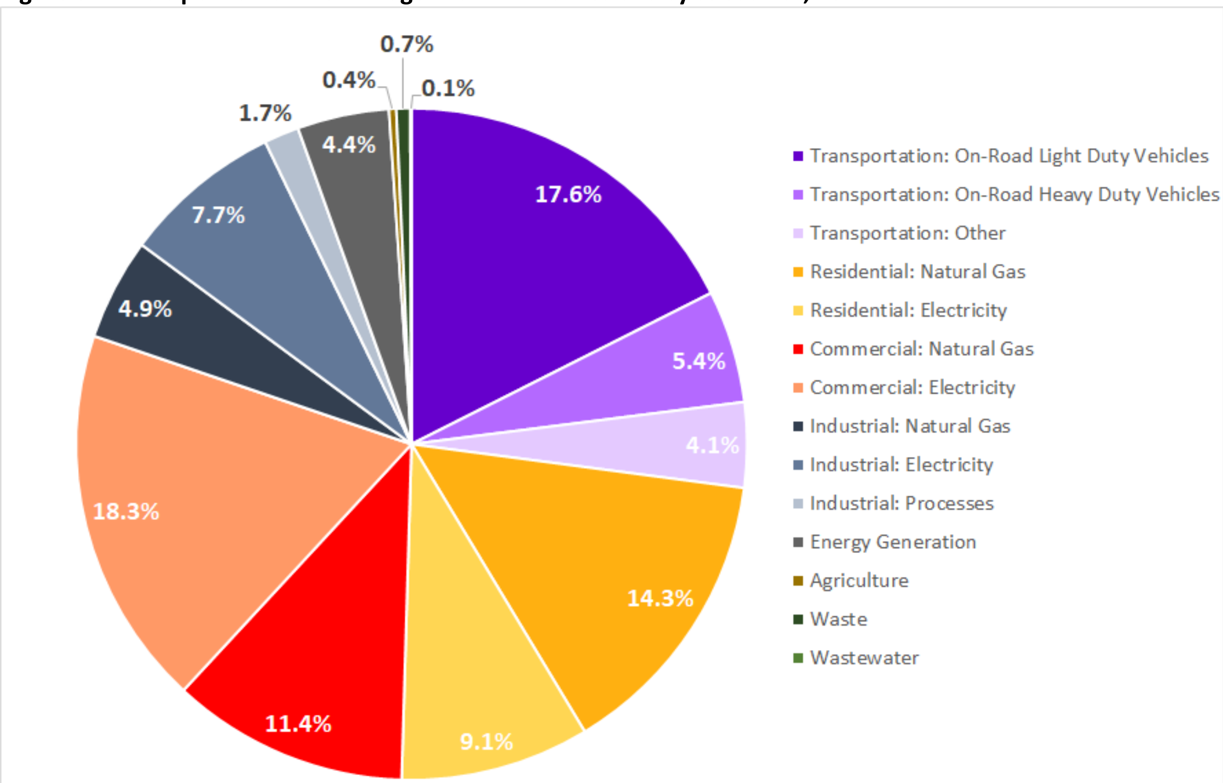
When viewing Chicago MSA GHG emissions by state, stark differences in the types of regional emissions come into focus. For example, nearly 85 percent of all industrial emissions are concentrated in Lake County, IN; Porter County, IN; and Cook County, IL.

Illinois portion of the Chicago MSA

The Illinois portion of the Chicago MSA represents 72 percent of the region's total GHG emissions and includes the counties of Cook, DuPage, Kendall, Kane, Lake, McHenry, Will, DeKalb, and Grundy. These emissions are detailed by subsector in Figure 5.

Generally speaking, emissions attributed to Illinois mirror the rest of the MSA; however, Illinois industrial emissions represent a much smaller portion of the overall MSA's emissions profile — a total of 14.3 percent versus 28.9 percent for the total Chicago MSA inventory.

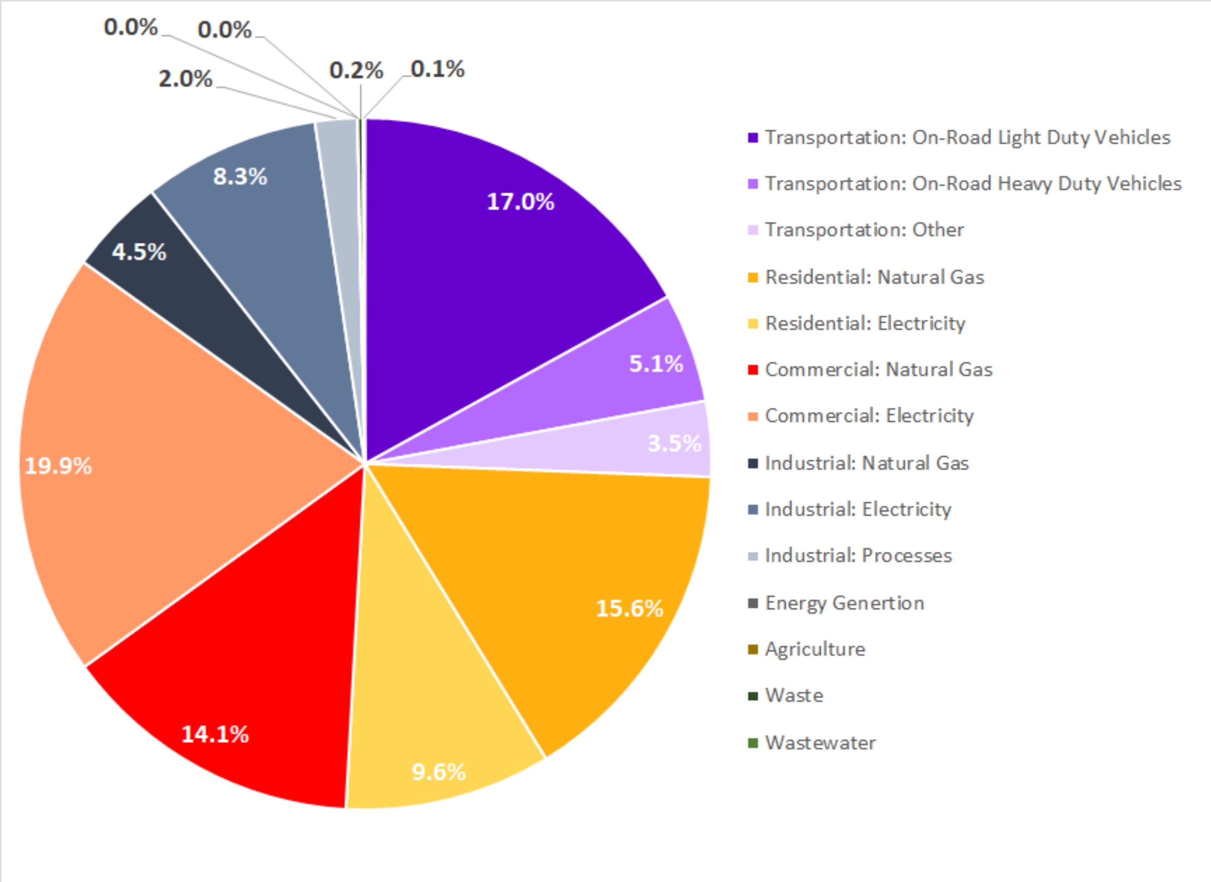
Figure 5. Illinois portion of the Chicago MSA GHG emissions by subsector, 2020.



Source: CMAP, 2024

Figure 6 details the GHG emissions for Cook County, which contributes the greatest share of emissions (40 percent) among all counties in the Chicago MSA. The percentage of Cook County's overall emissions from transportation (25.6 percent) is slightly lower than the total Illinois portion of the MSA (27.1 percent), and its residential and commercial building emissions (59.2 percent of the total) are slightly higher than the total Illinois portion of the MSA (53.1 percent). For Cook County, these results are likely due to the comparatively dense land use pattern, high access to the regional transit system, and significant building heating and cooling needs.

Figure 6. Cook County, IL GHG emissions by subsector, 2020.

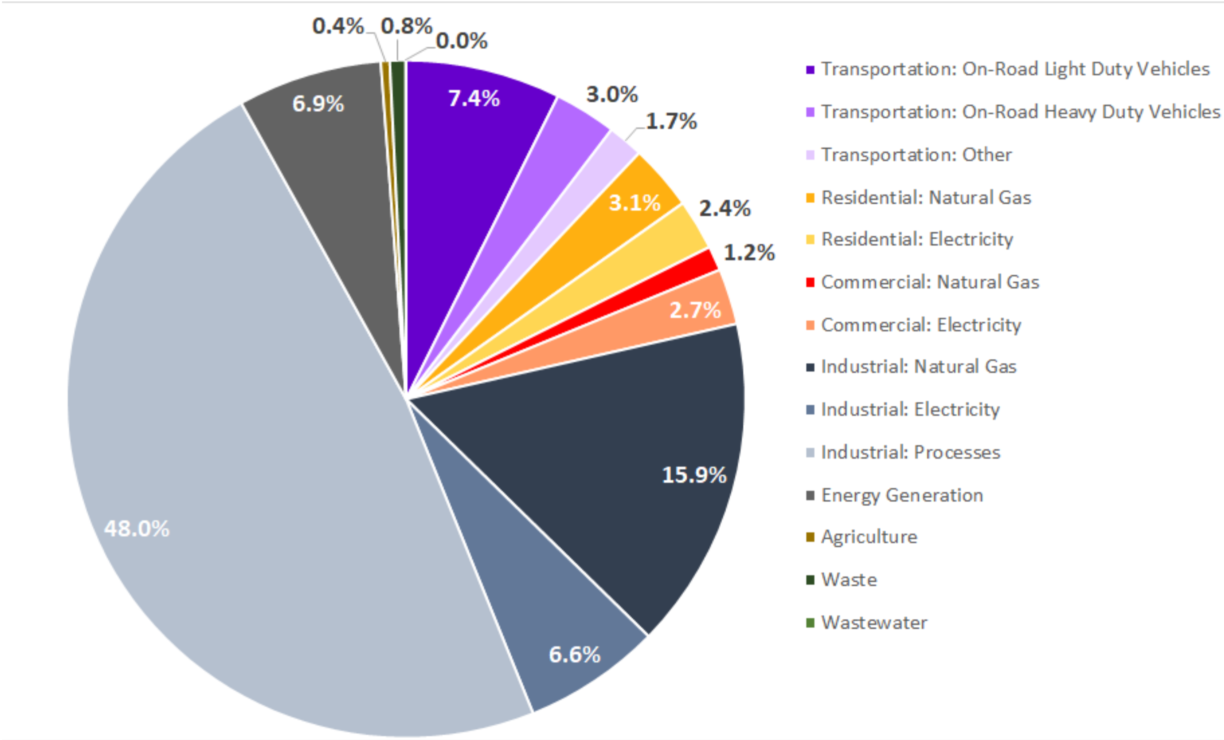


Source: CMAP, 2024

Indiana portion of the Chicago MSA

The Indiana portion of the Chicago MSA represents 26 percent of the total MSA emissions and includes the counties of Newton, Jasper, Porter, and Lake. As shown in Figure 7, northwest Indiana has a significantly larger percentage of emissions from industrial energy emissions compared with other parts of the MSA. The Northwestern Indiana Regional Planning Commission's (NIRPC) 2017 GHG emissions inventory attributed over half of the area's GHG emissions to this source. Similarly, the 2020 Chicago MSA inventory also found that 48 percent of GHG emissions in the four Indiana counties come from industrial processes, with additional emissions from industrial electricity and natural gas use for a combined total of 71 percent of all emissions in these four counties.

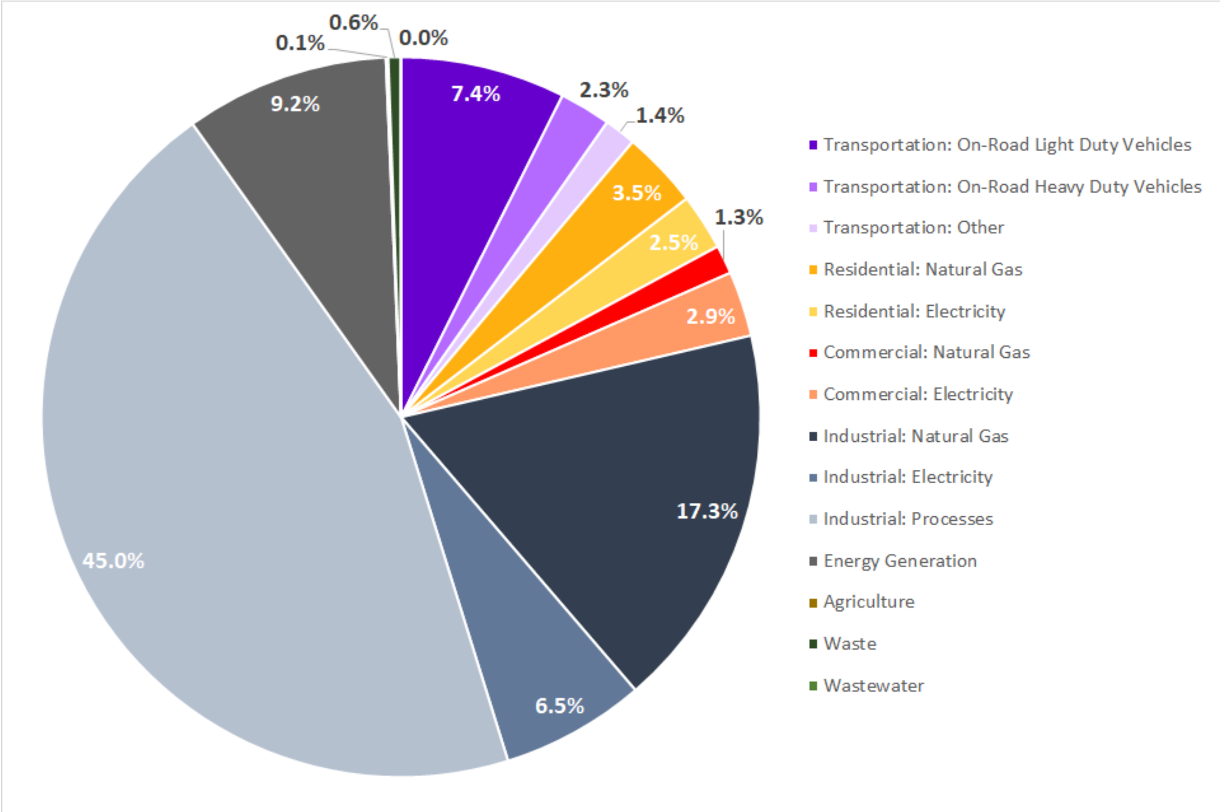
Figure 7. Indiana portion of the Chicago MSA GHG emissions by subsector, 2020



Source: CMAP, 2024

Figure 8 provides the emissions inventory by subsector for Lake County, IN. Lake County contributes the second largest share of greenhouse gas emissions (27.4 percent) among all the counties in the Chicago MSA region. Notably, however, Lake County's inventory differs significantly from Cook County's. Total industrial emissions in Lake County represent 69 percent of emissions (18.9 MMTCO2e) — considerably higher than Cook County, where they make up 15 percent (9.5 MMTCO2e) of total emissions. Industrial processes represent the highest contributing subsector in Lake County (45 percent), compared to only 2 percent for Cook County. In fact, Lake County represents 42 percent of all industrial emissions and 52 percent of all industrial process emissions within the region. Following industrial processes, Lake County's highest contributing sectors are transportation (11 percent) and energy generation (9 percent).

Figure 8. Lake County, IN GHG emissions by subsector, 2020

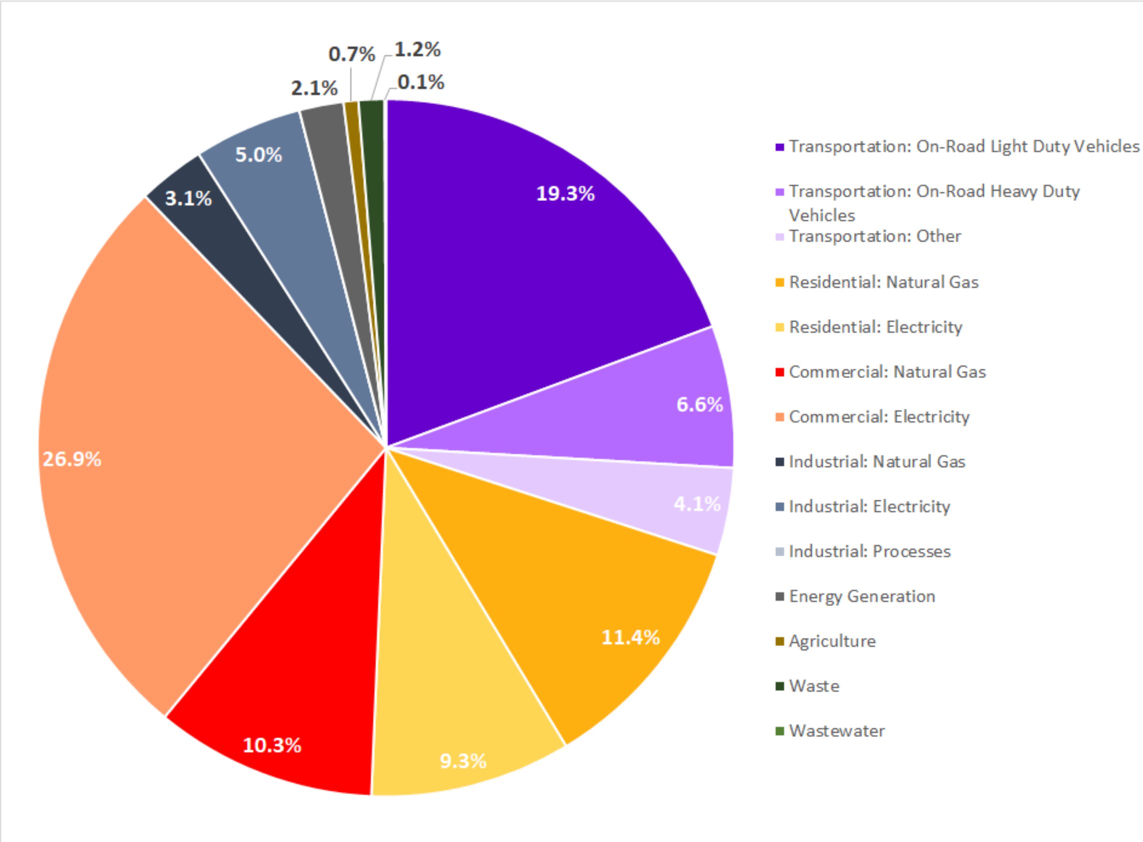


Source: CMAP, 2024

Wisconsin portion of the Chicago MSA

The Wisconsin portion of the Chicago MSA represents 1.5 percent of total MSA emissions and includes Kenosha County. Figure 9 provides the GHG emissions by subsector for this county and highlights very distinct differences from the regional picture. Compared to the regional inventory, industry accounts for a relatively small portion of Kenosha County's greenhouse gas emissions (8.1 vs. 28.9 percent*)*, while both transportation and commercial building emissions are a greater portion of the overall profile.

Figure 9. Wisconsin portion of the Chicago MSA GHG emissions by subsector, 2020



Source: CMAP, 2024

2.5.1 Past inventories and trends

The 2020 Chicago MSA inventory was the first conducted for the Chicago MSA, but several previous inventories for sub-geographies within the MSA can provide key insights into ongoing trends. Most notably, CMAP references the 2010, 2015, and 2019 GHG emissions inventories for the seven-county CMAP region and the 2017 GHG emissions inventory for two counties in the NIRPC region. While these inventories used different methodologies than the 2020 Chicago MSA inventory, they can be useful for studying high-level trends.

CMAP has been conducting regional GHG emissions inventories every five years since 2010 for the seven counties in the agency's jurisdiction: Cook, DuPage, Kane, Kendall, Lake, McHenry, and Will.[15] These inventories follow the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC) Basic methodology[16] and show emissions at the county level. Consistent with the GPC Basic methodology, CMAP's past inventories did not include industrial processes, agriculture, or sequestration.

CMAP's previous inventories also differ from the 2020 Chicago MSA inventory in their approach to building energy. CMAP's previous inventories used energy use data provided by natural gas and electricity utilities, rather than EPA data, and applied a region-specific emissions factor to estimate

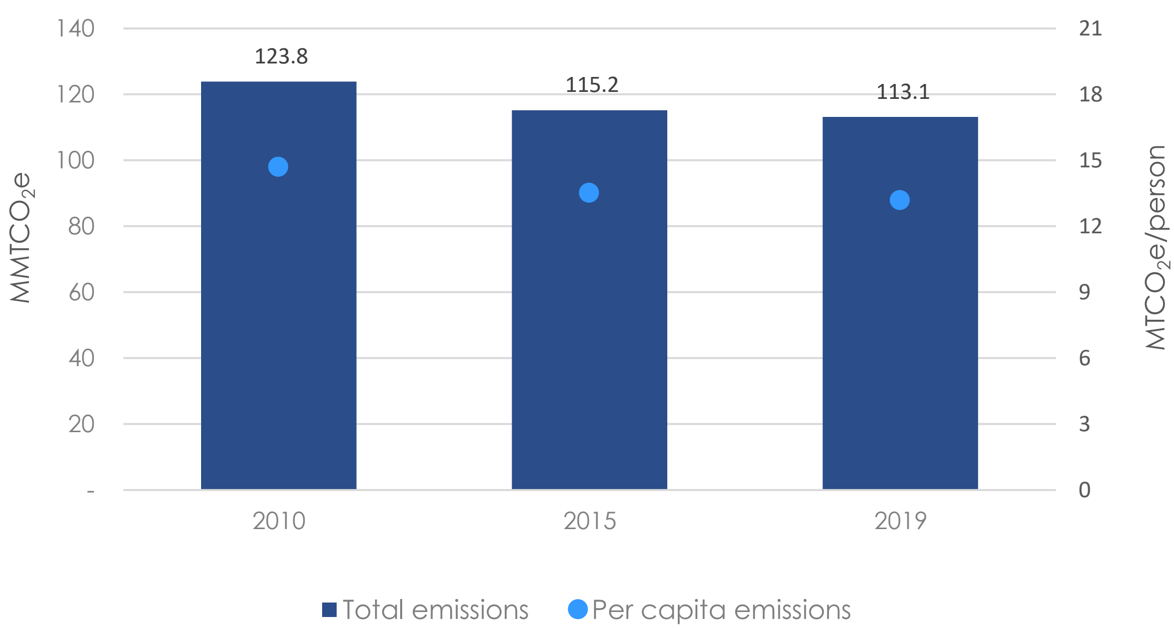
[15] Full inventory available at: https://www.cmap.illinois.gov/data/greenhouse-gas-inventory
[16] Inventory methodology available at: https://ghgprotocol.org/ghg-protocol-cities

electricity emissions. This custom emissions factor is intended to account for the relatively high proportion of nuclear energy in the ComEd service area, relative to the larger eGRID region.

The CMAP region's most recent inventory was conducted for 2019 and included an update of 2010 and 2015 data. As shown in figure 10, the 2019 inventory found a 9 percent emissions decrease between 2010 and 2019. This reduction was due primarily to a transition away from coal in electricity generation, in favor of lower emissions fuels, including natural gas, solar, and wind. During this same period, emissions from on-site natural gas consumption increased by 20 percent and emissions from transportation increased by 2 percent.

Differences in methodologies and data sources make direct comparisons between past CMAP GHG emissions inventories and the 2020 Chicago MSA inventory difficult, though analysis of both datasets suggests that 2010-2019 trends remain largely unchanged. Setting aside sectors not included in the 2019 inventory (agriculture, industrial processes, and sequestration), the CMAP region generated 109.5 MMTCO2e in 2020, which is comparable to the 113.1 MMTCO2e[17] reported in the 2019 inventory.

Figure 10: Greenhouse gas emissions in the CMAP region, 2010-2019



Source: CMAP, 2022

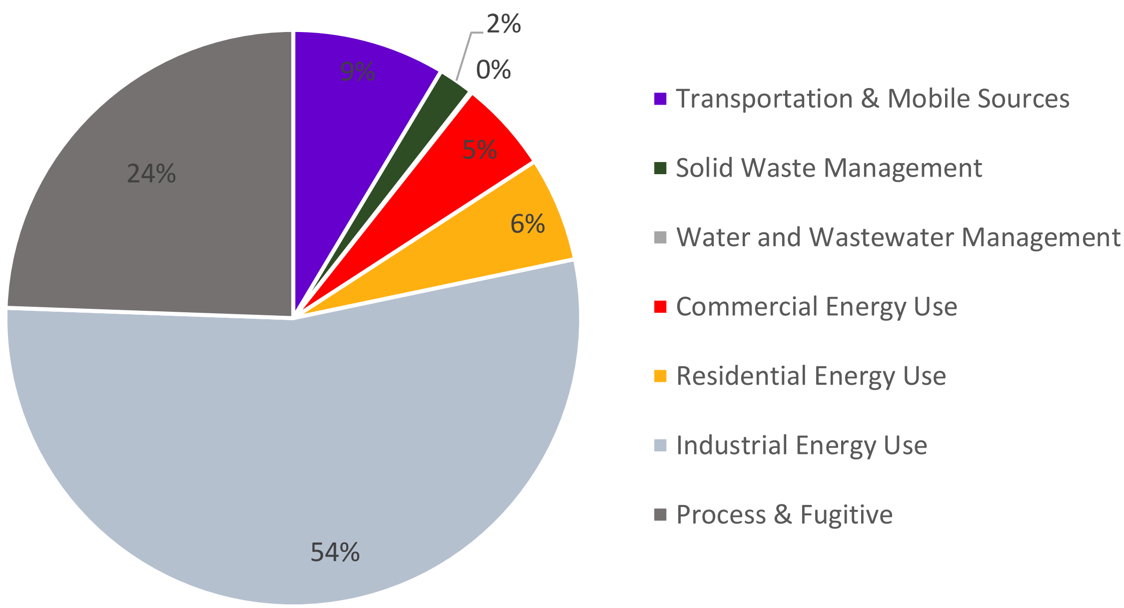
NIRPC conducted its first GHG emissions inventory in 2017. The inventory covered all three counties within NIRPC's jurisdiction; however, only two of those counties, Lake and Porter, are in the Chicago MSA. The 2017 NIRPC inventory relied on consumption data provided by local utilities, rather than the U.S. EPA data used in the 2020 Chicago MSA inventory. The 2017 NIRPC inventory also included different

[17] This 2019 figure is 0.72 MMTCO2e higher than the total initially published in CMAP's Regional GHG emissions inventory (112.35 MMTCO2e). This is due to the addition of emissions data from two municipal electric utilities in Kane County after publication.

sectors than the 2020 Chicago MSA inventory; agriculture and sequestration were omitted, but importantly, industrial processes were included.

Because the 2017 NIRPC inventory did not provide county level data and was conducted for a geography that does not fully align with the 2020 inventory, assessing trends is difficult. There are, nonetheless, several findings that are instructive to emissions planning. Most notably, the 2017 NIRPC inventory found that industrial processes and energy use (including fugitive emissions) accounted for 80 percent of all GHG emissions in the region, which is comparable to the 2020 Chicago MSA inventory estimates for Lake (IN) and Porter counties.

Figure 11: 2017 GHG emissions in the NIRPC region



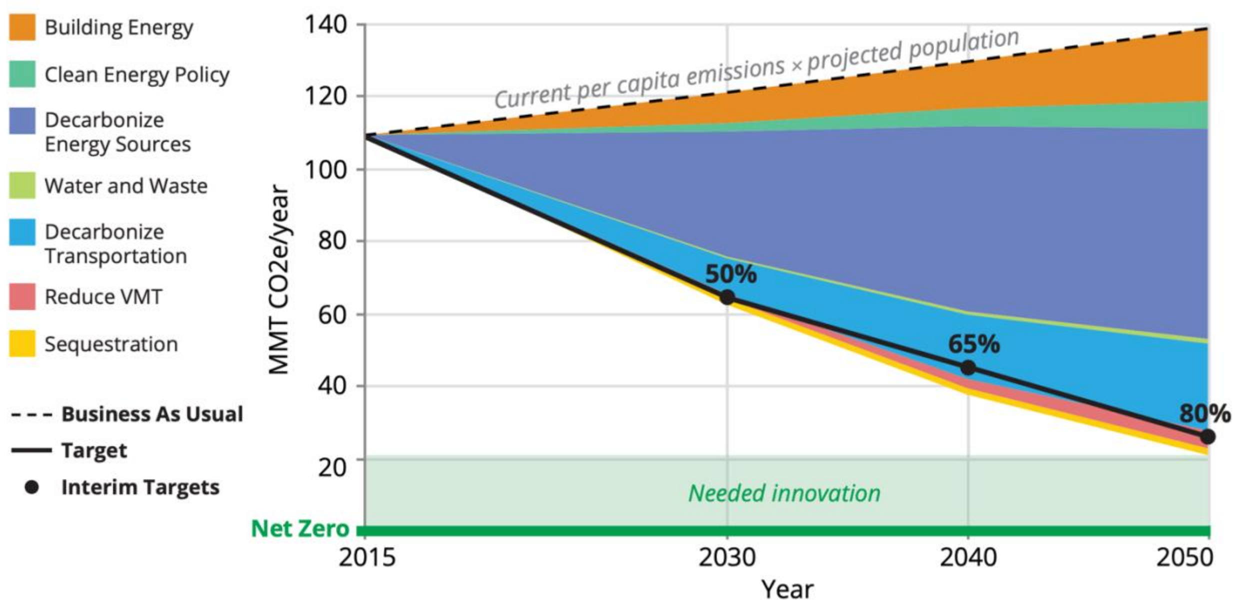
Source: NIRPC, 2022

3 GHG Emissions Projections

Emissions Projections for the entire Chicago MSA based on the 2020 GHG Inventory and analysis of available mitigation strategies will be done for the CCAP. This was not done for this PCAP.

However, the 2021 Climate Action Plan for the Chicago Region projected emissions based on the 2015 GHG inventory that was done for the 7-county Chicago metropolitan region only. These are presented here as the best projections currently available. These wedge graphs also provide helpful visualizations of the influence of different sectors in reducing GHG emissions.

The projections are organized by each of the 8 mitigation objectives that encompass all strategies that follow in the Complete List of GHG Reduction Strategies in *Section 6.*



Wedge graphs that illustrate the relative impact of each GHG Reduction Objective are also presented on respective pages of the Priority GHG Reduction Strategies (*Section 5)* for visualization purposes.

4 GHG Reduction Targets

GHG Reduction targets have not been set for the entire Chicago MSA inclusive of all sectors covered by the 2020 GHG inventory. This critical task will be done with stakeholder engagement for the CCAP.

However, the 2021 Climate Action Plan for the Chicago Region set mitigation goals and objectives based on the 2015 GHG inventory that was done for the 7-county Chicago metropolitan region only. Science-based targets were set following robust stakeholder feedback from within the Chicago metro region. Objectives presented are foundational and the goals are representative to support understanding of the Priority GHG Reduction Strategies and Additional Strategies.

(2021) Regional GHG Reduction Goal: Net zero greenhouse gas emissions

Interim GHG Reduction Targets:

- 2030 Reduce GHG emissions 50% from 2005 levels
- 2040 Reduce GHG emissions 65% from 2005 levels
- 2050 Reduce GHG emissions at least 80% from 2005 levels

5 Priority GHG Reduction Strategies for the Chicago MSA

All GHG Reduction Strategies are presented with critical planning information, including:

- Reference #
- GHG Reduction Potential
- Key implementers
- Timeline
- Scale
- Authority to Implement
- Performance Indicators
- LIDAC Considerations
- Co-benefits

All GHG Reduction Strategies*, are organized into these 8 GHG Reduction **Objectives.**

1. **Demonstrate Leadership**
2. **Decarbonize Energy Sources**
3. **Optimize Building Energy**
4. **Implement Clean Energy Policies**
5. **Decarbonize Transportation**
6. **Reduce Vehicle Miles Traveled**
7. **Manage Water and Waste Sustainably**
8. **Sustain Ecosystems to Sequester Carbon**

This PCAP uses this hierarchy to organize GHG reduction actions:

Objective

  All GHG Reduction Strategies

    Priority GHG Reduction Strategies

      Sample Quantified Measures

On the following pages are Priority GHG Reduction Strategies for the Chicago MSA with associated, quantified measures. These measures are used to define a scale, rate, and implementation approach that quantify the GHG reduction potential for each of these strategies. Multiple measures have been quantified for some strategies demonstrating broad opportunities to implement that Priority Strategy.

Many of these quantified measures specifically support championed projects that are likely to be submitted for CPRG Implementation funding consideration. This is true of the measures used to illustrate GHG reduction potential for Strategies W1 and DT 15 which quantify achievable results within the 5-year period of the CPRG Implementation timeline. Other measures illustrate more aspirational results like the measures used to quantify Strategies DE2 and VMT11. The quantified *measures* should not be perceived as restrictive approaches to implementing these *strategies.* **Eligible applicants for CPRG Implementation funding may propose any suitable project that addresses any of the overarching Priority GHG Reduction Strategies,** per CPRG Implementation General Competition guidelines.

*Note that the Chicago MSA PCAP uses the term "strategy" as the enabling group of actions eligible for CPRG funding and the term "measure" as a specific quantifiable example of actions that could be done to implement that strategy. This was done to be consistent with the hierarchy of Goals, Objectives, and Strategies used in the 2021 Climate Action Plan for the Chicago Region. The term "Priority GHG Reduction Strategy" should be interpreted to mean "priority measure" in CPRG Implementation General Competition guidance.

Detailed information about the methods used to quantify GHG reduction potential, scope of the and the rationale for selecting these strategies, see *Appendix A.*

5.1 Summary of Priority GHG Reduction Strategies

Ref#	Objective	Priority GHG Reduction Strategy
DE2	**Decarbonize Energy Sources**	Increase renewable energy supply and energy storage capacity for residential, commercial, municipal, institutional and industrial electricity use.
BE1	**Optimize Building Energy**	Engage *residential* utility customers to optimize building *efficiency* leveraging residential energy assessments, energy efficiency rebates, incentives, tax credits and weatherization, housing rehab, and energy assistance programs.
BE2	**Optimize Building Energy**	Engage *residential* utility customers to *electrify* space and water heating leveraging residential energy assessments, rebates, incentives, tax credits and weatherization and energy assistance programs.
BE3	**Optimize Building Energy**	Engage *commercial, institutional, and industrial* utility customers to optimize building *efficiency* leveraging tools and programs such as facility assessments, energy management, retrocommissioning, demand response, performance contracting, energy efficiency rebates, incentives, tax credits, and PACE financing.
BE4	**Optimize Building Energy**	Engage *commercial, institutional, and industrial* utility customers to *electrify* buildings leveraging tools and programs such as facility assessments, energy management, rebates, incentives, tax credits, direct pay and PACE financing.
BE6	**Optimize Building Energy**	Manage non-CO2 GHG emissions including CH4, HFC, SF6 and others through improved industrial processes, alternative solutions, efficiency, leak detection and reduction, and recovery.
DT7	**Decarbonize Transportation**	Transition transit trains, buses and related service equipment to low and zero-emission operation through equipment replacement and clean fueling infrastructure investments.
DT9	**Decarbonize Transportation**	Transition medium and heavy duty freight vehicles and non road equipment to low and zero-emission equipment through vehicle replacement and clean fueling infrastructure investments.
DT11	**Decarbonize Transportation**	Reduce freight vehicle and train idling by managing loading/unloading queues, decreasing the number of at-grade crossings through capital projects, idling control technologies, modernizing auxillary power and refrigeration systems.
DT15	**Decarbonize Transportation**	Transition gas-powered landscaping equipment to low and zero emissions models.
VMT1	**Reduce Vehicle Miles Traveled**	Establish a regional network of mobility hubs and expand shared micromobility and electric micromobility systems.
W1	**Manage Water and Waste Sustainably**	Capture biogas and convert to energy.
W3	**Manage Water and Waste Sustainably**	Increase composting and biological treatment of waste. Utilize energy and biosolid by-products.

5.2 Priority GHG Reduction Strategies with Quantified Measures

1. Decarbonize Energy Sources -E2

	Objective	Priority GHG Reduction Strategy
DE2	Decarbonize Energy Sources	Increase renewable energy supply and energy storage capacity for residential, commercial, municipal, Institutional, and industrial electricity use.

Measure 1: Generate 40 percent of electricity from renewable sources by 2030.

Estimated reduction: 23.11 MMT CO2e annually in 2030

Measure 2: Increase on-site renewable energy by installing solar arrays at 20% of industrial manufacturing, including metal and food and beverage manufacturing facilities by 2030

Estimated reduction: 0.057 MMT CO2e annually in 2030

Key implementers: Local, county, state governments; utilities; property owners; clean energy industry
Timeline: 0-5+ yrs
Scale: Local, regional
Authority to implement: Existing
Performance indicators: RE supply and storage capacity for all sectors
LIDAC considerations: Prioritize equitable access to clean energy. Create clean energy jobs in DACs.
Co-benefits: Modernized, efficient electric grid; resilient distributed generation; thriving RE industry; reduced long-term utility costs; create clean energy jobs

2. Optimize Building Energy - BE1

Objective	Priority GHG Reduction Strategy
Optimize Building Energy	Engage *residential* utility customers to optimize building *efficiency* leveraging residential energy assessments, energy efficiency rebates, incentives, tax credits and weatherization, housing rehab, and energy assistance programs.

Measure: Assess residential homes for cost-effective energy efficiency measures, including weatherization and building shell improvements, energy-efficient HVAC and appliances and other measures by 2030.

Estimated reduction: 0.41 MMTCO2e cumulative from 2024 to 2030

Key implementers: Local and county government, homeowners, building owners, utilities, clean energy industry, CAAs, nonprofits
Timeline: 0-5+ yrs
Scale: Local, regional, state
Authority to implement: Existing
Performance indicators: Investments made. Energy and cost savings achieved.
LIDAC considerations: Prioritize investment in DACs, multi-family housing, and where populations are vulnerable to poor indoor air quality. Reduce household energy burden. Provide energy savings information in all languages and formats.
Co-benefits: Improved indoor air quality; increases impact of grid decarbonization

3. Optimize Building Energy - BE2

Objective	Priority GHG Reduction Strategy
Optimize Building Energy	Engage *residential* utility customers to *electrify* space and water heating leveraging residential energy assessments, rebates, incentives, tax credits and weatherization and energy assistance programs.

Measure: Replace existing fossil-fueled furnaces with more efficient heat pumps by 2030

Estimated reduction: 0.16 MMTCO2e from 2024 to 2030

Key implementers: Local and county government, homeowners, building owners, utilities, clean energy industry, CAAs, nonprofits
Timeline: 0-5+ yrs
Scale: Local, regional, state
Authority to implement: Existing
Performance indicators: Investments made. Demand shifted from gas to electric energy.
LIDAC considerations: Prioritize investment in DACs, multi-family housing, and where populations are vulnerable to poor indoor air quality. Reduce household energy burden. Provide energy savings information in all languages and formats.
Co-benefits: Improved indoor air quality; increases impact of grid decarbonization

4. Optimize Building Energy - BE3

Objective	Priority GHG Reduction Strategy
Optimize Building Energy	Engage *commercial, institutional, and industrial* utility customers to optimize building *efficiency* leveraging tools and programs such as facility assessments, energy management, retro commissioning, demand response, performance contracting, energy efficiency rebates, incentives, tax credits , and PACE financing.

Measure 1: Replace 30% of fossil fuel boiler and process heating equipment/processes with electric, hydrogen, or other non-GHG emitting based alternatives for all low and medium heat processes by 2030

Estimated reduction: 4.93 MMT CO2e annually in 2030

Measure 2: Increase energy efficiency of heating, cooling and ventilation, lighting, envelope, appliances, and other components by 40% by 2030.

Estimated reduction: 1.08 MMT CO2e annually in 2030

Measure 3: Train workforce of industry decarbonization contractors by 2030.

Estimated reduction: 0.77 MMT CO2e annually in 2030

Measure 4: Improve energy efficiency standards for food and beverage and metal manufacturers by 15% by 2030.

Estimated reduction: 1.11 MMT CO2e annually in 2030

Measure 5: Replace high GWP F-gas refrigeration system with CO2 natural refrigerant system at 50% of commercial facilities

Estimated reduction: 0.89 MMT CO2e annually in 2030

Measure 6: Replace variable speed drives on HVAC and pollution control devices at 100 food and beverage and metal manufacturing facilities

Estimated reduction: 0.077 MMT CO2e annually in 2030

Measure 7: Replace high GWP F-gas industrial refrigeration systems with ammonia or another natural refrigerant system at 50% of food and beverage and chemical manufacturers in Chicago MSA

Estimated reduction: 0.023 MMT CO2e annually in 2030

Key implementers: Utilities, businesses, local government, institutions

Timeline: 0-5+ yrs
Scale: Local, regional
Authority to implement: Existing
Performance indicators: Investments made. Energy and cost savings achieved.
LIDAC considerations: Prioritize investment in DACs. Cost savings to protect jobs.
Co-benefits: Improved performance of facilities, long-term cost savings. Increases impact of grid decarbonization.

5. Optimize Building Energy - BE4

Objective	Priority GHG Reduction Strategy
Optimize Building Energy	Engage *commercial, institutional, and industrial* utility customers to *electrify* buildings leveraging tools and programs such as facility assessments, energy management, rebates, incentives, tax credits, direct pay and PACE financing.

Measure: Retrofit existing public sector buildings with more energy efficient lighting, HVAC, and other measures.

Estimated reduction: 0.66 MMTCO2e cumulative from 2024 to 2030

Key implementers: Utilities, businesses, local government, institutions
Timeline: 1-5 yrs
Scale: Local, regional
Authority to implement: Existing
Performance indicators: Investments made. Demand shifted from gas to electric energy.
LIDAC considerations: Prioritize investment in DACs and where workers are exposed to poor air quality.
Co-benefits: Improved indoor air quality; increases impact of grid decarbonization

6. Optimize Building Energy - BE6

Objective	Priority GHG Reduction Strategy
Optimize Building Energy	Manage non-CO2 GHG emissions including CH4, HFC, SF6 and others through improved industrial processes, alternative solutions, efficiency, leak detection and reduction, and recovery.

Measure: Substitute F-gas refrigerants by 67% and maintain or retrofit existing equipment at all industrial facilities by 2030.

Estimated reduction: 0.94 MMT CO2e annually in 2030

Key implementers: Federal, state, local government, businesses
Timeline: 0-5 yrs
Scale: Local, regional
Authority to implement: Existing
Performance indicators: Investments made. Reduction in the use of high GWP refrigerant.
LIDAC considerations: Prioritize investment in DACs. Cost savings to protect jobs.
Co-benefits: High emissions reduction benefits vulnerable populations.

7. Decarbonize Transportation - DT7

Objective	Priority GHG Reduction Strategy
Decarbonize Transportation	Transition transit trains, buses, and related service equipment to low and zero-emission operation through equipment replacement and clean fueling infrastructure investments.

Measure 1: Transition transit fleets to 100% electric by 2040

Estimated reduction: 0.286 MMT CO2e annually in 2040.

Measure 2: Deploy eight electric trainsets into service, retire remaining 16 Tier 0 locomotives in Metra's regional passenger rail fleet.

Estimated reduction: 0.027 MMT CO2e annually in 2030

Key implementers: Transit agencies, state government, utilities
Timeline: 0-4 yrs
Scale: Local
Authority to implement: Existing
Performance indicators: Deployment of low/zero emissions fleets and fueling infrastructure
LIDAC considerations: Protect vulnerable residents from tailpipe emissions. Focus investment to benefit DACs.
Co-benefits: Reduced health impacts of tailpipe emissions

8. Decarbonize Transportation - DT9

Objective	Priority GHG Reduction Strategy
Decarbonize Transportation	Transition medium and heavy duty freight vehicles and non road equipment to low and zero-emission equipment and invest in distribution, make-ready and clean fueling infrastructure

Measure 1: Support electrification or fuel-switching of 2.5% medium- and heavy-duty vehicles by 2030

Estimated reduction: 0.12 MMT CO2e annually in 2030

Measure 2: Electrify 2.5% of non-road freight vehicles, especially terminal trucks and material handlers and install clean fueling infrastructure

Estimated reduction: 0.0138 MMT CO2e annually in 2030

Key implementers: State government, private sector
Timeline: 1-5 yrs
Scale: State, regional
Authority to implement: Existing
Performance indicators: Deployment of low/zero emissions fleets and fueling infrastructure
LIDAC considerations: Protect workers and vulnerable residents from tailpipe emissions. Focus investment to benefit DACs.
Co-benefits: Reduced health impacts of tailpipe emissions

9. Decarbonize Transportation- DT11

Objective	Priority GHG Reduction Strategy
Decarbonize Transportation	Reduce freight vehicle and train idling by managing loading/unloading queues, decreasing the number of at-grade crossings through capital projects, idling control technologies, and modernizing auxiliary power and refrigeration systems.

Measure: Reduce freight locomotive idling emissions by 2.5% by deploying shore power idle reduction units

Estimated reduction: 0.0053 MTTCO2e annually in 2030

Key implementers: Local, state governments, rail, private sector
Timeline: 1-5 yrs
Scale: Regional, local
Authority to implement: Coordination across jurisdictions
Performance indicators: Idling hours and fuel consumption reduced. Adoption of electric transport refrigeration units (eTRU)
LIDAC considerations: Protect workers and vulnerable residents from tailpipe emissions. Focus investment to benefit DACs.
Co-benefits: Reduce congestion and lost time for drivers.

10. Decarbonize Transportation - DT15

Objective	Priority GHG Reduction Strategy
Decarbonize Transportation	Transition gas-powered landscaping equipment to low and zero emissions models.

Measure: Replace gas-powered lawn and garden equipment with zero emissions electric models at this rate 5% of residential mowers; 2% of commercial mowers' and 20% of commercial hand-held equipment (e.g. leaf blowers)

Estimated reduction: 0.04162 MMT COe annually in 2030

Key implementers: Local, county, and state governments, private sector
Timeline: 0-2 yrs
Scale: Regional, local
Authority to implement: Existing
Performance indicators: Share of zero-emissions landscaping equipment in use.
LIDAC considerations: Reduce exposure of workers and vulnerable residents to noise and emissions from equipment.
Co-benefits: Reduction of noise and criteria pollutants.

11. Reduce Vehicle Miles Traveled - VMT11

Objective	Priority GHG Reduction Strategy
Reduce Vehicle Miles Traveled	Establish a regional network of mobility hubs and expand shared micromobility and electric micromobility systems.

Measure: Replace 35 percent of low-milage SOV trips with electric and/or micromobility trips by 2030.

Estimated reduction: 0.22 MMT CO2e annually in 2030

Key implementers: Local and county government, transit agencies
Timeline: 2-4 yrs
Scale: Regional
Authority to implement: Existing
Performance indicators: Share of the region's population with access to micromobility options, share of transit stations with last-mile transportation options, creation of e-mobility rebate programs
LIDAC considerations: Provide safe and accessible transportation for all. Consider DAC personal safety needs. Balance pedestrian safety.
Co-benefits: Safe active transportation; connected communities; reduced tailpipe emissions; improved health and wellness; reduced infrastructure demands for personal vehicles

12. Manage Water and Waste Sustainably - W1

Objective	Priority GHG Reduction Strategy
Manage Water and Waste Sustainably	Capture biogas and convert to energy.

Measure: Capture 25% of biogas from publicly owned wastewater treatment in the Chicago MSA and additional landfill biogas and convert to renewable natural gas.

Estimated reduction: 0.12451 MMTCO2e annually in 2027

Key implementers: Local and state governments, POTW, waste industry
Timeline: 1-5 yrs
Scale: Local, regional
Authority to implement: Existing
Performance indicators: Volume of methane captured. Volume of energy produced.
LIDAC considerations: Reduce exposure to DACs. Engage diverse contractors
Co-benefits: Reduced methane gas emissions. Displacement of fossil fuels

13. Manage Water and Waste Sustainably - W3

Objective	Priority GHG Reduction Strategy
Manage Water and Waste Sustainably	Increase composting and biological treatment of waste. Utilize energy and biosolid by-products.

Measure: Divert nearly 20% of food waste generated in Cook County annually (over 311,000 tons) by establish food waste reduction, collection, and anaerobic digestion programs.

Estimated reduction: 0.20352 MMTCO2e annually in 2030

Key implementers: Local governments, waste industry
Timeline: 0-5+ yrs
Scale: Local
Authority to implement: Existing
Performance indicators: Volume of waste composted and utilized
LIDAC considerations: Expanded recycling and organic waste industries; value from waste captured.
Co-benefits: Reduced methane gas emissions. Enriched landscapes

6 Complete List of GHG Reduction Strategies

The following pages contain the full range of GHG Reduction Strategies that may guides strategic climate mitigation action in the Chicago MSA. These strategies are organized by their overarching Objective. Priority GHG Reduction Strategies are highlighted in blue.

Strategies identified for the 2012 Climate Action Plan for the Chicago Region form the basis for this list, but strategies have been updated, expanded, and refined based on CMAP's research and review. These should guide accelerated climate action now. They will also be used in the development of the forthcoming CCAP.

6.1 Demonstrate Leadership

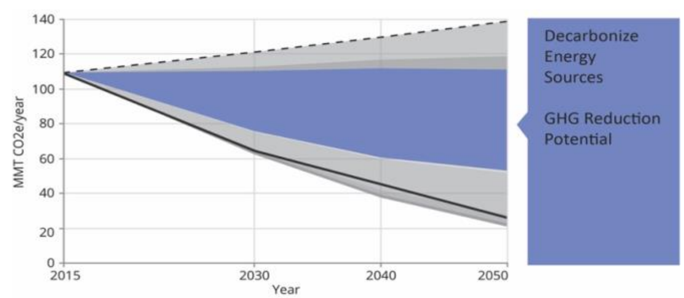
Ref#	Strategy	GHG Reduction Potential	Key implementers	Timeline	Scale	Authority to Implement	Performance Indicators	LIDAC Considerations
L1	Establish local sustainability targets that support regional climate objectives.	Enabling	Local, county governments, transit agencies, utilities	0-3 yrs	Local, regional	Existing	Adoption of local and regional sustainability targets	Engage diverse civic leaders in target-setting and implementation. Prioritize targets that address equity.
L2	Build and support a resilient workforce and local economy that creates green jobs and supports climate objectives.		State, county, local governments, non-profits, private sector	1-3 yrs	Local		Creation and retention of green jobs, workforce programs. Share of jobs accessible to vulnerable populations.	Provide access to green jobs prioritizing DACs and vulnerable populations; preserve local retail and services in DACs.
L3	Integrate smart technology into operations to effectively manage resource consumption.		Local, county governments, utilities, tech industry	2-5 yrs			Adoption of smart technology	Prioritize smart technology investments in vulnerable communities.
L4	Adopt the Greenest Region Compact and a GRC-based sustainability plan or local climate action plan with local targets aligned with the regional climate objectives.		Local and county governments	0-3 yrs		Local ordinance	Adoption and implementation of the GRC. Development of local plans	Tailor plans to the needs of vulnerable communities
L5	Demonstrate sustainability in government operations, purchasing, and through public events.			0-5+ yrs		Existing	Development and implementation of sustainable government policies	Prioritize small and minority-owned vendors.
L6	Provide funding and/or technical assistance to support GHG emissions reduction plans and projects.		State, county, local governments, non-profits, regional organizations	0-4 yrs	Regional		Number of projects completed	Prioritize investment to benefit DACs

	Co-benefits
L1	Local energy, water conservation, and waste reduction targets aligned; collaborative and accelerated GHG reduction
L2	Local green jobs and sustainable businesses; local production and consumption; reduced transportation costs
L3	Improved operational performance through smart technology
L4	Local plans guide effective action
L5	Leading by example inspires followers and cooperation across sectors; informed and engaged constituents
L6	Energy, water conservation, and waste reduction targets aligned; collaborative implementation and accelerated GHG reduction

6.2 Decarbonize Energy Sources

Ref#	Strategy	GHG Reduction Potential	Key implementers	Timeline	Scale	Authority to Implement	Performance Indicators	LIDAC Considerations
DE1	Bolster capacity of the distribution system to integrate distributed energy resources (DER) and invest in renewable energy (RE) infrastructure, including interconnection, distribution, microgrids, and storage capacity.	High	Utilities, clean energy industry, state government	0-5+ yrs	Local, regional	Existing	Development of DER and supportive infrastructure. Expansion of RE capacity.	Prioritize investment to serve disadvantaged communities (DACs).
DE2	**Increase RE supply and energy storage capacity for residential, commercial, municipal, institutional, and industrial electricity use.**		Local, county, state governments; utilities; property owners; clean energy industry				RE supply and storage capacity for all sectors	Prioritize equitable access to clean energy. Create clean energy jobs in DACs.
DE3	Improve and expand electricity transmission infrastructure.		State governments, regional transmission organizations, utilities		Regional	State, federal approval	Grid capacity, reliability and efficiency.	Support clean energy jobs training for displaced fossil fuel workers.
DE4	Accelerate and broaden decarbonization of the grid throughout the MSA inclusive of all power supply to the region.		Utilities, state and federal regulators, investors				RE and zero emissions generation capacity	Replace coal and gas-fired power to improve air quality for communities in transition. Support clean energy jobs training for displaced workers.
DE5	Procure clean energy for municipal and industrial operations.	Low	State and local governments, industry	0-4 yrs	Local	Existing	Load shift to clean energy supply	Prioritize access to clean energy jobs in DACs.
DE6	Engage the community to choose clean energy through procurement, aggregation, community solar, and other collaborative programs and by participating in financing, rebate, and incentive programs.	Enabling	Local, county, state governments; regulatory agencies; clean energy industry; non-profits		Local, regional		Investment in clean energy. Participation in programs and improved access to RE.	Provide equitable access to clean energy. Reduce household energy burden.
DE7	Support renewable district energy solutions	High	Local, county, state governments; utilities, private sector.	5+ yrs		Unsure	R&D and pilot project	Reduce long-term energy burden.

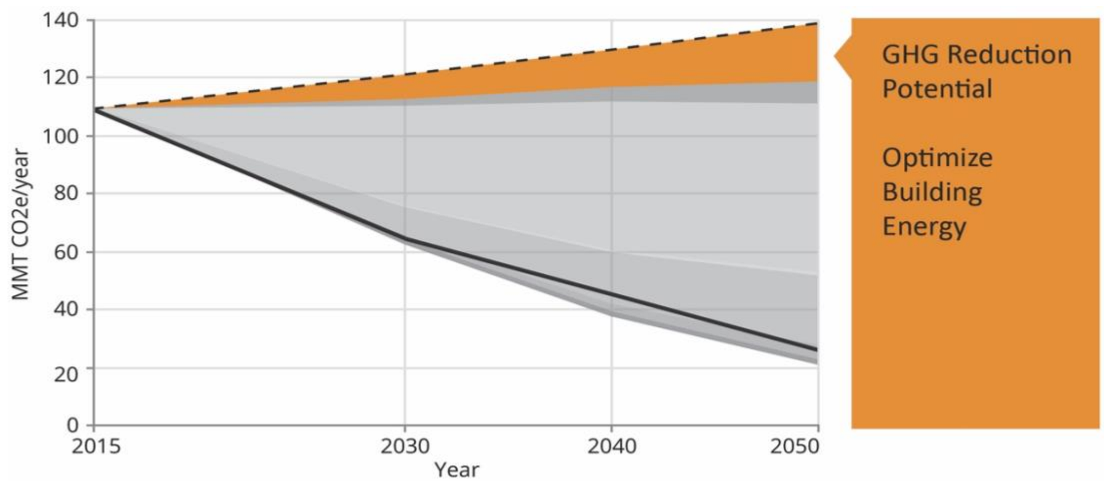
	Co-benefits
DE1 DE2 DE3	Modernized, efficient electric grid; resilient distributed generation; thriving RE industry; reduced long-term utility costs; create clean energy jobs
DE4	Elimination of fossil-fuel generated electricity; increase in utility-scale RE and zero emissions power generation
DE5 DE6	Thriving RE industry; informed energy consumers
DE7	Increased resilience and efficiency, reduced long-term costs



6.3 Optimize Building Energy

Ref#	Strategy	GHG Reduction Potential	Key implementers	Timeline	Scale	Authority to Implement	Performance Indicators	LIDAC Considerations
BE1	**Engage *residential* utility customers to optimize building *efficiency* leveraging residential energy assessments, energy efficiency rebates, incentives, tax credits and weatherization, housing rehab, and energy assistance programs.**	High	Local and county government, home owners, building owners, utilities, clean energy industry, CAAs, nonprofits	0-5+ yrs	Local, regional, state	Existing	Investments made. Energy and cost savings achieved.	Prioritize investment in DACs, multi-family housing, and where populations are vulnerable to poor indoor air quality. Reduce household energy burden. Provide energy savings information in all languages and formats.
BE2	**Engage *residential* utility customers to *electrify* space and water heating leveraging residential energy assessments, rebates, incentives and tax credits and weatherization and energy assistance programs.**						Investments made. Demand shifted from gas to electric energy.	
BE3	**Engage *commercial, institutional, and industrial* utility customers to optimize building *efficiency* leveraging tools and programs such as facility assessments, energy management, retrocommissioning, demand response, performance contracting, energy efficiency rebates, incentives, tax credits, and PACE financing.**		Utilities, businesses, local government, institutions		Local, regional		Investments made. Energy and cost savings achieved.	Prioritize investment in DACs. Cost savings to protect jobs.
BE4	**Engage *commercial, institutional, and industrial* utility customers to *electrify* buildings leveraging tools and programs such as facility assessments, energy management, rebates, incentives, tax credits, direct pay and PACE financing.**			1-5 yrs			Investments made. Demand shifted from gas to electric energy.	Prioritize investment in DACs and where workers are exposed to poor air quality.
BE5	Retrofit public buildings, facilities, and streetlights for maximum efficiency.	Medium	Local government, utilities, clean energy industry	0-4 yrs	Local		Investments made. Energy and cost savings achieved.	Reduce franchise fee burden in DACs.
BE6	**Manage non-CO2 GHG emissions including CH4, HFC, SF6 and others through improved industrial processes, alternative solutions, efficiency, leak detection and reduction, and recovery.**	High	Federal, state, local government, businesses	0-5 yrs	Local, regional		Investments made. Reduction in the use of high GWP refrigerant.	Prioritize investment in DACs. Cost savings to protect jobs.

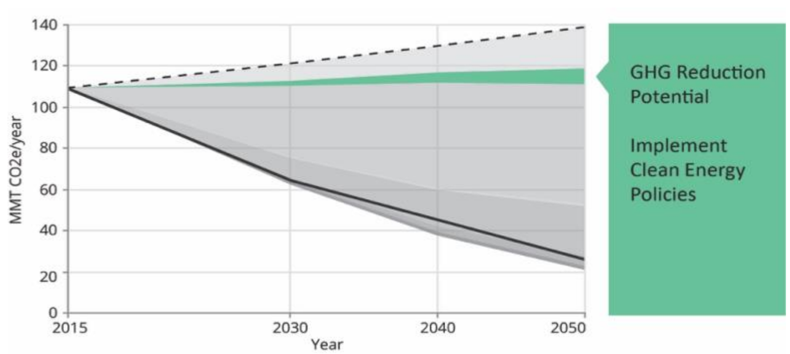
Ref#	Strategy	Co-benefits
BE1	**Engage *residential* utility customers to optimize building *efficiency* leveraging residential energy assessments, energy efficiency rebates, incentives, tax credits and weatherization, housing rehab, and energy assistance programs.**	Improved indoor air quality; increases impact of grid decarbonization
BE2	**Engage *residential* utility customers to *electrify* space and water heating leveraging residential energy assessments, rebates, incentives and tax credits and weatherization and energy assistance programs .**	
BE3	**Engage *commercial, institutional, and industrial* utility customers to optimize building *efficiency* leveraging tools and programs such as facility assessments, energy management, retrocommissioning, demand response, performance contracting, energy efficiency rebates, incentives, tax credits, and PACE financing.**	Improved performance of facilities, long-term cost savings. Increases impact of grid decarbonization.
BE4	**Engage *commercial, institutional, and industrial* utility customers to *electrify* buildings leveraging tools and programs such as facility assessments, energy management, rebates, incentives, tax credits, direct pay and PACE financing.**	Improved indoor air quality; increases impact of grid decarbonization
BE5	Retrofit public buildings, facilities, and streetlights for maximum efficiency.	Reduced energy costs; improved building performance; resilient facilities
BE6	**Manage non-CO2 GHG emissions including CH4, HFC, SF6 and others through improved industrial processes, alternative solutions, efficiency, leak detection and reduction, and recovery.**	High emissions reduction benefits vulnerable populations.



6.4 Implement Clean Energy Policies

Ref#	Strategy	GHG Reduction Potential	Key implementers	Timeline	Scale	Authority to Implement	Performance Indicators	LIDAC Considerations
EP1	Support robust building energy conservation codes, benchmarking, building performance standards and data transparency to optimize energy efficiency	Enabling	Local, state, county governments, International Code Council (ICC)	0-5+ yrs	Local	Dependent on ICC and state government.	Adoption of effective energy conservation codes at state, local level	Reduce long-term energy burden. Prioritize code adoption and compliance for LIDAC
EP2	Incentivize and encourage high performance, all-electric, and net zero new building construction.	High	Local governments, developers, clean energy industry, utilities	0-5 yrs	Local	Local control allowable in IL.	Reduction in natural gas demand. All-electric homes and buildings.	Reduce long-term energy burden and improve indoor air quality. Prioritize affordable housing and LIDAC.
EP3	Modernize municipal franchise agreements to leverage investment in clean energy and reduce costs to residents.	Enabling	Utilities, municipal government	0-5+ yrs	Local	Requires agreement between utility and municipal government	Modernized franchise agreements	Eliminate franchise cost to residents.
EP4	Adapt zoning codes and streamline development processes to accelerate investment in solar, other renewable energy systems and energy storage.	Enabling	Local government, utilities	0-3 yrs	Local	Existing	Permits issued for on-site RE and energy storage.	Reduce soft costs to improve access to clean energy. Reduce household energy burden.
EP5	Support state and federal policies to advance clean energy.	Enabling	Local, county, state governments, utilities, non-profit organizations.	0-5+ yrs	Local, state	Existing	Adoption of state RE and energy efficiency performance standards in IN.	Support equitable policies and just transition.

	Co-benefits
EP1 EP2	Reduced energy and water costs; improved long-term building performance; operational resilience; leverage private investment; demonstrate technology and design to achieve net-zero
EP3	Clean energy investment in public facilities enabled.
EP4	Accelerated investment in solar; more affordable, safe and effective renewable energy systems; grid resiliency improved.
EP5	Thriving clean energy industry

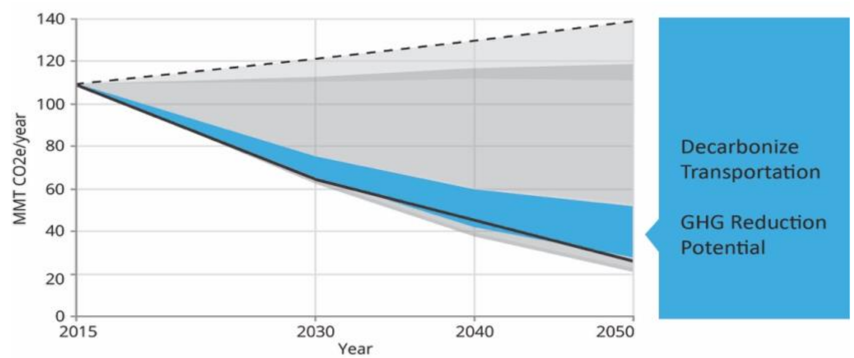


6.5 Decarbonize Transportation

Ref#	Strategy	GHG Reduction Potential	Key implementers	Timeline	Scale	Authority to Implement	Performance Indicators	LIDAC Considerations
DT1	Support strong federal and state fuel efficiency standards.	High	Federal, state government	0-5+ yrs	National, state	Existing	Increased fuel efficiency	Protect vulnerable residents from tailpipe emissions. Reduce cost of operating a SOV.
DT2	Enact and enforce anti-idling policies for passenger and commercial vehicles, freight, and transit.	Low	State, county, and local governments, school districts, transit agencies, private sector	0-2 yrs	Local	Local ordinance or state law	Adoption of anti-idling behaviors	Protect vulnerable residents from tailpipe emissions.
DT3	Create accessible and reliable networks of electric vehicle (EV) chargers.	Enabling	Federal, state, and local government, EVCS industry	0-4 yrs	National, state	Existing	Number of accessible charging ports	Focus on publicly accessible corridor, workplace, and multi-family charging
DT4	Adapt development processes to accelerate investment in electric and clean hydrogen fuel infrastructure.		Local government, electric utility	0-5 yrs	Local	Amend local ordinances	Codes and processes that enable investment in safe and accessible clean fueling infrastructure.	Support disadvantaged communities in preparing for clean fuel investment.
DT5	Encourage the switch to electric passenger vehicles.	High	Federal, state, and local government, EV industry	0-5+ yrs	Regional	Existing	Growth in EV adoption.	Clean, safe, accessible transportation for all.
DT6	Electrify car sharing and ridehailing services.	Low	State government, utilities, private sector	2-4 yrs	Local		Proportion of EVs in service	
DT7	**Transition transit trains, buses and related service equipment to low and zero-emission operation through equipment replacement and clean fueling infrastructure investments.**		Transit agencies, state government, utilities	0-4 yrs			Deployment of low/zero emissions fleets and fueling infrastructure	Protect vulnerable residents from tailpipe emissions. Focus investment to benefit DACs.
DT8	Transition public fleets to low and zero-emission vehicles through vehicle replacement and clean fueling infrastructure investments.		Local and state governments, transit agencies, utilities		Regional			
DT9	**Transition medium and heavy duty freight vehicles and non road equipment to low and zero-emission equipment through vehicle replacement and clean fueling infrastructure investments.**	High	State government, private sector	1-5 yrs	State, regional			Protect workers and vulnerable residents from tailpipe emissions. Focus investment to benefit DACs.
DT10	Increase the use and capacity of rail and waterborne freight systems through infrastructure investments and financial incentives.	Medium	State government, port authority, rail	2-4 yrs			Volume of freight cargo transportation by rail and water	Reduce exposure of workers and vulnerable residents to truck emissions.

Ref#	Strategy	GHG Reduction Potential	Key implementers	Timeline	Scale	Authority to Implement	Performance Indicators	LIDAC Considerations
DT11	**Reduce freight vehicle and train idling by managing loading/unloading queues, decreasing the number of at-grade crossings through capital projects, idling control technologies, and modernizing auxiliary power and refrigeration systems.**	Medium	Local, state governments, rail, private sector	1-5 yrs	Regional, local	Coordination across jurisdictions	Idling hours and fuel consumption reduced. Adoption of electric transport refrigeration units (eTRU)	Protect workers and vulnerable residents from tailpipe emissions. Focus investment to benefit DACs.
DT12	Strategically manage extended truck parking and invest in Truck Parking Information Systems (TPIS).	High	Local and state governments, private sector	3 years	Regional	Unsure	Idling hours and fuel consumption reduced. Adoption of TPIS	
DT13	Innovate freight delivery through curb management, clean freight-handling technologies, and last-mile and urban freight programs.	Medium	Local government, private sector	2-5 yrs	Local	Amend local ordinances	Establishment of innovative freight programs, VMT reduced	
DT14	Establish tracking and data gathering mechanisms for freight emissions.	Enabling	Regional agency, academia	1-3 yrs	Regional	Existing	Quality and quantity of data available	Track impacts on DAC
DT15	**Transition gas-powered landscaping equipment to low and zero emissions models.**	Low	Local, county, and state governments, private sector	0-2 yrs	Regional, local		Share of zero-emissions landscaping equipment in use.	Reduce exposure of workers and vulnerable residents to noise and emissions from equipment.

Ref#	Co-benefits
DT1	Reduce criteria air pollutants
DT2	
DT3	Accelerated EV adoption.
DT4	Accelerated investment in EV charging infrastructure; reduced soft costs; safe and effective EV charging systems
DT5	Reduced health impacts of tailpipe emissions
DT6	
DT7	
DT8	
DT9	
DT10	Support control of aquatic invasive species
DT11	Reduce congestion and lost time for drivers.
DT12	
DT13	Reduce urban truck congestion and lost time for drivers.
DT14	Cost savings
DT15	Reduction of noise and criteria pollutants.

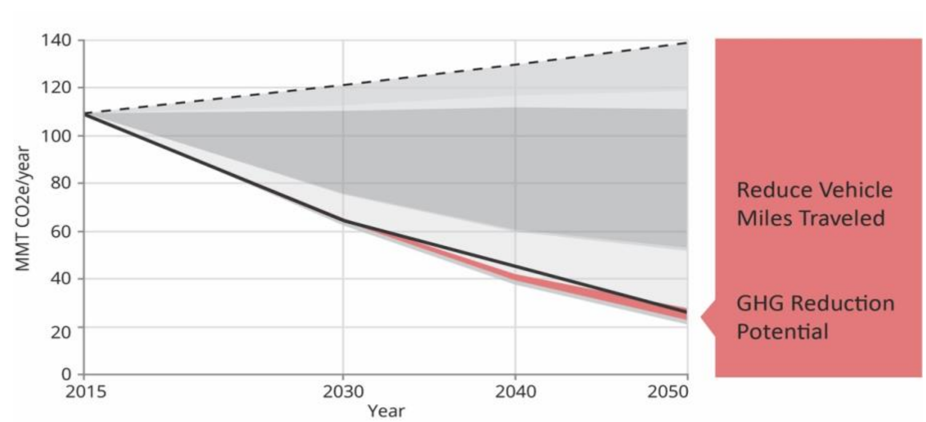


6.6 Reduce Vehicle Miles Traveled

Ref#	Strategy	GHG Reduction Potential	Key implementers	Timeline	Scale	Authority to Implement	Performance Indicators	LIDAC Considerations
VMT1	Prioritize transit-oriented development and transit-supportive development.	High	Local government, transit agencies, developers	0-5+ yrs	Local, regional	Existing	Density and walkability near transit service, establishment of new, transit ridership on existing routes	Prioritize investment to serve DACs
VMT2	Promote multi-family housing development near transit stations, employment, and along transit routes.				Local		Development and preservation of multi-family housing near transit stations and routes; employers and job opportunities near transit stations	Prioritize investment to increase affordable housing and serve DACs
VMT3	Pursue infill development with a focus on expanding housing in job rich locations	Medium		2-4 yrs	Local, regional		Infill development projects in job rich locations	Prioritize investment to serve DACs
VMT4	Build mixed-use transit stations that integrate public, commercial, and/or residential space with transportation infrastructure	Low		0-5 yrs	Regional	Existing and new municipal ordinance	Construction of mixed-use transit stations	Prioritize investment to increase affordable housing and serve DACs
VMT5	Enhance transit service frequency, reliability, and accessibility through capital projects that implement bus priority zones, regional rail service, other urban rail efficiencies, and ADA-compliant stations.	High	Local, state governments, transit agencies	2-4 yrs	Local, regional	Existing	Transit ridership, number of transit vehicle revenue hours and miles, proportion of on-time trips, transit speed, number of ADA-compliant transit stations	Prioritize investment to serve DACs
VMT6	Modernize the region's commuter and freight rail systems through upgrades to signals, switches, and scheduling, and other investment.		Transit agencies, rail, local and state governments		Regional	Coordination across jurisdictions	Improved efficiency and on-time performance	
VMT7	Expand transit-supportive technologies to promote ridership through seamless payment and wayfinding	Enabling	Transit agencies, local governments		Local, regional	Existing	Transit supportive technology implemented, customer-facing transit tracking, customer-facing integrated payment system	Provide tools and messaging in all languages and formats.
VMT8	Plan, design, and maintain roadways and corridors to benefit all road users by investing in safe and accessible bike and pedestrian infrastructure.	Combined Medium	Local and state governments	0-5+ yrs			Road safety and reliability by mode, and active transportation mode share, adoption of ADA transition plans, sidewalk network completeness, pedestrian safety, adoption of complete streets plans, miles of bike lanes, miles of sidewalks	Provide safe and accessible transportation for all.
VMT9	Build and maintain safe, resilient, and accessible active transportation infrastructure.		Local, county, state governments, transit agencies				Road safety and reliability by mode, and active transportation mode share, sidewalk network completeness, pedestrian safety, miles of bike lanes, miles of sidewalks	Prioritize investment to serve DACs

Ref#	Strategy	GHG Reduction Potential	Key implementers	Timeline	Scale	Authority to Implement	Performance Indicators	LIDAC Considerations
VMT10	Encourage walking, biking and transit use through education, incentives, and collaboration.	Combined Medium	Local governments, transit agencies, school districts, employers	0-5+ yrs	Local	Existing	Active transportation mode share	Provide safe and accessible transportation for all. Consider DAC personal safety needs. Balance pedestrian safety.
VMT11	**Establish a regional network of mobility hubs and expand shared micromobility and electric micromobility systems.**	Low	Local and county government, transit agencies	2-4 yrs	Regional	Existing	Share of the region's population with access to micromobility options, share of transit stations with last-mile transportation options, creation of e-mobility rebate programs	
VMT12	Strategically manage parking policies to promote active and public transportation.	Medium	Local government, developers, businesses	0-2 yrs	Local	Municipal ordinance	Adoption of updated parking standards, reduction in free/low-cost parking spaces, reduce parking requirements for new developments	Integrate equity into policies
VMT13	Implement transportation demand management strategies that discourage single occupancy vehicle (SOV) travel and ownership and encourage public transit and active transportation.	High	Local and state governments, transit agencies, regional organizations	5+ yrs	Local, regional	Existing	Number of intersections with intelligent transportation system (ITS) technologies installed, number of reduced SOV trips, number of increased transit trips, number of managed or priced lanes, number of road pricing programs	Provide safe and accessible transportation for all. Prioritize investment to serve DACs

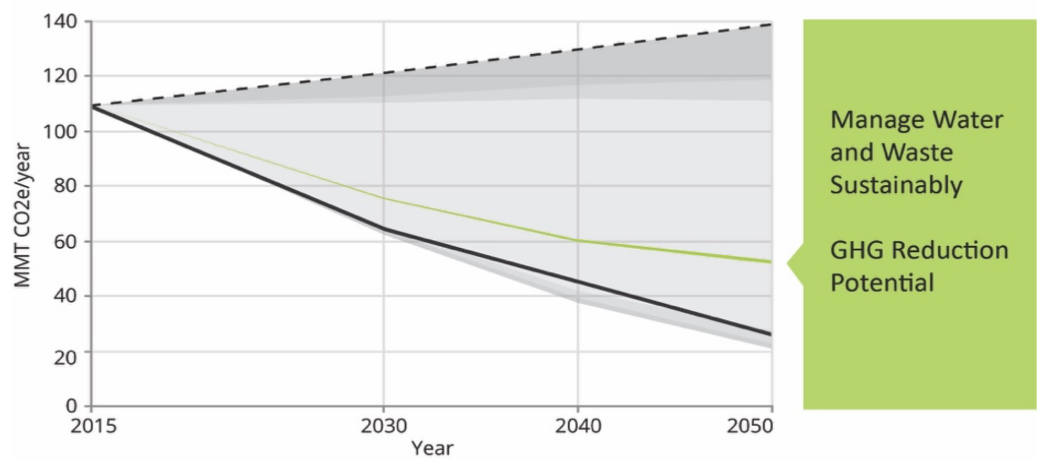
Ref#	Co-benefits
VMT1	Development of more compact, accessible neighborhoods; community cohesion strengthened; burden of owning and maintaining personal vehicle lessened
VMT2	
VMT3	Greater development density. Improve access to jobs.
VMT4	Increase ridership. Improve walkability and community vitality.
VMT5	Reduced traffic congestion; improved air quality; improved access to economic opportunity through greater mobility
VMT6	Improved safety and efficiency. Reduce travel delays.
VMT7	Increase ridership
VMT8	Safe active transportation; connected communities; reduced tailpipe emissions; improved health and wellness; reduced infrastructure demands for personal vehicles
VMT9	
VMT10	
VMT11	
VMT12	Reduced use of personal vehicles. Increased active transportation
VMT13	



6.7 Manage Water and Waste Sustainably

Ref #	Strategy	GHG Reduction Potential	Key implementers	Timeline	Scale	Authority to Implement	Performance Indicators	LIDAC Considerations
W1	**Capture biogas and convert to energy.**	Medium	Local and state governments, POTW, waste industry	1-5 yrs	Local, regional	Existing	Volume of methane captured. Volume of energy produced.	Reduce exposure to DACs. Engage diverse contractors
W2	Eliminate fugitive methane emissions from transmission industrial processes, and from commercial and household use of natural gas.		Local, county, and state governments, energy industry	0-5+ yrs	Regional	Federal, state	Emissions control technologies implemented, pipelines upgraded or replaced. Reduction of methane emissions	
W3	**Increase composting and biological treatment of waste. Utilize energy and biosolid by-products.**	Low	Local governments, waste industry		Local	Existing	Volume of waste composted and utilized	Expanded recycling and organic waste industries; value from waste captured.
W4	Support circular economies.	Enabling	Local, county and state governments, private sector	0-5yrs	Local, regional		Landfill diversion, production of longer lasting goods	Economic opportunities for DACs
W5	Reduce demand for building materials through material efficiency, longevity, and re-use.	Low	Local, county and state governments, private sector			Existing and new local ordinance	Rates of building material reuse and recycling	Reduce building costs. Economic opportunities for DACs in preservation and reuse.
W6	Increase the volume of waste that is recycled and composted.		Local, county, and state governments, waste industry, private sector, constituents			Existing	Quantity of compost, recycling rates	Reduce exposure to litter and illegal dumping. Site waste operations to avoid harm to DACs
W7	Reduce energy needed to deliver safe drinking water and shift operations to clean energy sources.		Local governments, water utilities.	2-5 yrs			Efficiency of water processing and distribution. Proportion of clean energy supply.	Eliminate lead pipes. Provide access to safe, clean, and affordable water to all. Reduce household utility burden.
W8	Reduce energy needed to manage wastewater and shift operation to clean energy sources.		Local governments, POTW				Efficiency of wastewater processing and conveyance. Proportion of clean energy supply.	Reduce energy costs and household utility burden. Create clean energy jobs for DACs.
W9	Encourage water conservation.		Local governments, water utilities, non-profits.	0-5yrs			Per capita water consumption	Conserve water supply. Reduce household utility burden.
W10	Benchmark water and energy use for commercial and residential properties.		Local, county, and state governments, water and electric utilities	2-5 yrs		Existing and new local ordinance	Adoption of water/energy nexus benchmarking.	

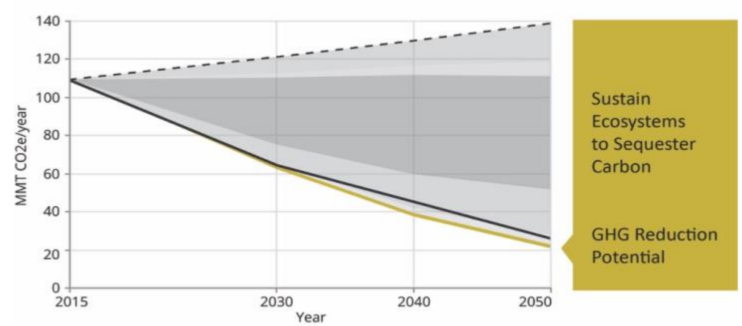
	Co-benefits
W1	Reduced methane gas emissions. Displacement of fossil fuels
W2	Reduced methane gas emissions
W3	Reduced methane gas emissions. Enriched landscapes
W4	Reduced embedded energy from production, transport, and disposal of materials; reduced persistent waste like plastic; value from waste stream and operations captured; household budgets stretched through smart purchasing
W5	
W6	
W7	Reduced long-term operational costs.
W8	
W9	
W10	



6.8 Sustain Ecosystems to Sequester Carbon

REF#	Strategy	GHG Reduction Potential	Key implementers	Timeline	Scale	Authority to Implement	Performance Indicators	LIDAC Considerations
SQ1	Increase protected lands and restore and manage public landscapes to optimize ecosystem services and support biodiversity.	Sequestration	Local, county, and state governments, property owners	0-5 yrs	Local	Existing. Local action to acquire lands	Quantity and quality of public and/or protected open space. Size and quantity of conservation easements. Quantity of restored land/open space.	Maintain accessible open space to invite safe and healthful activity.
SQ2	Encourage property owners to install and maintain sustainable and native landscapes.					Existing	Ecological health of public and private open space	Sustain tree canopy and gardens for desired cooling benefits in vulnerable communities.
SQ3	Plant trees and sustain the urban forest.		Local, county, and state governments, property owners, non-profits	0-2 yrs	Regional, local		Vitality and diversity of the urban forest	
SQ4	Encourage citizen tree stewardship.		Local governments and non-profits		Local			
SQ5	Preserve soil through low-impact development and restore soil integrity.		State, county and local governments, POTW, developers	0-5 yrs		Local, county ordinance	Soil health	Remediate contaminated soils and restore nature to sites in vulnerable communities.

	Co-benefits
SQ1 SQ2 SQ3	Stormwater managed sustainably; pollinator and wildlife habitat supported; quality open space encourages active transportation and lifestyles
SQ4	Improved air quality; cooling shade mitigates heat islands; reduced cooling energy demands; enhanced livability
SQ5	Clean water; healthy ecosystems



7 Low Income Disadvantaged Communities Benefits Analysis

This section addresses low-income and disadvantaged communities (LIDACs) in the Chicago MSA. Identifying LIDACs is a critical first step to ensure that the communities that disproportionately face climate, economic, and environmental burdens will receive needed benefits from PCAP implementation. The LIDAC identification and mapping was completed by CMAP.

7.1.1 Identify Chicago MSA LIDACs

To identify low-income and disadvantaged areas in the Chicago MSA, CMAP used the Climate and Economic Justice Screening Tool (CEJST) and the EPA's Environmental Justice Screening and Mapping Tool (EJScreen). These tools identify LIDACs by assessing indicators for categories of burden: air quality, climate change, energy, environmental hazards, health, housing, legacy pollution, transportation, water and wastewater, and workforce development. Following federal practice, CMAP identified any census tract identified as disadvantaged in CEJST and/or any census block group that is at or above the 90th percentile compared to the nation and/or state for any of EJScreen's supplemental indexes. Each of the identified tracts and block groups that meet or exceed these thresholds is defined as a low-income and disadvantaged community in the Chicago MSA.[18] Additional details about the data resources used to identify the low-income and disadvantaged communities are provided in *Appendix D. Appendix E* is the complete list of LIDAC census blocks in the Chicago MSA with each census block group identified using their U.S. Census Bureau block group identification number and includes their corresponding municipal and county location(s).[19]

Figure 1 maps the census block groups that meet this definition in the Chicago MSA. Overall, there are 2,881 census block groups identified as LIDACs in the Chicago MSA. Approximately 39 percent of the total MSA population (3,677,911 of approximately 9.4 million total) lives in areas identified as low income and disadvantaged communities. There are LIDAC block groups in each county, with 2,743,455 people living in LIDAC block groups identified in Cook County, Illinois alone.[20]

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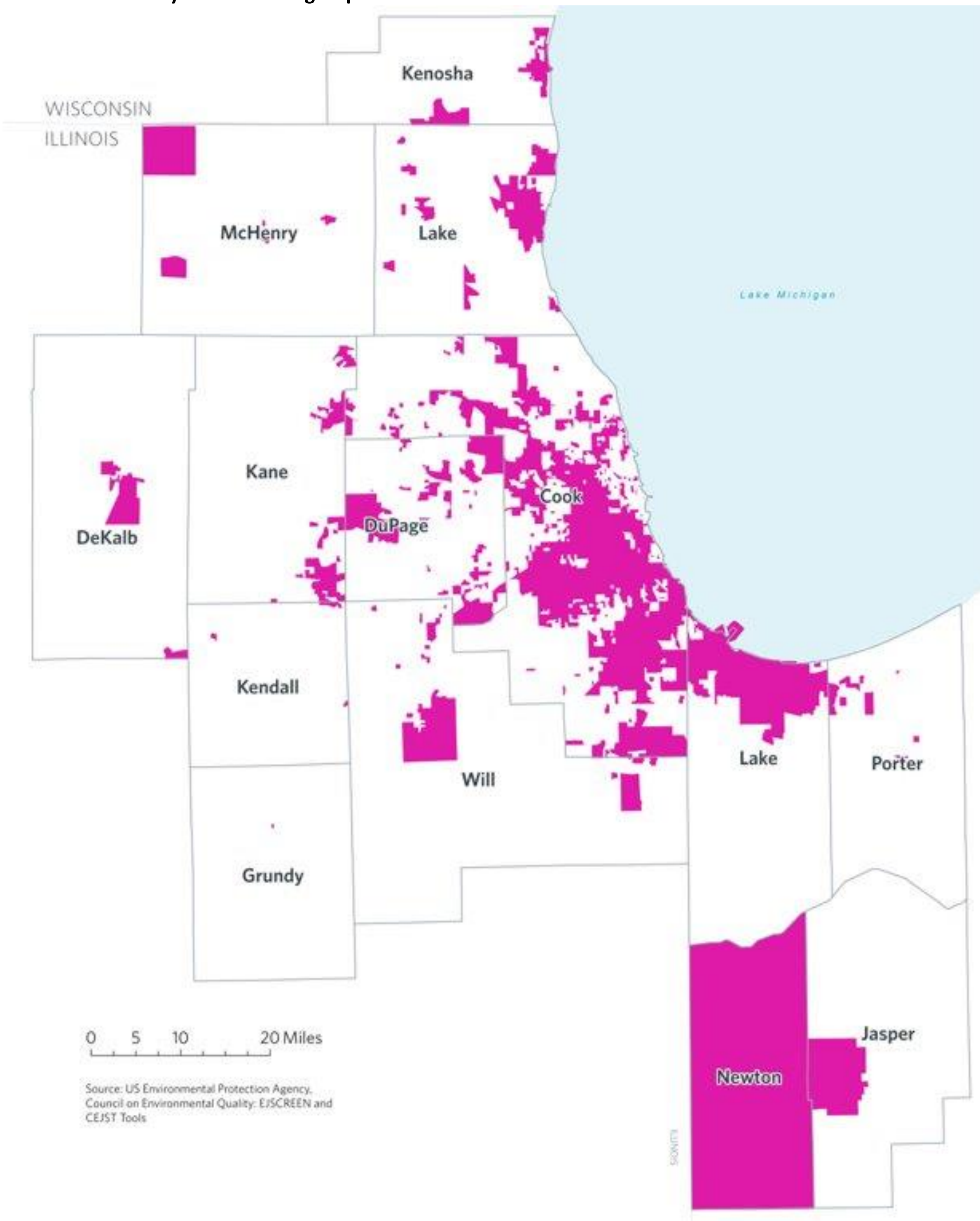
[18] CMAP used the U.S. EPA Inflation Reduction Act Disadvantaged Communities Map which combines CEJST and EJScreen Supplemental Indexes into one footprint for relevant IRA programs and analyses. Available at: https://www.epa.gov/environmentaljustice/inflation-reduction-act-disadvantaged-communities-map

[19] Some census block groups span multiple municipal jurisdictions.

[20] A note on Newton County, Indiana: Newton County contains only four, very large census tracts, with a low population (the July 2022 estimate was 13,823). The four tracts are included as disadvantaged because of a mix of CEJST's housing, transportation, health, and workforce development burdens.

Figure 1. Low-income and disadvantaged communities in the Chicago metropolitan statistical area, defined by CEJST and EJScreen by census block groups



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

7.1.2 LIDAC Engagement in Climate Action Planning

The Metropolitan Mayors Caucus serves as a convening and coordinating council of governments for the 275 municipalities throughout northeastern Illinois. Caucus members include all municipalities in Cook, DuPage, Kane, Kendall, Lake, McHenry and Will counties and the City of DeKalb in DeKalb County. This 7-county+ service area encompasses 97% of the census tracts identified as LIDAC.

As such, the Caucus relied heavily on participation of its LIDAC member communities to provide meaningful engagement in the PCAP process. Time constraints and administrative barriers related to subawards for NIRPC prevented new, meaningful engagement of the remaining 4% of LIDACs, especially in Indiana and Wisconsin and Grundy County in Illinois. More extensive meaningful engagement across the MSA is planned for the duration of the CPRG planning process.

The Caucus' representative leadership fosters a spirit of mutual trust and collaboration. The Executive Board of the Caucus is comprised of mayors appointed by each of 9 sub-regional councils of governments and the City of Chicago. These mayors, democratically elected by their constituents, are then selected by their sub-regional council of governments (e.g. South Suburban Mayors and Managers Association) to represent their sub-region on the Caucus Executive Board. Ten Executive Board Members and Directors (55%) represent LIDAC communities including Batavia, Burr Ridge, Chicago, Darien, Hazel Crest, Hillside, Northlake, Palos Hills, Richton Park, and University Park. The Executive Board has been meaningfully engaged in the development of the Caucus' 2021 Climate Action Plan for the Region and the PCAP. This collaborative leadership body recognizes community values, concerns, practices, and the local norms and history that LIDAC members are uniquely able to provide.

The Caucus further engages LIDAC communities within 7-county+ metro region through its Environment Committee which is open to all Caucus member communities. The Environment Committee engaged in the PCAP through discussion and facilitated participation (using the *Mentimeter* engagement tool) at two Environment Committee meetings in May 2023 and January 2024. See Stakeholder Engagement *Section 1.3.3* above. All Caucus member municipalities were invited to the Climate Townhall in December 2023 to provide input into the PCAP. NIRPC and CMAP extended invitations to additional LIDAC communities and stakeholders beyond the Caucus' reach.

The Metropolitan Mayors Caucus leads the Greenest Region Compact (GRC), the largest regional sustainability collaborative for municipalities in the U.S. The GRC is a set of consensus sustainability goals developed with consideration of the needs and capabilities of all municipalities in the Chicago metro region. To date, 153+ municipalities and 5 counties have formally endorsed the goals of the GRC. Of these, at least 61 are designated LIDAC. This broad consensus gives the Caucus the ability to understand and address the needs and desired outcomes of LIDAC communities, relative to sustainability and equitable climate action.

Finally, the 2021 Climate Action Plan for the Chicago Region (CAP) was crafted with input from 175 organizations. Fifty-three of those organizations were municipalities, and sixteen of those were municipalities identified as LIDAC. Over the sixteen-month period (2019-2021) of CAP development there were 20 meetings and events, which allowed for meaningful engagement of low income and disadvantaged communities. See *Appendix G.* Robust community engagement by the City of Chicago in the development of their 2022 Chicago Climate Action Plan also enriched our understanding of LIDAC community priorities and needs.

7.1.3 Estimate potential benefits of GHG emission reduction measures to LIDACs

Paired with each strategy of the Complete List of GHG Reduction Strategies is information relative to the needs and opportunities for LIDAC. The "LIDAC Considerations" column notes planning and implementation approaches that could maximize equitable benefits to LIDAC communities and minimize disbenefits. The "Co-Benefits" column identifies benefits that could be realized by LIDAC from equitable implementation of that strategy. Both LIDAC Considerations and Co-Benefits are paired with every Priority GHG Reduction Strategy and Additional GHG Reduction Strategies. LIDAC benefits were key decision factor for selecting Priority GHG Reduction Strategies.

7.1.4 LIDAC and Climate Impacts and Risks

A comprehensive climate risk and vulnerability assessment was done for the 2021 Climate Action Plan for the Chicago Region.

This was undertaken in two comprehensive steps. First a set of climate known concerns were compiled from literature reviews. *See Appendix F.*

Table 1. Vulnerability and risk scoping for the Chicago region based on literature review Climate-related hazards are ranked on a scale of (1-5) indicating probability and potential consequences. The two are multiplied to assign a risk score.

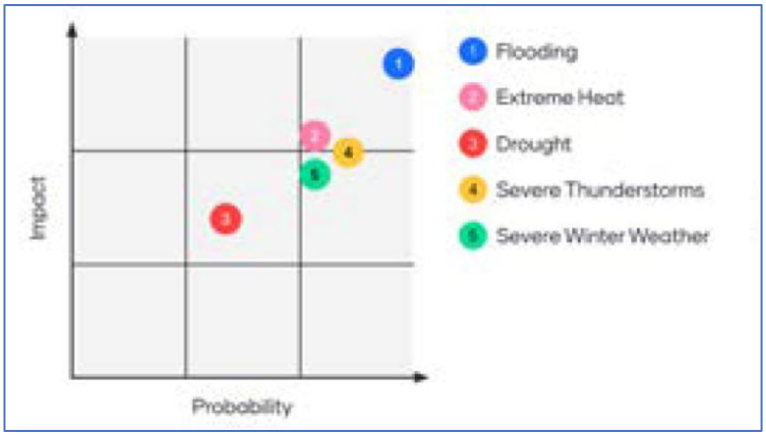
Source: Buro Happold

Climate-Related Hazard	Probability	Consequence	Risk
Extreme Heat	3	3	9
Drought	2	3	6
Severe Thunderstorms	2	2	4
Flooding	3	3	9
Severe Winter Weather	2	2	4

This assessment considered risks and impacts to vulnerable populations. The tool used in the PCAP to identify low income and disadvantaged communities (LIDAC) were not available in 2021 at the time of CAP publication.

To complement climate science assessments, a live survey was done (on May 22, 2020) to gather stakeholder perceptions about the probability and potential impacts from climate-related hazards. Twenty-eight individuals including representatives from disadvantaged communities participated in this ranking exercise.

Table 2: Aggregated votes of climate adaptation workshop who assessed the probability and potential impacts of climate-related hazards.



8 Intersection with Other Funding Availability

The federal Bipartisan Infrastructure Law (BIL) and the Inflation Reduction Act (IRA) will make the largest investment in climate action in U.S. history. Climate Pollution Reduction Grant Implementation funds drive the development of this PCAP and spark innovative proposals to implement its strategies.

The IRA authorizes Direct Pay, a new way for non-profit and government entities to access federal investment previously delivered only in the form of tax credits for businesses and individuals. At the same time, the Illinois Climate and Equitable Jobs Act (CEJA) provides a pathway to a clean energy future, and funding to begin the journey. CEJA enables Illinois utilities to invest in clean energy technologies, grid resilience and electrification.

The dynamic nature of these new funding opportunities means that tracking and responding to them can prove challenging for climate project planners. The PCAP organizes GHG Reduction Strategies organized by Objectives. With the aim of accomplishing these objectives, this section provides an overview of intersecting funding sources to complement CPRG investment.

8.1 Potential funding and resources

Objective 1: Demonstrate leadership to reduce emissions

As this mitigation objective focuses primarily on administrative and policy actions, many do not require outside funding, but will require dedicated staff resources to implement. Technical assistance and advisory support could facilitate implementation. The Illinois Sustainable Technology Center, affiliated with the University of Illinois, manages a technical assistance program that focuses on operational sustainability. CMAP and the Regional Transportation Authority (RTA) also maintain joint technical assistance programs that provide consultant and in-house support for local and regional planning projects, including grant readiness and capacity building projects. At the national level, the Local

Infrastructure Hub provides municipalities with the resources and expert advice they need to access federal infrastructure funding through programs such as grant application Bootcamps.

Academic and non-profit organizations such as the University of Illinois Extension and the Center for Neighborhood Technology also offer extensive informational and educational resources that are valuable for shaping conversations with residents, staff, and elected officials. Indiana University's Environmental Resilience Institute offers climate planning technical assistance to Indiana jurisdictions.

Objective 2: Decarbonize Energy Sources

The U.S. Department of Energy (DOE) provides a number of funding sources to decarbonize energy sources, including the Long-Duration Energy Storage Demonstrations Program, the Transmission Facilitation Program, and Communities LEAP (Local Energy Action Program).

The U.S. Department of the Treasury offers a variety of tax credits intended to support the development of clean energy projects, and the U.S. Department of Agriculture (USDA) is available to support building retrofits and energy projects in participating communities.

At the state level, the Illinois Environmental Protection Agency (IEPA) manages the Clean Energy Innovation Fund, which can be used to fund "high-potential, early-stage Illinois-based cleantech companies." IEPA also administers the formula funding for the Energy Efficiency and Conservation Block Grant in Illinois, which provides funding for energy planning projects. The Illinois Department of Commerce and Economic Opportunity oversees several programs created through the Climate and Equitable Jobs Act, including the Equitable Energy Future Grant program, which can be used for renewable energy and energy efficiency projects primarily benefiting low-income communities.

Objective 3: Optimize Building Energy

Funding sources for building efficiency are substantially similar to those focused on decarbonizing energy sources. The IEPA Energy Efficiency and Conservation Block Grant provides funding for building decarbonization in addition to energy planning. The U.S. DOE Property Assessed Clean Energy Program can also be used for both efficiency retrofits and on-site energy projects for residential and commercial buildings. Of note, this program often requires enabling state legislation and authorization from local governments.

The DOE offers several funding programs for building decarbonization such as Home Efficiency Rebates and the Weatherization Assistance Program. The U.S. EPA and Department of Housing and Urban Development (HUD) also offer a variety of funding programs to support building decarbonization through retrofits, efficiency programs, and other investments, such as U.S. EPA's Reducing Embodied Greenhouse Gas Emissions for Construction Materials and Products grant and HUD's Green and Resilient Retrofit Program.

At the state level, several grant programs exist to fund building decarbonization, such as the Community Development Block Grant Housing Rehabilitation Program at Illinois Department of Commerce and Economic Opportunity, the Energy Efficiency Trust Fund Grant Program at IEPA, and Illinois Solar for All through the state DOE. There are a variety of small-scale, local programs as well, but these are generally programs designed to be applied for directly by residents and businesses to receive assistance from the municipality for individual projects.

In Illinois, ComEd offers a robust energy savings program that supports energy efficiency and beneficial electrification goals established by CEJA. ComEd's Smart Energy Marketplace offers a wide range of incentives and services to help customers optimize building energy through energy efficiency and electrification. Some of these services include free home energy assessments, rebates on energy efficiency appliances, and discounts on efficient heating and cooling equipment. Public sector customers may access facility assessments and rebates through ComEd's Commercial and Industrial programs. Dedicated funding and resources are available to help reduce household energy burden of income qualified customers in LIDACs as well, including free energy-saving kits, weatherization improvements, and the Whole Home Electric program for qualifying customers.

Objective 4: Implement Clean Energy Policies

Several of the measures included in this mitigation objective focus on administrative actions, such as local and state policies, energy planning, and streamlining processes. These actions have lower implementation costs but may benefit from technical assistance provided by CMAP, the Caucus, the Interstate Renewable Energy Council (IREC), Slipstream, the Midwest Energy Efficiency Alliance (MEEA), and other organizations.

In August of 2023, Elevate, the Illinois Green Alliance, and ComEd launched the Building Energy Resource Hub to provide training and advisory services to building professionals. The Hub will support building owners and developers in areas such as compliance with more efficient codes or taking on building electrification.

The IRA provides up to $1 billion for states and units of local government with the authority to adopt building energy codes to adopt and implement the latest building energy codes, zero energy building codes, or equivalent codes or standards. Out of the $1 billion, there is $530 million available through the U.S. DOE Assistance for the Adoption of the Latest and Zero Building Energy Codes funding opportunity.

Objective 5: Decarbonize Transportation

The federal government has various competitive funding opportunities to support the transition from fossil fuels in the transportation sector. U.S. EPA manages a number of programs focused on freight decarbonization, such as Clean Ports and Clean Heavy-Duty Vehicles. The U.S. Department of Transportation (USDOT) offers funding programs targeting all aspects of the transportation sector including the Low or No Emissions Grants for Buses and Bus Facilities Program, Port Infrastructure Development Program and Infrastructure for Rebuilding America Grants, the Charging and Fueling Infrastructure Discretionary Grant Program, and the National Electric Vehicle Infrastructure Program. The Infrastructure Investment and Jobs Act also included funding for a wide range of transportation areas discussed at length in the act's guidebook.

Many federal funding programs are administered at a state, regional, and local level. Within the Chicago metropolitan statistical area, CMAP, NIRPC, and SEWRPC are responsible for programming the Congestion Mitigation and Air Quality Improvement Program, the Carbon Reduction Program, the Transportation Alternatives Program, and the Surface Transportation Program within their respective jurisdictions. Additional information about these programs is available on each agency's website.

ComEd recently announced new EV rebates for residents, businesses, and public sector customers. Residents can receive rebates for purchasing and installing at-home chargers, with the highest rebates available for income-eligible customers. For businesses and public sector customers, ComEd is offering rebates for purchasing EVs and for installing make-ready infrastructure. Other rebates available for vehicles include residential rebates on new or used EVs through Illinois' CEJA and the Commercial Clean Vehicle Credit for businesses and tax-exempt organizations that purchase EVs.

The Caucus supports municipalities and counties in the ComEd territory to become EV Ready Communities through the EV Readiness Program. Working in cohorts, communities receive no-cost technical assistance and work collaboratively to seek funding for EVs and EV charging infrastructure.

Objective 6: Reduce Vehicle Miles Traveled

Similar to the funding sources for decarbonizing transportation, this mitigation area has competitive funding opportunities from several federal departments. U.S. DOT offers transit-related funding through programs like the Low or No Emission Vehicle Program for buses and bus facilities and the Transit-Oriented Development Pilot Program. The U.S. Federal Transit Administration has the Integrated Mobility Innovation Program and All Stations Accessibility Program, which aim to make transit a more accessible, efficient, and innovative travel mode. The Infrastructure Investment and Jobs Act also includes other funding opportunities for transit and are discussed at length in act's guidebook.

Many of the federal transportation programs administered at the state, local, and regional level detailed in the Decarbonize Transportation mitigation objective can also be used to support vehicle miles traveled reduction efforts. These programs include Congestion Mitigation and Air Quality Improvement Program, the Carbon Reduction Program, and the Transportation Alternatives Program. Motor fuel tax funds may also be used to design and construct roadways that are safe and accessible for all road users, allowing for alternatives to driving. In northeastern Illinois, CMAP and RTA's joint technical assistance program can also assist with these efforts.

The Active Transportation Alliance offers timely information and technical assistance to jurisdictions seeking grant funding for active transportation projects.

Objective 7: Manage Water and Waste Sustainably

U.S. EPA maintains several funding sources for waste and wastewater projects, include Solid Waste Infrastructure for Recycling Grants; Embodied Carbon in Construction Materials Grants, Technical Assistance, and Labeling Program; and the Clean Water State Revolving Fund Program. USDA also administers numerous relevant programs, including Composting and Food Waste Reduction Grants; USDA Rural Utilities Service, Water, and Wastewater Loan/Grant Program; and the Solid Waste Management Rural Development Grants. HUD Community Development Block Grants may also be used for public facility construction and improvement projects such as water and sewer facilities.

At the state level, IEPA's Public Water Infrastructure Plant Efficiency Program and Public Water Supply Energy Efficiency Grant Program are great resources for water-focused projects. ComEd, Northeastern Illinois' primary electricity provider, also offers facility assessments for residential, commercial, and public sector facilities.

Site scale green infrastructure projects that reduce the quantity of stormwater entering combined sewer systems also play an important role in lowering emissions by reducing demand on wastewater treatment facilities. Funding opportunities for these projects are discussed in the sustain ecosystems to sequester carbon mitigation objective.

Objective 8: Sustain Ecosystems to Sequester Carbon

USDA offers many grants and funding programs to support green infrastructure, open space, and ecosystem services under the umbrella of the Natural Resources Conservation Service, including the Regional Conservation Partnership Program, the Conservation Stewardship Program, and Agriculture Conservation Easement Programs.

At the state level, the Illinois Department of Natural Resources manages various grant programs such as the Open Space Lands Acquisition and Development Program. At the local and regional level, several private and non-profit organizations maintain funding and volunteer programs to support open space, including USDA Urban Forestry Grants (administered by the Morton Arboretum), the Openlands TreeKeepers Program and TreePlanters Grant, and the ComEd Green Region Grant. The Chicago Region Tree Initiative maintains a helpful grants hub that tracks grants available for urban forestry and green infrastructure projects as well. Local and county referenda for open space acquisition and maintenance have historically provided the bulk of funding for open space preservation.

9 Next Steps

The work to prepare the Priority Climate Action Plan for the Chicago Metropolitan Statistical Area heralds an exciting new era of broad collaboration to accelerate innovation, investment, and effective climate action. Our hurried work towards these critical CPRG program deadlines has brought together new partners across jurisdictions and state lines to think big and quickly aim for transformation. The purpose of the PCAP is to prepare the Chicago MSA to propose big, transformative projects that will implement our chosen Priority GHG Reduction Strategies. We are ready to work together to stem rising greenhouse gas emissions causing global climate change.

The immediate next step is for these activated civic leaders to compile their project ideas into winning proposals that will demonstrate the ability to significantly reduce GHG emissions, transform operations and behaviors, reap benefits for low-income and disadvantaged communities, and contribute to the equitable growth of our region. As a region, we hope for strong federal investment that capitalizes on our local talent, Midwestern sensibility and imagination, and leverages our own local investment.

Following CPRG Implementation grant submissions, the Caucus, NIRPC and our constituents and stakeholders will support CMAP is creating a robust Comprehensive Climate Action Plan for the Region (CCAP) in June 2025. We will more earnestly seek to engage LIDAC communities and deepen our climate commitments.

This Priority Climate Action Plan underscores the need for urgent coordinated action to equitably mitigate climate change. Our regional culture of cohesion and collective expertise positions us well to meet this challenge. All are invited to join us.

10 Appendix A: Priority GHG Reduction Strategy Quantification Methodology

This section outlines the methodology used by CMAP, Cook County, ComEd, Lake Michigan Air Directors Consortium, and others to calculate the greenhouse gas emission reduction potential of priority climate action plan measures. The *Objectives, Priority GHG Reduction Strategies*, and *Measures* are listed below. For each one, the measure and interim target year are identified.

10.1.1 Decarbonize Energy Source - DE2

Objective	Priority GHG Reduction Strategy
Decarbonize Energy Sources	Increase renewable energy supply and energy storage capacity for residential, commercial, municipal, Institutional, and industrial electricity use.

Measure 1: Generate 40 percent of electricity from renewable sources by 2030.

Quantifier: CMAP

Champion: Kane County

Estimated reduction: 23.11 MMT CO2e annually in 2030

Reference for establishing the measure: The State of Illinois adopted the Climate and Equitable Jobs Act in 2021. The Act set a long-term target of achieving a carbon-free grid by 2045. The Act also called for the state to generate 40 percent of its electricity from renewable (non-nuclear) sources by 2030 and 50 percent by 2040. The CEJA target is currently an Illinois target. This plan expands that target to include portions of the MSA in Indiana and Wisconsin.

Calculation Method Description: The emissions and generation resource integrated database (eGRID) is a comprehensive source of data from the EPA on the environmental characteristics of electric power generation in the United States. The data includes emissions, emission rates, generation, resource mix, and many other attributes that were useful in this policy analysis exercise. The entire Chicago MSA region falls within the RFCW eGRID region.

For this analysis, the 2020 RFCW eGRID data were used to understand the CO2e reduction benefits, compared to the baseline, of generating 40% of electricity for the entire MSA region from renewable sources by 2030. To do this, the resource mix of the 2020 eGRID RFCW data would be updated to reflect the 40% renewable electricity goal. 2030 electricity usage was also necessary for this analysis. The NREL and DOE tool, SLOPE was used to get 2030 electricity usage, by county, for the entire MSA region. SLOPE has energy usage projections for every county in the United States for all years through 2050. After gathering 2030 electricity usage by county, these data were input into the EPA Local Greenhouse Gas Inventory Tool. This tool allows a user to calculate electricity emissions based on existing eGRID rates or based on custom rates. For the business-as-usual scenario, the 2030 Chicago MSA electricity usage data was entered into this tool and emissions were calculated based on the 2020 eGRID resource mix. For the 40% renewable energy scenario, custom emission factors were calculated from eGRID rates based on increases to Solar and Wind electricity generation to achieve the 2030 40% renewable energy goal. The same 2030 Chicago MSA electricity usage data was entered into this tool and emissions were calculated based on the 40% renewable energy goal resource mix. Table 1 provides the results of the analysis.

Table 1. Renewable energy GHG reduction measure quantification.

Scenario	CO2 (in MMT CO2e)	CH4 (in MMT CO2e)	N2O (in MMT CO2e)	Total (in MMT CO2e)
Business As Usual Scenario	44.24	0.11	0.14	44.49
40% Renewable Energy Scenario	21.15	0.09	0.13	21.38
2030 CO2e Reduction (MMT CO2e)	23.09	0.01	0.01	**23.11**

DE2 Measure 2

Measure 2: Increase on-site renewable energy by installing solar arrays at 20% of industrial manufacturing, including metal and food and beverage manufacturing facilities.

Champion and Quantifier: Cook County

Estimated reduction: 0.057 MMT CO2e annually in 2030

Scope: Cook County

Calculation Method Description: Per ComEd energy efficiency assessment reports from 2023 at 2 food and beverage manufacturers and 1 metal finisher site in Suburban Cook County, a single solar panel may save .29 mt CO2e/yr. An average solar array on an industrial facility may save an average of 1,236,930 kWh/yr which is 864 mtco2e / yr. Per 2020 NEI data, there are 303 total food and beverage and metal manufacturers in the Chicago MSA. 864 mtco2e extrapolated onto 20% of those sites (roughly 61 facilities). Due to limited data sample size and time constraints, this data should be used as a rough sample size of industrial facilities capable of installing solar. ComEd Energy Efficiency Industrial Assessment reports from 2023 - Suburban Cook County.

10.1.2 Optimize Building Energy - BE1

Objective	Priority GHG Reduction Strategy
Optimize Building Energy	Engage *residential* utility customers to optimize building *efficiency* leveraging residential energy assessments, energy efficiency rebates, incentives, tax credits and weatherization, housing rehab, and energy assistance programs.

Measure 1: Assess residential homes for cost-effective energy efficiency measures, including weatherization and building shell improvements, energy-efficient HVAC and appliances and other measures.

Quantifier: ComEd

Estimated reduction: 0.41 MMTCO2e cumulative from 2024 to 2030

Scope: ComEd Territory

Calculation Method Description: Energy savings are based on ComEd 2022 program year results; verified by ComEd Program Independent Evaluator consistent with the Illinois Technical Reference manual (TRM).

10.1.3 Optimize Building Energy - BE2

Objective	Priority GHG Reduction Strategy

Optimize Building Energy	Engage *residential* utility customers to *electrify* space and water heating leveraging residential energy assessments, rebates, incentives, tax credits and weatherization and energy assistance programs.

Measure: Replace existing fossil-fueled furnaces with more efficient heat pumps

Quantifier: ComEd

Estimated reduction: 0.16 MMTCO2e from 2024 to 2030

Scope: ComEd Territory

Calculation Method Description: Energy savings are based on ComEd 2022 program year results; verified by ComEd Program Independent Evaluator consistent with the Illinois Technical Reference manual (TRM).

10.1.4 Optimize Building Energy - BE3

Objective	**Priority GHG Reduction Strategy**
Optimize Building Energy	Engage *commercial, institutional, and industrial* utility customers to optimize building efficiency leveraging tools and programs such as facility assessments, energy management, retro commissioning, demand response, performance contracting, energy efficiency rebates, incentives, tax credits , and PACE financing.

Measure: Replace 30% of fossil fuel boiler and process heating equipment/processes with electric, hydrogen, or other non-GHG emitting based alternatives for all low and medium heat processes by 2030

Quantifier: CMAP

Champion: Cook County

Estimated reduction: 4.93 MMT CO2e annually in 2030

Scope: Chicago MSA

Measure Justification: Cook County identified this as a critical strategy to reduce industrial sector GHG emissions.

Calculation Method Description: Electrification and hydrogen of low and medium heat processes were measured in the Rocky Mountain Institute Energy Policy Simulator tool. This tool assesses a variety of climate mitigation policies at the state level and calculates a reduction in million metric tons/year CO2e emissions from the policies in question.

This 30% improvement rate by 2030 was applied to all industrial subsectors, with the exception of coal mining, and for all three states within the Chicago MSA, which produced the reduction in MMT for all three states. However, given that the Chicago MSA only encompasses portions of all three states, these reductions needed to be scaled to only incorporate the areas within the MSA region.

To scale these state totals to the MSA, the total square feet of industrial building area was collected using building data from Replica. Replica provides land use and building area data at the county level for all counties within the country. This data was collected for Illinois, Wisconsin, and Indiana, as well as for the unique counties within the MSA in each of these respective states. These data were used to calculate the proportion of industrial building area in each state that is represented within the Chicago MSA, which acts as our scaling factor. Table 2 provides the scaled results.

Table 2. Replace 30% of fossil fuel boiler and process heating equipment with non-GHG emitting based alternatives measure quantification.

State	2030 Baseline (MMT CO2e)	2030 Baseline Scaled (MMT CO2e)	2030 Scenario 1* Scaled (MMT CO2e)	CO2e Reduction (MMT CO2e)	Percent of State Industrial Building Area in MSA
Illinois	219.1	176.1	172.2	3.94	80.4%
Indiana	185.4	13.6	12.7	0.87	7.3%
Wisconsin	111.0	3.6	3.5	0.12	3.3%
MSA Total	515.5	193.4	188.4	**4.93**	--

**Scenario 1 represents replacement of 30% of fossil fuel boiler and process heating equipment with non-GHGH emitting based alternatives for all low and medium heat processes by 2030.*

Optimize Building Energy - BE3 Measure 2

Measure 2: Increase energy efficiency of heating, cooling and ventilation, lighting, envelope, appliances, and other components by 40% by 2030.

Quantifier: CMAP

Champion: Cook County

Estimated reduction: 1.08 MMT CO2e annually in 2030

Scope: Chicago MSA

Measure Justification: Cook County identified this as a critical strategy to reduce industrial sector GHG emissions.

Calculation Method Description: Increasing energy efficiency of heating, cooling and ventilation, lighting, envelope, appliances, and other components by 40% by 2030 were measured in the Rocky Mountain Institute Energy Policy Simulator Tool. This tool assesses a variety of climate mitigation policies at the state level and calculates a reduction in million metric tons/year CO2e emissions from the policies in question.

This 40% improvement rate by 2030 was applied to all three states within the Chicago MSA, which produced the reduction in MMT for all three states. However, given that the Chicago MSA only encompasses portions of all three states, these reductions needed to be scaled to only incorporate the areas within the MSA region.

To scale these state totals to the MSA, the total square feet of industrial building area was collected using building data from Replica. Replica provides land use and building area data at the county level for all counties within the country. This data was collected for Illinois, Wisconsin, and Indiana, as well as for the unique counties within the MSA in each of these respective states. These data were used to calculate the proportion of industrial building area in each state that is represented within the Chicago MSA, which acts as our scaling factor. Table 3 provides the scaled results.

Table 3. Increase industrial energy efficiency standards measure quantification.

State	2030 Baseline (MMT CO2e)	2030 Baseline Scaled (MMT CO2e)	2030 Scenario 1* Scaled (MMT CO2e)	CO2e Reduction (MMT CO2e)	Percent of State Industrial Building Area in MSA
Illinois	219.1	176.1	175.1	0.96	80.4%
Indiana	185.4	13.6	13.5	0.08	7.3%
Wisconsin	111.0	3.6	3.6	0.04	3.3%
MSA Total	515.5	193.4	192.3	**1.08**	--

**Scenario 1 represents a 40% increase in energy efficiency of heating, cooling and ventilation, lighting, envelope, appliances, and other components by 2030.*

Optimize Building Energy - BE3 Measure 3

Measure 3: Train workforce of industry decarbonization contractors by 2030.

Quantifier: CMAP

Champion: Cook County

Scope: Chicago MSA

Estimated reduction: 0.77 MMT CO2e annually in 2030

Measure Justification: Cook County identified this as a critical strategy to reduce industrial sector GHG emissions.

Calculation Method Description: Emissions reductions resulting from a program to train a workforce of industry decarbonization contractors across the MSA by 2030 were measured in the Rocky Mountain Institute Energy Policy Simulator Tool. This tool assesses a variety of climate mitigation policies at the state level and calculates a reduction in million metric tons/year CO2e emissions from the policies in question.

This job training program to train contractors in energy-efficient products and installation practices by 2030 was applied to all three states within the Chicago MSA, which produced the reduction in MMT for all three states. However, given that the Chicago MSA only encompasses portions of all three states, these reductions needed to be scaled to only incorporate the areas within the MSA region.

To scale these state totals to the MSA, the total square feet of industrial building area was collected using building data from Replica. Replica provides land use and building area data at the county level for all counties within the country. This data was collected for Illinois, Wisconsin, and Indiana, as well as for the unique counties within the MSA in each of these respective states. These data were used to calculate the proportion of industrial building area in each state that is represented within the Chicago MSA, which acts as our scaling factor. Table 4 provides the scaled results.

Table 4. Train workforce of industry decarbonization contractors measure quantification

State	2030 Baseline (MMT CO2e)	2030 Baseline Scaled (MMT CO2e)	2030 Scenario 1* Scaled (MMT CO2e)	CO2e Reduction (MMT CO2e)	Percent of State Industrial Building Area in MSA
Illinois	219.1	176.1	175.4	0.72	80.4%
Indiana	185.4	13.6	13.6	0.03	7.3%
Wisconsin	111.0	3.6	3.6	0.02	3.3%
MSA Total	515.5	193.4	192.6	**0.77**	--

**Scenario 1 represents the emissions reductions associated with training a workforce of industry decarbonization contractors by 2030 throughout the MSA.*

Optimize Building Energy - BE3 Measure 4

Measure 4: Improve energy efficiency standards for food and beverage and metal manufacturers by 15% by 2030.

Quantifier: CMAP

Champion: Cook County

Estimated reduction: 1.11 MMT CO2e annually in 2030

Scope: Chicago MSA

Measure Justification: Cook County identified this as a critical strategy to reduce industrial sector GHG emissions.

Calculation Method Description: The emissions reductions from implementing energy efficiency standards for food and beverage and metal manufacturers by 15% by 2030 were measured in the Rocky Mountain Institute Energy Policy Simulator Tool. This tool assesses a variety of climate mitigation policies at the state level and calculates a reduction in million metric tons/year CO2e emissions from the policies in question.

This 15% improvement rate by 2030 was applied to all three states within the Chicago MSA, which produced the reduction in MMT for all three states. However, given that the Chicago MSA only encompasses portions of all three states, these reductions needed to be scaled to only incorporate the areas within the MSA region.

To scale these state totals to the MSA, the total square feet of industrial building area was collected using building data from Replica. Replica provides land use and building area data at the county level for all counties within the country. This data was collected for Illinois, Wisconsin, and Indiana, as well as for the unique counties within the MSA in each of these respective states. These data were used to calculate the proportion of industrial building area in each state that is represented within the Chicago MSA, which acts as our scaling factor. Table 5 provides the scaled results.

Table 5. Improve energy efficiency standards for food and beverage and metal manufacturers measure quantification.

State	2030 Baseline (MMT CO2e)	2030 Baseline Scaled (MMT CO2e)	2030 Scenario 1* Scaled (MMT CO2e)	CO2e Reduction (MMT CO2e)	Percent of State Industrial Building Area in MSA
Illinois	219.1	176.1	175.1	1.04	80.4%
Indiana	185.4	13.6	13.6	0.04	7.3%
Wisconsin	111.0	3.6	3.6	0.03	3.3%
MSA Total	515.5	193.4	192.2	**1.11**	--

**Scenario 1 represents a 15% increase in energy efficiency of food and beverage facilities and metal manufacturers by 2030.*

Optimize Building Energy - BE3 Measure 5

Measure 5: Replace high GWP F-gas refrigeration system with CO2 natural refrigerant system at 50% of commercial facilities.

Estimated reduction: 0.89 MMT CO2e annually in 2030

Quantifier and Champion: Cook County

Scope: Cook County

Quantification Methodology: Cook County has approximately 1000 supermarkets that on average use 4000 lbs of R404-A, which is a refrigerant that has a GWP that is twice has potent as its predecessor, R-22. R404-A is becoming the most common replacement for R-22. This methodology uses EPA Green Chill Calculator to calculate mt CO2e and assumes 1000 supermarket facilities that hold a charge of 2 tons of high GWP refrigerant with an average leak rate of 25% per year. The GWP for R-22 is 1810, however, R404-A has a charge of 3921.60. This methodology assumes complete replacement of a high GWP refrigerant based systems at supermarkets across Cook County. This number can be extrapolated into the rest of the MSA.

Optimize Building Energy - BE3 Measure 6

Measure: Replace variable speed drives on HVAC and pollution control devices at 100 food and beverage and metal manufacturing facilities.

Estimated reduction: 0.077 MMT CO2e annually in 2030

Quantifier and Champion: Cook County

Scope: Cook County

Quantification Methodology: Per ComEd energy efficiency assessment data from 2023 at multiple food and beverage and metal finishing sites, variable speed drives offer a kWh savings of 110,290 kWh or 77mt CO2e per VSD. Multiple VSDs can be used within an industrial facility. This methodology assumes 10 VSDs are installed per facility. ComEd Energy Efficiency Industrial Assessment reports from 2023 - Suburban Cook County.

Optimize Building Energy - BE3 Measure 7

Measure: Replace high GWP F-gas industrial refrigeration systems with ammonia or another natural refrigerant system at 50% of food and beverage and chemical manufacturers in Chicago MSA.

Estimated reduction: 0.023 MMT CO2e annually in 2030.

Quantifier and Champion: Cook County

Scope: Cook County

Quantification Methodology: The EPA Green Chill Calculator was used to calculate mt CO2e. While this calculator is meant for supermarkets, the variables used in the calculator can still be used for industrial systems. Assumes industrial chiller systems hold a charge of 4409 lbs of high GWP refrigerant, R-410A, with an average leak rate of 5% per year. The GWP for the most polluting industrial refrigerant, R-410A, is 2088. This methodology assumes complete replacement of a high GWP refrigerant based system with an ammonia based natural refrigeration system that has a GWP of 0 at 216 industrial facilities. GHG metric accounts for 50% of facilities (113) replacing systems by 2030.

10.1.5 Optimize Building Energy - BE4

Objective	Priority GHG Reduction Strategy
Optimize Building Energy	Engage *commercial, institutional, and industrial* utility customers to *electrify* buildings leveraging tools and programs such as facility assessments, energy management, rebates, incentives, tax credits, direct pay and PACE financing.

Measure: Retrofit existing public sector buildings with more energy efficient lighting, HVAC, and other measures.

Estimated reduction: 0.66 MMTCO2e cumulative from 2024 to 2030

Quantifier: ComEd

Champion: City of Chicago, Chicago Public Schools

Scope: ComEd Territory

Quantification Methodology: Energy savings are based on ComEd 2022 program year results; verified by ComEd Program Independent Evaluator consistent with the Illinois Technical Reference manual (TRM).

10.1.6 Optimize Building Energy - BE6

Objective	Priority GHG Reduction Strategy
Optimize Building Energy	Manage non-CO2 GHG emissions including CH4, HFC, SF6 and others through improved industrial processes, alternative solutions, efficiency, leak detection and reduction, and recovery.

Measure: Substitute F-gas refrigerants by 67% and maintain or retrofit existing equipment at all industrial facilities by 2030.

Quantifier: CMAP

Champion: Cook County

Estimated reduction: 0.94 MMT CO2e annually in 2030

Scope: Entire MSA

Measure Justification: Cook County identified this as a critical strategy to reduce industrial sector GHG emissions.

Calculation Method Description: The emissions reductions from substituting F-gas refrigerants, which have an outsized impact on CO2e emissions, by 67% by 2030 were measured in the Rocky Mountain Institute Energy Policy Simulator Tool. This tool assesses a variety of climate mitigation policies at the state level and calculates a reduction in million metric tons/year CO2e emissions from the policies in question.

This 67% reduction by 2030 was applied to all three states within the Chicago MSA, which produced the reduction in MMT for all three states. However, given that the Chicago MSA only encompasses portions of all three states, these reductions needed to be scaled to only incorporate the areas within the MSA region.

To scale these state totals to the MSA, the total square feet of industrial building area was collected using building data from Replica. Replica provides land use and building area data at the county level for all counties within the country. This data was collected for Illinois, Wisconsin, and Indiana, as well as for the unique counties within the MSA in each of these respective states. These data were used to calculate the proportion of industrial building area in each state that is represented within the Chicago MSA, which acts as our scaling factor. Table 6 provides the scaled results.

Table 6. Substitute F-gas refrigerants and maintain or retrofit existing equipment at all industrial facilities measure quantification.

State	2030 Baseline (MMT CO2e)	2030 Baseline Scaled (MMT CO2e)	2030 Scenario 1* Scaled (MMT CO2e)	CO2e Reduction (MMT CO2e)	Percent of State Industrial Building Area in MSA
Illinois	219.1	176.1	176.1	0.88	80.4%
Indiana	185.4	13.6	13.6	0.04	7.3%
Wisconsin	111.0	3.6	3.6	0.02	3.3%
MSA Total	515.5	193.4	194	**0.94**	--

**Scenario 1 represents a 67% reduction in F-gas refrigerants by 2030.*

10.1.7 Decarbonize Transportation - DT7

Objective	Priority GHG Reduction Strategy
Decarbonize Transportation	Transition transit trains, buses, and related service equipment to low and zero-emission operation through equipment replacement and clean fueling infrastructure investments.

Measure 1: Transition transit fleets to 100% electric by 2040

Estimated reduction: 0.286 MMT CO2e annually in 2040.

Quantifier: CMAP

Champion: CTA, Pace

Scope: Entire MSA

Measure Justification: The Chicago Transit Authority and Pace Suburban Bus plan to fully electrify their fleets by 2040. Metra Rail and the Gary Public Transportation Corp have not announced formal electrification timelines but have begun purchasing electric vehicles in preparation for a full transition.

Calculation Method Description: The United States Environment Protection Agency's Diesel Emissions Quantifier was used to calculate the annual emissions savings from replacing a diesel transit bus with a battery electric transit bus. This per bus emissions reduction rate was then multiplied by the number of diesel buses reported by each of the region's transit systems in the Federal Transit Administration's National Transit Agency Profile database. Total emissions savings from each transit system were then combined to create an estimate of total annual GHG emissions reductions from a full electrification of the region's transit bus system, Table 7.

Table 7. Transit bus fleet electrification GHG reduction measure quantification.

Transit agency	Total diesel buses	CO2e* reduced (MMT)
Chicago Transit Authority	1,863	0.199
Gary Public Transportation Corp	19	0.002
Kenosha Area Transit	47	0.005
Pace	750	0.081
Total	2,679	**0.286**

*The Diesel Emissions Quantifier reports CO2 emissions, which have a CO2 equivalence of one. Other greenhouse gasses are not reported.

Decarbonize Transportation - DT7 Measure 2

Measure: Deploy eight electric trainsets into service, retire remaining 16 Tier 0 locomotives in Metra's regional passenger rail fleet.

Estimated reduction: 0.027 MMT CO2e annually in 2030

Quantifier and Champion: Metra

Scope: Metra fleet

Quantification Methodology: The United States Environment Protection Agency's Diesel Emissions Quantifier was used to calculate the annual emissions savings (NOx, PM2.5, HC, CO, CO2) supplemented with an analysis using research sourced from EPA's 2020 National Emissions Inventory Locomotive Methodology (SO2, VOCs, NH3) to estimate the results of replacing sixteen (16) Tier-0 diesel locomotive with battery-electric trainsets. Underlying assumptions are based on the diesel fuel consumption averaged across Metra's fleet of various locomotive models given Metra's current scheduled service runs annualized (195,780), which requires each locomotive to consume approximately 300,000 gallons of Ultra-Low Sulfur Diesel (ULSD) fuel. The basis of the emissions reduction estimate is the sixteen (16) retired locomotives reduce Metra's annual ULSD consumption by 4,800,000 gallons, however, the emissions produced to generate electricity to repower the battery-electric trainsets are not accounted for due to the lack of known inputs at this time. Table 8

Table 8. Commuter rail GHG reduction measure quantification.

DT 7: Pilot Zero-Emission Regional Passenger Rail Vehicles

Deploy 8 x Trainsets into service, retire remaining 16 x Tier-0 Locomotives in Metra's regional passenger rail fleet.

Annual emissions reductions from retiring 8 x Tier-0 Locomotives for 8 x Zero-Emission Trainsets

Output	GHG Emission Reductions (MT CO2e)	Co-Pollutant Reductions (metric tons)						
		SO2	NOx	VOCs	NH3	PM2.5	HC	CO
Introduce 8 x Trainsets into service, retire remaining 16 x Tier-0 Locomotives	3,375.00	28,170.00	3.70	197,121.60	26,499.00	0.20	0.73	(0.40)
RETIRE 16 LOCOMOTIVES	27,000.00	225,360.00	29.60	1,576,972.80	211,992.00	1.60	5.80	(3.20)
	0.027							

DT 7: Retire the Oldest Locomotives in the Regional Passenger Rail Fleet

Metra retires Tier-0+ locomotives with remanufactured Tier-3 Diesel Locomotives

Annual emissions reductions from retiring 50 x Tier-0+ Locomotives for 50 x Tier-3 Locomotives

Output	GHG Emission Reductions (MMT CO2e)	Co-Pollutant Reductions (metric tons)						
		SO2	NOx	VOCs	NH3	PM2.5	HC	CO
Retire one (1) x Tier-0+ locomotive with one (1) Tier-3 locomotive	-	-	9.34	3.72	-	0.15	1.60	2.42
RETIRE 50 TIER-0+ UNITS	-	-	467.05	186.17	-	7.55	80.00	120.85

10.1.8 Decarbonize Transportation - DT9

Objective	Priority GHG Reduction Strategy
Decarbonize Transportation	Transition medium and heavy duty freight vehicles and non road equipment to low and zero-emission equipment and invest in distribution, make-ready and clean fueling infrastructure

Measure 1: Support electrification or fuel-switching of 2.5% medium- and heavy-duty vehicles by 2030

Estimated reduction: 0.12 MMT CO2e annually in 2030

Quantifier: CMAP

Champion: Drive Clean Indiana

Scope: Entire MSA

Measure Justification: The United States is a signatory to the global Memorandum of Understanding to advance Zero-Emission Medium and Heavy-Duty Vehicles (ZE-MHDV), which seeks to ensure that 30 percent of new medium and heavy-duty trucks sold in 2030 are zero-emission vehicles. A CMAP analysis of truck sales and lifecycles suggests that implementing the policies needed to achieve this target will result in the conversion of 2.5 percent of the region's medium and heavy-duty trucks to zero-emissions vehicles by 2030. The share of zero-emission vehicles is expected to increase at a much faster pace beyond 2030, as older vehicles are retired.

Calculation Method Description: This calculation assumes that Heavy Duty truck activity stays flat from 2020 to 2030 within the Chicago MSA. The 2020 MSA GHG Inventory utilized emission data from the National Emissions Inventory to identify on-road transportation emissions. NEI transportation data identifies emissions by vehicle type. Medium and heavy truck emissions are identified by the SCC Level 3 variable. The three following classes were included in determining the current emissions from medium and heavy truck activity within the Chicago MSA: Combination Long-haul Truck, Combination Short-haul Truck, Single Unit Long-haul Truck. NEI reports emissions in MT of CO2e. These emissions were reduced by 2.5% to account for the stated electrification goal for medium and heavy trucks, Table 9.

Table 9. Support electrification or fuel-switching for medium- and heavy-duty trucks measure quantification.

Vehicle Type	2020 MMT CO2e	2030 MMT CO2e	Assumed Growth Rate (2020 to 2030)	2030 Scenario Reduction Target	2030 MMT CO2e Electrification Scenario	2030 Reduction Benefit
Combination Long-haul Truck	3.43	3.43	1	0.025	3.35	0.09
Combination Short-haul Truck	1.20	1.20	1	0.025	1.17	0.03
Single Unit Long-haul Truck	0.14	0.14	1	0.025	0.14	0.00
Chicago MSA Total	4.77	4.77	1	0.025	4.65	**0.12**

Decarbonize Transportation - DT9 Measure 2

Measure 2: Electrify 2.5% of non-road freight vehicles, especially terminal trucks and material handlers and install clean fueling infrastructure.

Estimated reduction: 0.0138 MMT CO2e annually in 2030.

Quantifier: CMAP and Drive Clean Indiana

Champion: Drive Clean Indiana

Scope: NIRPC region

Quantification Methodology: This calculation assumes that non road freight vehicles activity stays flat from 2017 to 2030 within the NIRPC region. NIRPC conducted a mobile emissions inventory that provides emissions rates for a variety of sources, including nonroad sources such as diesel terminal trucks and material handling equipment. The 2017 NIRPC mobile emissions inventory concluded nonroad equipment produced 0.55195 MMT of CO2e. If 2.5% of that equipment were electrified by 2030, this would result in a 0.14 MMT annual reduction of CO2e.

10.1.9 Decarbonize Transportation - DT11

Objective	Priority GHG Reduction Strategy
Decarbonize Transportation	Reduce freight vehicle and train idling by managing loading/unloading queues, decreasing the number of at-grade crossings through capital projects, idling control technologies, and modernizing auxiliary power and refrigeration systems.

Measure: Reduce freight locomotive idling emissions by 2.5% by deploying shore power idle reduction units

Estimated reduction: 0.0053 MTTCO2e annually in 2030

Quantifier: CMAP and Drive Clean Indiana

Champion: Drive Clean Indiana

Scope: NIRPC region

Quantification Methodology: This calculation assumes that freight locomotive activity stays flat from 2017 to 2030 within the NIRPC region. NIRPC conducted a mobile emissions inventory that provides emissions rates for a variety of sources, including freight rail locomotives. The 2017 NIRPC mobile emissions inventory concluded freight rail produced 0.21198 MMT of CO2e. If 2.5% of that equipment were electrified by 2030, this would result in a 0.005 MMT annual reduction of CO2e.

10.1.10 Decarbonize Transportation - DT15

Objective	Priority GHG Reduction Strategy
Decarbonize Transportation	Transition gas-powered landscaping equipment to low and zero emissions models.

Measure: Replace gas-powered lawn and garden equipment with zero emissions electric models at this rate 5% of residential mowers; 2% of commercial mowers' and 20% of commercial hand-held equipment (e.g. leaf blowers)

Estimated reduction: 0.04162 MMT COe annually in 2030.

Quantifier: Lake Michigan Air Director's Consortium

Champion: Metropolitan Mayors Caucus

Scope: DuPage, Cook, Kane, Kendall, Lake, McHenry, and Will counties

Quantification Methodology: The calculation assumes the defaults inside the MOVES nonroad model. We used 2020 based emissions to estimate the impact of these programs. LADCO also used emission reduction reports conducted by RAMBOL for ozone planning that were helpful in setting these goals. The MOVES results assumed that we would impact 5% of residential offroad equipment, 20% of commercial handheld equipment, and 2% of commercial mowers and tractors. These changes should result in a 4% reduction in overall lawn and garden or 37,753 tons of CO2 in the metropolitan area.

10.1.11 Reduce Vehicle Miles Traveled- VMT11

Objective	Priority GHG Reduction Strategy
Reduce Vehicle Miles Traveled	Establish a regional network of mobility hubs and expand shared micromobility and electric micromobility systems.

Measure: Replace 35 percent of low-milage SOV trips with electric and/or micromobility trips by 2030.

Quantifier: CMAP

Champion: City of Chicago

Estimated reduction: 0.22 MMT CO2e annually in 2030

Scope: Entire MSA

Measure Justification: The City of Chicago 2022 Climate Action Plan aims to increase shared micro-mobility trips 30% by 2030 and to enable residents to walk, bike, take transit, or use shared micro-mobility by 45% by 2040. Similarly, under Kane County aims, through their Climate Action and

Implementation Plan, to decrease community wide Vehicle Miles Traveled (VMT) by 5% by 2030 and increase public transit commuter ridership from 2.24% to 6.5% by 2030. Additionally, the DOE notes that, in 2021, over 50% of car trips in the U.S. were 3 miles or less (with over half of that percentage being trips under 1 mile). Using this data and local knowledge, a low-milage SOV trip was defined as 2 miles or less.

Calculation Method Description: The CMAP Trip Based Model, which models transportation activity for 12 of the 14 counties within the Chicago MSA, was used to identify the percentage of single occupancy vehicle (SOV) trips that are deemed as "short trips". Short trips were defined as SOV trips that were 2 miles or fewer. The existing short SOV trips served as the baseline scenario while a 35% reduction in these trips was the scenario that was tested. The Bicycle and Pedestrian Improvements tool within the CMAQ emissions calculator toolkit was used to quantify the emissions benefit of this shift. This tool uses emissions rates based on a national scale run of the EPA MOVES model to calculate the emissions benefits of mode shift scenarios. The analysis year (2030) and the daily passenger vehicle trips for both the baseline and reduction scenarios, and the trip distance distributions were entered into the tool. The trip distance distribution of the short trips being considered in this analysis were identified based on results from the CMAP trip based model. Of trips that were 2 miles or fewer in the Chicago MSA region, 40.69% were under 1 mile and 59.31% were between 1 and 2 miles. After entering these inputs into the CMAQ tool, it calculated the daily CO2e emissions benefits of shifting 35% of SOV trips to micromobility or existing transit options by 2030. The final step in this analysis was to scale the results to include the two counties within the Chicago MSA that are not represented within the CMAP Trip Based Model (Newton, IN & Jasper, IN). NEI CO2e on-road emissions for passenger vehicles were used to scale the results for these two counties, as shown in Table 10. Table 10. Mode shift GHG reduction measure quantification.

Daily CO2e Reduction (kg/day)	Annual CO2e Reduction (kg/year)	Annual CO2e Reduction (MMT/year)	Missing County Scaling Factor	Annual CO2e Scaled Reduction (MMT/year)
593,451.85	216,609,924	0.2166	0.126	0.22

10.1.12 Manage Water and Waste Sustainably - W1

Objective	Priority GHG Reduction Strategy
Manage Water and Waste Sustainably	Capture biogas and convert to energy.

Measure: Capture 25% of biogas from publicly owned wastewater treatment in the Chicago MSA and additional landfill biogas and convert to renewable natural gas.

Estimated reduction: 0.12451 MMTCO2e annually in 2027

Quantifier: Strand Associates, Inc

Champion: Chicago-Area Wastewater Utility Consortium

Scope: Entire MSA

Quantification Methodology:

Table 11. Methane Recapture GHG reduction measure quantification.

Chicago-Area Wastewater Utility Consortium - Methane Recapture to Reduce GHG and Replenish Natural Gas Resources

2/23/2024

PCAP Objective: **Manage Water and Waste Sustainably**

PCAP Strategy: **W1: Capture biogas and convert to energy**

Measure: **Capture 25% of biogas from publicy-owned treatment works in the Chicago MSA and additional landfill b**

Entity	Avg. Biogas Produced (CFD)	Current Use (in Plant)	% of Gas Used (Currently)	New NG Purchase (MMBTU/yr)	New Electric Load + Cogen Lost (kW)	New Biodiesel for RNG trucking (gal/yr)	RNG Production (avoided Fosil Nat Gas Production) (MMBTU/yr)	Annual GHG Reduction CO2 eq (MT/yr)	First year of gas production	2025-2030 GHG Reductions (Metric Tons)	2031-2050 GHG Reductions (Metric Tons)	Capital Cost
Fox Metro WRD	600,000	Boilers	40%	46,700	300	-	(131,400)	(3,243)	2026	(16,215)	(64,860)	$ 19,000,000
Wheaton San District	70,000	Boilers	50%	7,600	90	800	(15,300)	(24)	2027	(96)	(480)	$ 7,000,000
DuPage County	110,000	None	0%	-	120	1,150	(24,100)	(768)	2027	(3,072)	(15,360)	$ 9,000,000
Fox River WRD	150,000	Boilers	50%	17,500	140	1,230	(32,900)	(219)	2027	(876)	(4,380)	$ 12,000,000
Kishwaukee WRD	250,000	Cogen	80%	15,300	450	2,300	(54,800)	(318)	2027	(1,272)	(6,360)	$ 10,000,000
Glenbard Wastewater Auth	270,000	Cogen	60%	17,500	350	1,850	(59,100)	(815)	2027	(3,260)	(16,300)	$ 10,000,000
Kenosha Water Utility	222,000	Cogen	98%	17,500	400	3,100	(48,600)	(58)	2027	(232)	(1,160)	$ 10,000,000
Addison, City of	70,000	Boilers	50%	7,600	90	1,080	(15,300)	(22)	2027	(88)	(440)	$ 7,000,000
Mallard Lake Landfill	2,880,000	None	0%	-	1,000	-	(546,600)	(24,851)	2027	(99,404)	(497,020)	$ 40,000,000
Totals	**4,622,000**			**129,700**	**2,940**	**11,510**	**(928,100)**	**(30,318)**		**(124,515)**	**(606,360)**	**$ 124,000,000**

Assumptions

1. Gas proudciton from each facility remains essentially constant over time.
2. Biodiesel will be used for hauling; truck mileage rate is 6.5 miles/gal
3. EPA's simlified GHG calculator was used to estimate GHG emissions from power required, natural gas required, and truck hauling required. A credit toward GHG
4. Capital costs are based on preliminary engineering studies at FMWRD, WSD, and DuPage County. Costs for other faclities are based on RNG system sizing and rela
5. Costs for the landfill RNG system is based on a similar landfill to RNG project in Dane County, Wisconsin.
6. The EPA spreadsheet includes GHG emission reduction estimates for other gases (CO2, N2O, CH4) on the "electricity" tab. Strand has not verifed these calculation

10.1.13 Manage Water and Waste Sustainably - W3

Objective	Priority GHG Reduction Strategy
Manage Water and Waste Sustainably	Increase composting and biological treatment of waste. Utilize energy and biosolid by-products.

Measure: Divert nearly 20% of food waste generated in Cook County annually (over 311,000 tons) by establish food waste reduction, collection, and anaerobic digestion programs.

Estimated reduction: 0.20352 MMTCO2E annually in 2030

Quantifier: Illinois Sustainable Technology Center

Champion: Cook County

Scope: Cook County

Quantification Methodology: Based on 2022 Cook County landfill tonnage data and using the EPA WARM tool to estimate GHG emissions, that Cook County (Suburban Cook County & City of Chicago) transferred an estimated 311,386 tons of food scraps to the landfill in 2022. This landfilled wasted food generated 156,148.32 MTCO2E, converted to 0.20352 MMTCO2E, Table 12.

Table 12. Food waste diversion GHG reduction measure quantification.

Geography	Total Tons of Waste Being Landfilled (tons)	GHG Emissions Generated from Total Tons of Waste Being Landfilled (MTCO2e)	Projected 20% of Food Scraps Being Transferred to Landfills (tons)	Daily Amount of Food Projected going to the Landfill (tons)	Projected GHG Emissions Generated from Food Scraps Being Landfilled (MTCO2e)
Suburban Cook County	764,354	236,356.59	152,870.8	418.8	76,658.93
City of Chicago	792,576	245,083.51	158,515.2	434.3	79,489.39
County wide Totals	**1,556,930**	**481,440.10**	**311,386**	**853.1**	**156,148.32**

11 Appendix B Stakeholder Engagement in Chicago Regional Climate Action Planning (2019-2020)

Organizations Participating

Advanced Renewables LLC	DePaul University Dept. of Public Policy
American Public Works Association	DuPage County Dept. of Stormwater Management
Animalia Project	Ecology and Environment, Inc.
Applied Ecological Services	Elevate
Argonne National Lab, Decision and Infrastructure Sciences Division	Environmental Law and Policy Center
Argonne National Lab, Environmental Science Division	City of Evanston
Village of Arlington Heights	The Field Museum
City of Aurora	First Congregational Church of Western Springs
City of Aurora Sustainability Commission	Foresight Design Initiative
City of Batavia Environmental Commission	Forest Preserve District of Cook County
Baxter & Woodman	Forest Preserve District of Will County
City of Blue Island	City of Fort Lauderdale, FL
Blue Stem	Friends of the Chicago River
Village of Bolingbrook	Gade Environmental Group
Village of Broadview	City of Geneva
Village of Brookfield	Village of Glen Ellyn
Buro Happold Engineering	Village of Glenview
City of Chicago	Global Covenant Mayors for Climate and Energy
Chicago Area Clean Cities Coalition	Global Philanthropy Partnership
Chicago Dept. of Transportation	Go Green Winnetka
Chicago Metropolitan Agency for Planning (CMAP)	Great Lakes Commission
CMAP Citizens' Advisory Committee	Green Diamond, LLC
CMAP Counties Committee	Greenest Region Corps
CMAP Economic Development Committee	Greenleaf Communities
CMAP Environment & Natural Resources Committee	Green Ways 2Go
CMAP Metropolitan Planning Organization Planning Committee	Village of Hanover Park
CMAP Transportation Committee	Harvey Area Chamber of Commerce
Chicago Region Trees Initiative	Village of Hawthorn Woods
Chicago Wilderness, Climate Committee	Village of Hazel Crest
Climate Literacy & Energy Awareness Network	City of Highland Park
CME Group	Village of Hoffman Estates
Collective Resource Compost	Village of Homer Glen, Environment Committee
College of Lake County	Illinois Dept. of Natural Resources (IDNR)

Organizations Participating *continued*

ComEd	IDNR, Coastal Management Program
Cook County Dept. of Environment & Sustainability	Illinois Dept. of Transportation
City of Darien	Illinois Division of U.S. DOT Federal Highway Administration
Village of Deer Park	Illinois Environmental Protection Agency, Office of Energy
Deigan & Associates	Illinois Green Alliance
City of DeKalb Environmental Commission	Illinois State Water Survey
Illinois Sustainable Technology Center	Nicor Gas
Illinois-Indiana Sea Grant	Village of Niles
International Urban Cooperation	Village of Northbrook
Jacobs Engineering Group	Northern Illinois Energy Summits and Expos
Kane County Development Dept.	Northern Illinois University Dept. of Economics
Kane County Farm Bureau	Village of Northfield
Kane County, Division of Environmental and Water Resources	Northwest Municipal Conference
Kishwaukee Water Reclamation District	Northwestern University Center for Engineering Sustainability
Village of La Grange Environmental Quality Commission	and Research
Lake County Administrator's Office	Northwestern University Dept. of Chemical and Biological Engineering
Lake County Forest Preserves	Village of Oak Brook
City of Lake Forest	Village of Oak Park
Village of Lombard	Office of Alderman Michele Smith- 43rd Ward, City of Chicago
Loyola University Chicago School of Environmental Sustainability	Openlands
McHenry County Dept. of Transportation	Village of Oswego
Merritt Connect Inc.	Pace Suburban Bus
Metra	Village of Palos Park
Metro West Council of Government	Village of Park Forest
Metropolitan Mayors Caucus	City of Park Ridge Sustainability Task Force
Metropolitan Planning Council	The Power Bureau
Metropolitan Water Reclamation District of Greater Chicago	Prairie Research Institute
Midwestern Regional Climate Center	Quercus Consulting
Village of Montgomery	Region 1 Planning Council, Rockford
Moraine Valley Community College	The Resiliency Institute
Village of Morton Grove	Village of Richton Park
Village of Mount Prospect	Village of River Forest Sustainability Commission
City of Naperville	Village of Round Lake Beach

Organizations Participating *continued*

Naperville Area Chamber of Commerce	Sustain Libertyville Commission
City of Naperville Environment and Sustainability Task Force	Sustainable Development Strategies Group
National Environmental Modeling and Analysis Center -	The Technology Alliance, Inc.
Fern Leaf Collaborative	TRC Solutions
National Oceanic & Atmospheric Administration	United Nations, Disaster Risk Reduction, ARISE
Natural Resources Defense Council	University of Illinois at Chicago (UIC)
The Nature Conservancy	UIC College of Urban Planning
SCARCE	UIC Energy Initiative
Village of Schaumburg	UIC Office of Sustainability
Seven Generations Ahead	UIC School of Public Health
Shared Use Mobility Center	University of Illinois at Urbana-Champaign (UIUC)
Shedd Aquarium	UIUC College of Law
Solid Waste Agency of Lake County	UIUC Dept. of Atmospheric Sciences
Village of South Barrington	UIUC Dept. of Geography & Geographic Information Science
	University of Virginia McIntire School of Commerce
South Metropolitan Higher Education Consortium	U.S. Environmental Protection Agency
Southwest Conference of Mayors	City of Waukegan
City of St. Charles	Village of Western Springs
St. Charles Natural Resources Commission	Village of Westmont Environmental Improvement Committee
Village of Summit	Will County Dept. of Land Use
Sustain Edgewater	Will County Board
	Will County Emergency Management Agency
	Will County Governmental League
	Village of Winnetka
	Winnetka Environmental and Forestry Commission

All Stakeholder Events for Climate Action Plan for the Chicago Region (2019-2020)

10/8/2019	Regional Climate Planning Kickoff & Mitigation Workshop	MMC/CMAP, Chicago
11/5/2019	CMAP Counties Committee	CMAP, Chicago
11/7/2020	Northern Illinois University Center for Government Studies, 50th Anniversary Conference	DeKalb
11/21/2019	International Urban Cooperation/Global Covenant of Mayors City to City Event	Brussels, Belgium
12/9/2019	MMC Environment Committee- Regional Climate Action Planning Meeting at the Global Congress for Climate Change and Sustainability Professionals	The Westin Chicago Northwest, Itasca
1/9/2020	CMAP Environment & Natural Resources Committee	CMAP, Chicago
1/21/2020	MMC Environment Committee- Regional Climate Action Planning Workshop	Village of Montgomery, Village Hall
1/27/2020	CMAP Economic Development Committee	CMAP, Chicago
2/7/2020	Growing Sustainable Communities Together conference	Prairie State College, Chicago Heights
2/10/2020	National Conference of Regions	Washington, DC
3/10/2020	CMAP Citizens' Advisory Committee	CMAP, Chicago
3/12/2020	CMAP MPO Planning Committee	CMAP, Chicago
5/22/2020	CMAP Transportation Committee	Remote
5/22/2020	Webinar 1- A Chicago Regional Climate Plan- Overview & Status	Webinar
5/29/2020	Webinar 2- Climate Impacts & Hazards	Webinar
6/5/2020	Webinar 3- Climate Risk and Vulnerability at the Nexus of Equity, Health, Public Works,	Webinar
	& Planning	
6/12/2020	Webinar 4- Regional Climate Adaptation Planning & Prioritization Virtual Workshop	Webinar
9/23/2020	GreenTown conference	Webinar
10/22/2020	MMC Environment Committee- Regional Climate Plan Preview	Remote
12/3/2020	4th City-to-City International Urban Cooperation Event	Remote

12 Appendix C: Greenhouse Gas Inventory Methodology and Documentation

This section documents the methodology used to develop the 2020 Chicago MSA greenhouse gas (GHG) emissions inventory and the process and results of executing the QAPP. The Chicago MSA is defined as nine counties in Illinois, Cook, DuPage, Kane, Kendall, Lake, McHenry, Will, DeKalb, and Grundy, four counties in Indiana, Newton, Jasper, Porter, and Lake, and one county in Wisconsin, Kenosha County. The EPA tool, Local Greenhouse Gas Inventory Tool (LGGIT), was used to produce emissions for this inventory. For each sub-sector, this document describes the methodologies and data sources used to develop the inventory estimates. Following the inventory methodology, the results from the QAPP process are also provided.

12.1.1 Data Sources

Table 1 provides a summary of the data source and quality for each sector. **Table 1. Data sources and quality for each GHG emission sector.**

Sector	Source	Data Quality
Transportation	National Emissions Inventory	High
Residential: Natural Gas	DOE/NREL SLOPE Tool	High
Residential: Electricity	DOE/NREL SLOPE Tool	High
Commercial: Natural Gas	DOE/NREL SLOPE Tool	High
Commercial: Electricity	DOE/NREL SLOPE Tool	High
Industrial: Natural Gas	DOE/NREL SLOPE Tool	High
Industrial: Electricity	DOE/NREL SLOPE Tool	High
Industrial: Processes	GHGRP	High
Agriculture and Land Management	EPA State Inventory Tool (SIT) scaled with USDA cropland acreage	High
Solid Waste	EPA FLIGHT Tool/GHGRP	High
Wastewater	Local reported data from Metropolitan Water Reclamation District (MWRD) scaled with population data from the US Census.	Medium
Carbon Sinks	Tree canopy data from U.S. Department of Agriculture tool, i-Tree. Land use data from Replica.	Medium

12.1.2 Process

Stationary-Energy and Electricity Data

Stationary Energy encompasses emissions from natural gas and electricity within residential, commercial and institutional, and industrial buildings. The following steps will detail how the data was collected, refined, and entered into the GHG inventory tool.

1. **Step 1:** Use the SLOPE Data Viewer, which contains nationwide electricity and natural gas consumption data. These data are disaggregated by economic sector (residential, commercial, and industrial).

2. **Step 2:** Filter data for the Inventory analysis year, 2020.
3. **Step 3:** Filter the data to include only the counties listed below.
    - i. IL – Cook
    - ii. IL – DeKalb
    - iii. IL – DuPage
    - iv. IL – Grundy
    - v. IL – Kane
    - vi. IL – Kendall
    - vii. IL – Lake
    - viii. IL – McHenry
    - ix. IL – Will
    - x. IN – Jasper
    - xi. IN – Lake
    - xii. IN – Newton
    - xiii. IN – Porter
    - xiv. WI – Kenosha
4. **Step 4:** Use the conversion factors listed below in Table 2 to convert SLOPE outputs in MMBtu to the required unit for entry into the LGGIT inventory tool.

Table 2. Conversion factors to convert SLOPE energy outputs, which are reported in millions of British thermal units (MMBtu) to metric cubic feet (mcf) for natural gas consumption and kilowatt hours (kWh) for electricity consumption.

Energy Source	SLOPE Units	Community Module Units	Conversion Factor
Natural Gas Consumption	MMBtu	mcf	0.9643 mcf/1 MMBtu
Electricity Consumption	MMBtu	kWh	293.07 kWh/1 MMBtu

5. **Step 5:** Emissions from natural gas were entered into the inventory tool under the Stationary-Entry tab and can be found on the Stationary-Data tab. Data was entered into the LGGIT tool by county and sector.

Transportation Data

Transportation data were collected using 2020 NEI data. Due to limitations of the LGGIT tool, the NEI results were entered into the "Additional Emission Sources" tab instead of the mobile entry tab within the tool. The transportation data includes the following subsectors: on-road transportation, non-road transportation, locomotives, and commercial marine vessels.

a. **Step 1:** Access the 2020 NEI data retrieval tool website.
b. **Step 2:** Select the following criteria
    - **i. States:**
        1. Illinois
        2. Indiana
        3. Wisconsin
    - **ii. Counties:**
        1. IL – Cook

2. IL – DeKalb
3. IL – DuPage
4. IL – Grundy
5. IL – Kane
6. IL – Kendall
7. IL – Lake
8. IL – McHenry
9. IL – Will
10. IN – Jasper
11. IN – Lake
12. IN – Newton
13. IN – Porter
14. WI – Kenosha

c. **Step 3:** Select GHG as pollutant. NEI GHG's include Carbon Dioxide (CO2), Methane (CH4), and Nitrous Oxide (N2O).

d. **Step 4:** Filter out non transportation emissions. Select the following EIS sectors:
   i. Mobile – Commercial Marine Vessels
   ii. Mobile – Locomotives
   iii. Mobile – Non-Road Equipment – Diesel
   iv. Mobile – Non-Road Equipment – Gasoline
   v. Mobile – Non-Road Equipment – Other
   vi. Mobile – On-Road Diesel Heavy Duty Vehicles
   vii. Mobile – On-Road Diesel Light Duty Vehicles
   viii. Mobile – On-Road non-Diesel Heavy Duty Vehicles
   ix. Mobile – On-Road non-Diesel Light Duty Vehicles

e. **Step 5:** Export the selected data

f. **Step 6:** Convert NEI data to Metric Tons (MT) NEI provides emissions in short tons so they need to be converted to Metric Tons using the following conversion factor -- 0.907185 MT/1 short ton.

g. **Step 7:** Convert NEI data to CO2e. NEI emissions are reported for three GHG pollutants, CO2, CH4, and N2O, see Table 3.

Table 3. Conversion factors for three GHG pollutants to CO2e

GHG Conversion	Global Warming Potential V5 Conversion Factor
Carbon Dioxide (CO2) to CO2e	1
Methane (CH4) to CO2e	28
Nitrous Oxide (N2O) to CO2e	265

h. **Step 8:** Separate NEI data into sectors

i. **Step 9:** Input data into Additional Emission Sources tab.

Solid Waste Data

a. **Step 1:** Create a comprehensive list of landfills within the Chicago MSA region using the US EPA FLIGHT tool. This tool provides emissions in CO2e, however, these values were converted using the global warming potential values The following filters were applied to the tool to identify landfills within the MSA region

   i. Data Year: 2020
   ii. Browse to a State: Illinois
   iii. Pick a Metro Area: Chicago-Naperville-Elgin, IL-IN-WI
      1. This will include all landfills within the MSA region, not just those within Illinois.
   iv. Sector: Waste (deselect Wastewater Treatment)

b. **Step 2:** Data was exported: describe process of selecting landfills within the Chicago MSA region.
c. **Step 3:** Each landfill report was examined to determine Methane, CO2, and NO2 emissions. These data are reported in CO2e and are converted using GWP 4 rates within the FLIGHT tool. GWP values provide a conversion rate to translate different pollutants into a standard CO2e value. Because the inventory being described used GWP 5 rates, these values all needed to be converted back to raw emissions using the GWP 4 rates and then converted back to CO2e using the GWP 5 rates. These rates are shown in the table below.

Table 4. Conversion factors for three GHG pollutants to CO2e

Pollutant	Global Warming Potential Fourth Assessment Factors	Global Warming Potential Fifth Assessment Factors
Carbon Dioxide (CO2)	1	1
Methane (CH4)	28	25
Nitrous Oxide (N2O)	265	298

d. **Step 4:** Converted FLIGHT raw emissions to CO2e emissions using GWP V5 values.
e. **Step 5:** Landfills were summarized by the county they were located in and were entered into the spreadsheet tool in the solid waste entry tab.

Wastewater Data

a. **Step 1:** Wastewater emissions were estimated based on results from the [CMAP 2019 GHG Inventory](). This inventory, which contains seven of the fourteen counties within the Chicago MSA region, calculated wastewater emissions based on biogas consumption emissions at the wastewater treatment plants in the region, as provided directly by the Metropolitan Water Reclamation District (MWRD) wastewater treatment plants in the region. Electricity and natural gas usage from these plants were included within the stationary energy sections of the inventory.
b. **Step 2:** MWRD provided CH4 and N2O emissions data. For counties included in both the Chicago MSA Inventory and the CMAP 2019 Inventory, the rates from the 2019 CMAP inventory were kept. For counties not included in the CMAP 2019 inventory, the data from MWRD was used to calculate emissions per million gallons of wastewater treated per person for the CMAP region. These CMAP per population rates were then used to calculate wastewater emissions from biogas emissions for the counties not included in the CMAP 2019 inventory.
c. **Step 3:** Wastewater data was converted to MT C02e and were entered into the spreadsheet tool under Additional Emission Sources.

Agriculture and Land Management Data

a. **Step 1:** Obtain state-level fertilizer data from the State Inventory Tool Agriculture Module. Fertilizers consumption data at the state level is available from the State Inventory Tool (SIT) Agriculture Module. The SIT Modules can be downloaded here. This dataset lists total nitrogen consumption in metric tons by state on the FertilzerData tab.

b. **Step 2:** Fertilizer data is reported in fertilizer years, so we need to convert this to calendar years. The Tennessee Valley Authority estimates that 35% of fertilizer consumption occurs from July to December and 65% from January to June. However, values for the two years using the calendar year of 2020 and 2019 are the same, so this does not impact the analysis.
   i. $Fertilizer_{total}$ = (Year 1 Fertilizer t_m * 35%) + (Year 2 Fertilizer t_m * 65%)
   ii. Where:
      1. $Fertilizer_{total}$: total amount of fertilizer applied during the calendar year
      2. Year 1 Fertilizer t_m: total amount of fertilizer applied during Year 1 fertilizer year
      3. Year 2 Fertilizer t_m: total amount of fertilizer applied during Year 2 fertilizer year
      4. t_m: metric tons
   iii. Illinois: 937,962 = (937,962 * 35%) + (937,962 * 65%)
   iv. Indiana: 460,067 = (460,067 * 35%) + (460,067 * 65%)
   v. Wisconsin: 321,396 = (321,396 * 35%) + (321,396 * 65%)

c. **Step 3:** Convert from metric tons to short tons to enter into the Community Greenhouse Gas Tool.
   i. $Fertilizer_{total}$ = Fertilizer t_m / 0.9072
   ii. Where:
      1. $Fertilizer_{total}$: total amount of fertilizer applied, from all sources
      2. t_s: short tons
      3. t_m: metric tons
      4. 0.9072: the conversion factor for metric tons to short tons
   iii. Illinois: 1,033,909 t_s = 937,962 t_m / 0.9072
   iv. Indiana: 507,128 t_s = 460,067 t_m / 0.9072
   v. Wisconsin: 354,273 t_s = 321,396 t_m / 0.9072

d. **Step 4:** Calculate the consumption of each fertilizer type. So far, we have established statewide fertilizer usage across all types of fertilizers. The following formulas will calculate the consumption of synthetic fertilizer, manure, and organic fertilizer.
   i. Calculating Consumption of Fertilizer, Synthetic N (short tons)
      1. $Fertilizer_{synthetic}$ = Fertilzer t_s * 99.75%
      2. Where:
         a. $Fertilizer_{synthetic}$: amount of synthetic fertilizer applied, from total fertilizer (short tons).
         b. 99.91%: percentage of synthetic nitrogen fertilizer in total fertilizer.
      3. Illinois: 1,031,357 = 1,033,909 * 99.75%
      4. Indiana: 505,876 = 507,128 * 99.75%
      5. Wisconsin: 353,398 = 354,273 * 99.75%
   ii. Calculating Consumption of Fertilizer, Manure (short tons)
      1. $Fertilizer_{manure}$ = Fertilizer t_s * 0.01%
      2. Where:
         c. Fertilizer manure: amount of manure applied, from total fertilizer.
         d. 0.01%: Percentage dried manure fertilizer in total fertilizer.
      3. Illinois: 60 = 1,033,909 * 0.01%

4. Indiana: 30 = 507,128 * 0.01%
5. Wisconsin: 21 = 354,273 * 0.01%

iii. Calculating Consumption of Fertilizer, Activated Sewage Sludge (short tons)

1. $Fertilizer_{organic}$ = Fertilizer t_s * 0.15%
2. Where:
   e. $Fertilizer_{organic}$: amount of activated sewage sludge fertilizer applied, from total fertilizer
   f. 0.05% : percentage of (organic) sewage sludge in fertilizer
3. Illinois: 1,603 = 1,033,909 * 0.15%
4. Indiana: 786 = 507,128 * 0.15%
5. Wisconsin: 549 = 354,273 * 0.15%

iv. Calculating Consumption of Fertilizer, Other Organic Materials (short tons)

1. $Fertilizer_{other}$ = Fertilizer t_s * 0.09%
2. Where:
   g. $Fertilizer_{other}$: amount of other fertilizer applied (e.g., compost), from total fertilizer.
   h. 0.09% : percentage of other fertilizer
3. Illinois: 889 = 1,033,909 * 0.09%
4. Indiana: 436 = 507,128 * 0.09%
5. Wisconsin: 305 = 354,273 * 0.09%

e. **Step 5: Downscale state-level data to the county level.** After state-level data are calculated, it needs to be downscaled to the county level. To do this, state-level fertilizer consumption estimates were multiplied by the proportion of state cropland acreage found within each of the counties in the Chicago MSA region. Total cropland acres in each county and state can be downloaded from the U.S. Department of Agriculture (USDA)'s QuickStats database.

i. Scaling State-Level Fertilizer Data to the County Level

1. $Fertilizer_{county}$ = (Cropland $acres_{county}$ / Cropland $acres_{state}$) * $Fertilizer_{state}$
2. Where:
   a. Cropland $acres_{county}$: total cropland acreage per selected county, from USDA QuickStats
   b. Cropland $acres_{state}$: total cropland acreage per selected state, from USDA QuickStats
   c. $Fertilizer_{state\ fertilizer\ type}$: total fertilizer consumption per fertilizer type (synthetic, organic, manure) per selected state, from SIT Agriculture Module.

Table 5. Estimated Short Tons of Fertilizer by County

County, State	Cropland Acres$_{county}$	Cropland acres$_{state}$	Short Tons Fertilizer$_{state}$	Short Tons Fertilizer$_{county}$
Cook, IL	10,763	24,003,086	1,033,909	464
DeKalb, IL	362,602	24,003,086	1,033,909	15,619
DuPage, IL	1,643	24,003,086	1,033,909	71
Grundy, IL	224,916	24,003,086	1,033,909	9,688
Kane, IL	161,894	24,003,086	1,033,909	6,973
Kendall, IL	133,626	24,003,086	1,033,909	5,756
Lake, IL	23,883	24,003,086	1,033,909	1,029
McHenry, IL	189,679	24,003,086	1,033,909	8,170
Will, IL	208,158	24,003,086	1,033,909	8,966
Jasper, IN	251,565	12,909,673	507,128	9,882
Lake, IN	106,022	12,909,673	507,128	4,165
Newton, IL	161,348	12,909,673	507,128	6,338
Porter, IL	114,702	12,909,673	507,128	4,506
Kenosha, WI	65,214	10,085,021	354,273	2,291
TOTAL	--	--	--	**83,917**

f. **Step 6:** Enter fertilizer consumption data into the tool.

Industrial Processes

a. **Step 1:** Industrial process emissions are reported to the EPA and are available for download via the GHG reporting program. There are two relevant reports that needed to be downloaded, the sector information and the subpart summary information. The sector information report provides greenhouse gas information displayed by reporting sectors. The Subpart information report provides greenhouse gas information displayed by the subpart that a facility reports under.
b. **Step 2:** Subpart Information Summary
    i. **Choose a Subject Area:** Subpart Information
    ii. **Select Fields:** Select All
    iii. **Add Search Criteria:** Add search criteria for state abbreviation and reporting year.
        1. State Abbreviations should include Illinois, Wisconsin, and Indiana
        2. Reporting Year filter should be set to 2020
    iv. Export to CSV
c. **Step 3:** Sector Summary Information
    i. **Choose a Subject Area:** Sector Summary Information
    ii. **Choose a Table:** V_GHG_Emitter_Sector
    iii. **Select Fields:** Select All
    iv. **Add Search Criteria:** Add search criteria for state abbreviation and reporting year.
        1. State Abbreviations should include Illinois, Wisconsin, and Indiana
        2. Reporting Year filter should be set to 2020
    v. Export to CSV

d. **Step 3:** Review both downloaded files and filter out data for counties that are not included in the Chicago MSA region.
e. **Step 4:** A sector mapping crosswalk was developed for the 2019 CMAP GHG Inventory and this resource was utilized for this inventory. The crosswalk can be found on the CMAP_Sector_Lookup tab of the Chicago_MSA_GHGRP_Data.xlsx.
    i. Due to the larger geography of this inventory, several subsectors were not included within the crosswalk. These were added to the existing CMAP Sector Mapping crosswalk and are now included on the CMAP_Sector_Lookup tab.
f. **Step 5:** Emissions were summarized by County for the following sectors
    i. Power Plant Emissions
    ii. Natural Gas Refineries
    iii. Petroleum Refining
    iv. Petroleum and Natural Gas Systems
    v. Hydrogen Production
    vi. Ethanol Production
    vii. Iron and Steel Production
    viii. Petrochemical Production
    ix. Lime Production
    x. Glass Production
    xi. Zinc Production
    xii. Food Processing
    xiii. Manufacturing (Auto)
    xiv. Military
    xv. Other Chemicals
    xvi. Other Metals (not including Iron and Steel)
    xvii. Other Minerals
    xviii. Pulp and Paper Production
g. **Step 6:** Emissions were entered into the GHG Inventory tool in CO2e

Carbon Sinks

a. Step 1: Carbon sinks are represented by tree coverage within this inventory. Tree coverage data comes from the U.S. Department of Agriculture tool, i-Tree. I-Tree is a peer reviewed database that provides urban and rural forestry analysis and benefits assessment tools. The first step was to obtain county level tree canopy coverage from i-tree tools. The counties selected are listed below:
    a. Cook, IL
    b. DeKalb, IL
    c. DuPage, IL
    d. Grundy, IL
    e. Kane, IL
    f. Kendall, IL
    g. Lake, IL
    h. McHenry, IL
    i. Will, IL
    j. Jasper, IN
    k. Lake, IN
    l. Newton, IL

m. Porter, IL
n. Kenosha, WI

b. **Step 2:** The next three steps do not require any additional user action. The final step within the tool will generate a report. Users should select the following criteria to produce a report with tree canopy coverage by counties:
   a. **Report Type:** Executive Summary
   b. **Report Element:** Canopy and Impervious
   c. The following report, showing tree canopy coverage by county, is the result.
      i. http://landscape.itreetools.org/report/48a4e664-dcca-4f63-a186-39e321b144c6/executive-summary

c. **Step 4:** Obtain land use data by County from Replica. This land use dataset provides area in square feet for fifteen distinct land use categories. This inventory only considers residential, commercial/institutional, industrial, and energy generation as categories, so each of the land use categories needed to be assigned to one of these four categories. Table 6 provides the crosswalk that was used.

Table 6. Land use category crosswalk

Replica Land Use Category	Chicago 2020 MSA Inventory Sector
Single Family	Residential
Multi Family	Residential
Retail	Commercial/Institutional
Office	Commercial/Institutional
Non Retail Attraction	Commercial/Institutional
Mixed Use	Residential
Industrial	Industrial
Civic/Institutional	Commercial/Institutional
Education	Commercial/Institutional
Healthcare	Commercial/Institutional
Utilities	Energy Generation
Open Space	Split*
Agriculture	Industrial
Other	Split*
Unknown	Split*

*Land use categories with no clear connection to an existing inventory sector were split evenly among the existing sectors.

d. Step **5:** Calculate the percentage of land attributed to the four inventory sectors for each county as well as the percentage of area in each county that is covered by tree canopy coverage.

Table 7. Estimates of tree canopy coverage by county

County, State	Canopy Coverage %	Residential Area Share	Commercial/ Institutional Area Share	Industrial Area Share	Energy Generation Share
McHenry, IL	18.6%	45.2%	4.8%	49.1%	0.9%

Kane, IL	15.7%	43.0%	11.0%	43.3%	2.7%
Newton, IN	8.4%	35.2%	14.9%	35.1%	14.7%
Jasper, IN	7.9%	39.8%	15.1%	29.9%	15.2%
Cook, IL	16.7%	55.1%	22.3%	14.0%	8.6%
DeKalb, IL	2.5%	25.2%	2.0%	72.0%	0.8%
Kendall, IL	8.1%	40.0%	2.8%	56.6%	0.5%
Porter, IN	18.1%	50.0%	5.7%	42.1%	2.3%
DuPage, IL	26.3%	58.6%	23.9%	10.7%	6.9%
Lake, IL	10.3%	59.4%	19.1%	18.2%	3.3%
Kenosha, WI	5.1%	54.0%	11.2%	32.5%	2.3%
Lake, IN	14.0%	36.8%	10.1%	47.8%	5.3%
Grundy, IL	6.3%	22.7%	2.2%	74.4%	0.7%
Will, IL	14.0%	43.1%	8.8%	45.4%	2.6%

e. **Step 6:** Use these percentages to determine the total tree canopy coverage area (in sqft) for each county.

Step 7: The required input for the inventory tool was total area of tree canopy coverage by sector in km2. The following conversion rate was used to convert the tree canopy coverage in sqft to km2 – 10,763,900 / 1 Km2.

f. **Step 8:** Enter tree canopy coverage data into the inventory tool.

12.1.3 Quality Assurance Project Plan Process and Results

As required, CMAP developed a Quality Assurance Project Plan (QAPP) that outlined the process for reviewing the development of the GHG inventory for quality assurance purposes. The following section outlines the process for performing the QAPP and provides the results by sector/emission source.

Mobile Sources

As described above, mobile sources in this inventory were collected from the U.S. National Emissions Inventory. This dataset is considered of the highest quality rank in terms of data quality. The methodology used to gather this data and enter it into the inventory tool also followed EPA guidance.

Data was collected twice, once when it was entered into the inventory tool and then a second time, following the instructions noted in the mobile sources section above, to ensure that no errors were made in collecting, cleaning, and entering the data into the inventory tool. This analysis resulted in an exact match to the inventory entry.

Mobile emissions were also compared to the 2019 CMAP Greenhouse Gas Inventory and a variance between the two inventories for the overlapping areas, Table 8. Only the seven MSA counties covered within the CMAP 2019 GHG Inventory were compared.

Table 8. Comparison between mobile GHG emissions in the Chicago MSA 2020 GHG Inventory for the counties within the CMAP region and CMAP's 2019 GHG inventory.

Subsector	MSA GHG Inventory (MT CO2e) for CMAP Counties	CMAP 2019 GHG Inventory (MT CO2e)	Variance
On-Road Mobile Emissions	25,825,978	29,506,123	-12.5%
Non-Road Mobile Emissions	3,936,888	3,626,269	8.6%
All Other Mobile Emissions*	566,668	912,269	-37.9%

*All Other Mobile Emissions included emissions from locomotives and marine vessels.

All these subsectors were within the stated variance within the MSA QAPP. It is important to note that there while all three of these subsectors fall within the stated variance goals within the MSA QAPP, emissions from locomotives and marine vessels are larger than other comparisons. This is primarily tied to additional emissions from marine vessels within the CMAP 2019 GHG Inventory. These differences should be noted and considered for future analysis.

Electric Power Consumption

As described above, electric power consumption in this inventory were derived from the EPA tool SLOPE, which provides power consumption estimates by county. Data for this section were collected twice, once when it was entered into the inventory tool and then a second time, following the instructions noted in the stationary energy section above, to ensure that no errors were made in collecting, cleaning, and entering the data into the inventory tool. This analysis resulted in an exact match to the inventory entry.

Electricity consumption emissions were compared to the 2019 CMAP Greenhouse Gas Inventory and a variance between the two inventories for the overlapping areas, Table 9. Only the seven MSA counties covered within the CMAP 2019 GHG Inventory were compared.

Table 9. Comparison between electric power GHG emissions in the Chicago MSA 2020 GHG Inventory for the counties within the CMAP region and CMAP's 2019 GHG inventory.

Subsector	MSA GHG Inventory (MT CO2e) for CMAP Counties	CMAP 2019 GHG Inventory (MT CO2e)	Variance
Residential Electricity	10,317,241	9,837,890	4.9%
Commercial Electricity	20,744,914	20,367,940	1.9%
Industrial Electricity	8,734,420	7,907,887	10.5%

Natural Gas Consumption

As described above, natural gas emissions in this inventory were derived from the EPA tool, SLOPE, which provides power consumption estimates by county.

Data for this section were collected twice, once when it was entered into the inventory tool and then a second time, following the instructions noted in the stationary energy section above, to ensure that no errors were made in collecting, cleaning, and entering the data into the inventory tool. This analysis resulted in an exact match to the inventory entry.

Natural Gas consumption emissions were compared to the 2019 CMAP Greenhouse Gas Inventory and a variance between the two inventories for the overlapping areas, Table 10. Only the seven MSA counties covered within the CMAP 2019 GHG Inventory were compared.

Table 10. Comparison between natural gas GHG emissions in the Chicago MSA 2020 GHG Inventory for the counties within the CMAP region and CMAP's 2019 GHG inventory.

Subsector	MSA GHG Inventory (MT CO2e) for CMAP Counties	CMAP 2019 GHG Inventory (MT CO2e)	Variance
Residential Natural Gas	16,267,367	17,265,623	-5.8%
Commercial Natural Gas	13,008,443	11,951,341	8.8%
Industrial Natural Gas	5,046,982	5,127,403	-1.6%

Solid Waste

As described above, solid waste emissions in this inventory were derived from the US EPA tool, FLIGHT, which provides emissions information for large point sources, such as landfills.

Data for this section were collected twice, once when it was entered into the inventory tool and then a second time, following the instructions noted in the solid waste section above, to ensure that no errors were made in collecting, cleaning, and entering the data into the inventory tool. This analysis resulted in an exact match to the inventory entry.

Solid waste emissions were compared to the 2019 CMAP Greenhouse Gas Inventory and a variance between the two inventories for the overlapping areas, Table 11. Only the seven MSA counties covered within the CMAP 2019 GHG Inventory were compared.

Table 11. Comparison between solid waste GHG emissions in the Chicago MSA 2020 GHG Inventory for the counties within the CMAP region and CMAP's 2019 GHG inventory.

Subsector	MSA GHG Inventory (MT CO2e) for CMAP Counties	CMAP 2019 GHG Inventory (MT CO2e)	Variance
Solid Waste	525,115	461,051	12.2%

Wastewater

As described above, wastewater emissions in this inventory were derived from the 2019 CMAP GHG Inventory. It should be noted that this is the same inventory that has been used to determine the variance for the QA/QC process. As a result, the variance for this sector is 0%.

Data for this section were collected twice, once when it was entered into the inventory tool and then a second time, following the instructions noted in the solid waste section above, to ensure that no errors were made in collecting, cleaning, and entering the data into the inventory tool. This analysis resulted in an exact match to the inventory entry, Table 12. Only the seven MSA counties covered within the CMAP 2019 GHG Inventory were compared.

Table 12. Comparison between wastewater GHG emissions in the Chicago MSA 2020 GHG Inventory for the counties within the CMAP region and CMAP's 2019 GHG inventory.

Subsector	MSA GHG Inventory (MT CO2e) for CMAP Counties	CMAP 2019 GHG Inventory (MT CO2e)	Variance

Wastewater	71,337	71,337	0%

Agriculture and Land Management

As described above, Agriculture and Land Management emissions in this inventory were derived from scaled state inventory data.

Data for this section were collected twice, once when it was entered into the inventory tool and then a second time, following the instructions noted in the solid waste section above, to ensure that no errors were made in collecting, cleaning, and entering the data into the inventory tool. This analysis resulted in an exact match to the inventory entry, Table 13.

Table 13. Comparison between agriculture and land management GHG emissions in the Chicago MSA 2020 GHG Inventory and the MSA GHG QC Inventory.

Subsector	MSA GHG Inventory (MT CO2e) for CMAP Counties	MSA GHG Inventory QC Entry	Variance
Agriculture and Land Management	71,337	71,337	0%

Industrial Processes

As described above, Industrial process emissions in this inventory were derived from the GHG reporting program.

Data for this section were collected twice, once when it was entered into the inventory tool and then a second time, following the instructions noted in the industrial process section above, to ensure that no errors were made in collecting, cleaning, and entering the data into the inventory tool. This analysis resulted in an exact match to the inventory entry, Table 14. Only the seven MSA counties covered within the CMAP 2019 GHG Inventory were compared.

Table 14. Comparison between industrial processes GHG emissions in the Chicago MSA 2020 GHG Inventory for the counties within the CMAP region and CMAP's 2019 GHG inventory.

Subsector	MSA GHG Inventory (MT CO2e) for CMAP Counties	CMAP 2019 GHG Inventory (MT CO2e)	Variance
Fugitive Emissions and Energy Industry Emissions	4,406,869	3,556,287	23.8%

Both the fugitive emissions and energy industry subsectors were within the stated variance within the MSA QAPP. It is important to note that there while all three of these subsectors fall within the stated variance goals within the MSA QAPP, there are still significant differences between the two inventories, despite similar sources and methodologies. Specific facilities were examined and compared as part of the QA process to determine if specific plants were responsible for the increase in emissions from the CMAP 2019 inventory to the 2020 MSA inventory. Several facilities, such as the Lemont Refinery in Will County, Illinois were identified as having significantly higher emissions in 2020 than 2019, as reported to the GHGRP.

Emissions from other industrial processes, such as metal and glass production were not included in the 2019 CMAP GHG Inventory and thus, cannot be used for QC. These emissions were compared to the independently gathered information from the same source and resulted in an exact match of the industrial process emissions reported in the 2020 MSA GHG Inventory.

13 Appendix D: LIDAC identification process

CMAP reviewed the Climate Pollution Reduction Grant technical guidance and corresponding materials to understand the methodology used in the Climate and Economic Justice Screening Tool (CEJST) and EJScreen.[21,22] The U.S. EPA recommends following LIDAC definition which is provided in a combined map. [23]

- Any census tract that is included as disadvantaged in CEJST; and/or,
- Any census block group that is at or above the 90th percentile for any of EJScreen's supplemental indexes when compared to the nation or state, and/or any geographic area within Tribal lands and indigenous areas as included in EJScreen.

The Climate and Economic Justice Screening Tool (CEJST)

CEJST is an interactive map that identifies disadvantaged communities at the Census tract level based on indicators of burdens in eight categories: climate change, energy, health, housing, legacy pollution, transportation, water and wastewater, and workforce development.[24] To qualify as disadvantaged, one of the burden indicators must exceed the 90th percentile. Developed by the Council on Environmental Quality in response to Executive Order 14008: Tackling the Climate Crisis at Home and Abroad,[25] the tool is intended to be used for federal programs covered by the Justice40 Initiative. Justice40 seeks to deliver 40 percent of the benefits of investments in climate, clean energy, and related areas to disadvantaged communities.

EJScreen and its supplemental indexes

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[21] U.S. EPA Office of Air and Radiation, 2023, "Benefits Analyses: Low-Income and Disadvantaged Communities, Climate Pollution Reduction Grants Program: Technical Reference Document for States, Municipalities, and Air Pollution Control Agencies," available at https://www.epa.gov/system/files/documents/2023-05/LIDAC%20Technical%20Guidance%20-%20Final_2.pdf

[22] The 1.0 version of CEJST, which is the current version, was released on November 2, 2022. Details on the datasets used and years associated with that data can be found at: https://screeningtool.geoplatform.gov/en/methodology. The most recent update of EJScreen was in June 2023. Details on that update, including datasets used and years associated with that data can be found here: https://www.epa.gov/ejscreen/ejscreen-change-log.

[23] CMAP used the U.S. EPA Inflation Reduction Act Disadvantaged Communities Map, which combines CEJST and EJScreen Supplemental Indexes into one footprint for relevant IRA programs and analyses. Available at: https://www.epa.gov/environmentaljustice/inflation-reduction-act-disadvantaged-communities-map

[24] Council on Environmental Quality, Climate and Economic Justice Screening Tool, available at https://screeningtool.geoplatform.gov/en/#3/33.47/-97.5

[25] Executive Order 14008: Tackling the Climate Crisis At Home and Abroad, available at https://www.federalregister.gov/documents/2021/02/01/2021-02177/tackling-the-climate-crisis-at-home-and-abroad#p-151

EJScreen is U.S. EPA's environmental justice mapping and screening tool.[26] The 13 supplemental indexes combine environmental indicators with demographic socioeconomic indicators, to show how an area compares to the state, EPA region, or nation in terms of environmental justice. The five-factor supplemental demographic index averages the following factors: percent low-income, percent unemployed, percent limited English speaking, percent less than high school education, and low life expectancy.[27] The purpose of this methodology is to display areas with the highest intersection between socioeconomic factors and the given environmental indicator.

Why use both tools to identify low-income and disadvantaged communities?

EJScreen operates at the census block group level, which is at a finer geographic scale than CEJST, which operates at the census tract level (census tracts, which are typically subdivisions of counties, contain block groups, which are groups of blocks within tracts).[28] EJScreen ensures that smaller areas (especially those within non-disadvantaged areas) can still be identified as disadvantaged. Generally, EJScreen's supplemental indexes provide a focused view of environmental justice across communities, while CEJST provides a broader view of burdens relevant to climate and economic justice. In tandem, they can guide implementation of PCAP measures that will deliver key co-benefits that address climate, economic, and environmental impacts in overly burdened communities.[29]

Identifying LICADs

An initial review of the screening criteria shows that only the first 7 of the 13 EJScreen supplemental indexes are likely to impacted by the PCAP's greenhouse gas emissions reduction measures (Table 1).CMAP conducted an additional review of block groups that are only identified as disadvantaged based on the remaining EJScreen supplemental indexes (8-13).[30] This additional analysis indicated that only a small percentage of the overall LIDACs were identified via these indexes alone. CMAP concluded that using all the EJScreen supplemental indexes in the LIDAC definition would help identify the greatest number of communities most in need of investment.

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[26] U.S. EPA, EJScreen: Environmental Justice Screening and Mapping tool, available at: https://www.epa.gov/ejscreen/ej-and-supplemental-indexes-ejscreen

[27] The 13 Supplemental Indexes differ from the Environmental Justice Index in that the Supplemental Indexes use a five-factor demographic index, as opposed to the two-factor demographic index used by the Environmental Justice Index (which only averages low income and people of color populations). The five-factor demographic index provides a more comprehensive picture of the characteristics and vulnerabilities of a community.

[28] Details and definitions on tracts and block groups can be found in the U.S. Census Bureau glossary: https://www.census.gov/programs-surveys/geography/about/glossary.html#par_textimage_4

[29] U.S. EPA Inflation Reduction Act Disadvantaged Communities Map combines CEJST and EJScreen Supplemental Indexes into one footprint for relevant IRA programs and analyses. Available at: https://www.epa.gov/environmentaljustice/inflation-reduction-act-disadvantaged-communities-map

[30] Only 69 census block groups were identified by EJScreen Supplemental Indexes 8-13 alone, compared to the nearly 3,000 census block groups identified via CEJST and EJ Screen Supplemental Indexes 1-7.

Table 1. Supplemental indexes in EJScreen

Supplemental Indexes	
1	Particulate matter 2.5
2	Ozone
3	Diesel particulate matter
4	Air toxics cancer risk
5	Air toxics respiratory hazard index
6	Toxic releases to air
7	Traffic proximity
8	Lead paint
9	Risk Management Plan (RMP) facility proximity
10	Hazardous waste proximity
11	Superfund proximity
12	Underground storage tanks
13	Wastewater discharge

Source: U.S. EPA

Further refinements to the LIDAC definition will be explored through the development of the Comprehensive Climate Action Plan to ensure adequate representation of regional burdens and needs. While well established and highly vetted, CEJST and EJScreen were developed at the federal level and operate at the national scale. CMAP sees an opportunity to both explore a more regionally focused approach and to develop a stronger and more granular understanding of the burdens that communities face across the region during the Comprehensive Climate Action Plan process. Doing so could inform effective greenhouse gas emissions reduction strategy development and implementation at a more granular level. As such, the enclosed LIDAC definition and identified LIDACs should be understood to be provisional for the purposes of the PCAP but may be updated in the future to better reflect the characteristics and needs of the region.

14 Appendix E: LIDAC census block groups for the Chicago MSA

The List of Chicago MSA LIDAC spreadsheet includes tables of the nearly 3,000 census block groups identified in the Chicago MSA. Column headings include the following:

- Census block group identification number[31]
- Municipality (this includes cities, towns, villages, and census designated places)
- County
- State

An Excel version of this LIDAC list may be downloaded here.

List of Chicago MSA Low Income and Disadvantage Communities (LIDAC)

Block Group ID	Municipality	County
170318233021	Alsip	Cook County
170318233022	Alsip	Cook County
170318233043	Alsip	Cook County
170318234004	Alsip	Cook County
170318036122	Arlington Heights	Cook County
170318036132	Arlington Heights	Cook County
170318051071	Arlington Heights	Cook County
170318051072	Arlington Heights	Cook County
170318051075	Arlington Heights	Cook County
170318051083	Arlington Heights	Cook County
170318051084	Arlington Heights	Cook County
170318044061	Bartlett	Cook County
170318045081	Bartlett	Cook County
170318202021	Bedford Park	Cook County
170318205011	Bedford Park	Cook County
170318205021	Bedford Park	Cook County
170318209011	Bedford Park	Cook County
170318209021	Bedford Park	Cook County
170318170001	Bellwood	Cook County
170318170002	Bellwood	Cook County
170318170003	Bellwood	Cook County
170318170004	Bellwood	Cook County
170318170005	Bellwood	Cook County

[31] The census block group ID number is a 12-digit code with the following: the 2-digit state code, the 3-digit county code, the 6-digit tract code, and the final digit as the block group. Details can be found on the U.S. Census Bureau website: https://www.census.gov/programs-surveys/geography/guidance/geo-identifiers.html#:~:text=FIPS%20codes%20for%20smaller%20geographic,state%20and%20the%20nesting%20county.

170318171011	Bellwood	Cook County
170318171012	Bellwood	Cook County
170318171013	Bellwood	Cook County
170318171014	Bellwood	Cook County
170318171021	Bellwood	Cook County
170318117011	Bensenville	Cook County
170318146001	Berwyn	Cook County
170318146002	Berwyn	Cook County
170318146003	Berwyn	Cook County
170318146004	Berwyn	Cook County
170318146005	Berwyn	Cook County
170318148001	Berwyn	Cook County
170318149001	Berwyn	Cook County
170318149002	Berwyn	Cook County
170318150001	Berwyn	Cook County
170318150002	Berwyn	Cook County
170318150003	Berwyn	Cook County
170318152001	Berwyn	Cook County
170318152004	Berwyn	Cook County
170318152005	Berwyn	Cook County
170318154004	Berwyn	Cook County
170318155001	Berwyn	Cook County
170318155003	Berwyn	Cook County
170318155004	Berwyn	Cook County
170318155007	Berwyn	Cook County
170318212001	Blue Island	Cook County
170318212002	Blue Island	Cook County
170318212003	Blue Island	Cook County
170318212004	Blue Island	Cook County
170318213001	Blue Island	Cook County
170318213002	Blue Island	Cook County
170318213003	Blue Island	Cook County
170318213004	Blue Island	Cook County
170318234002	Blue Island	Cook County
170318234003	Blue Island	Cook County
170318234004	Blue Island	Cook County
170318235001	Blue Island	Cook County
170318235002	Blue Island	Cook County
170318236031	Blue Island	Cook County
170318243001	Blue Island	Cook County
170318248001	Blue Island	Cook County
170318268003	Blue Island	Cook County
170318268004	Blue Island	Cook County
170318205011	Bridgeview	Cook County
170318205012	Bridgeview	Cook County
170318205013	Bridgeview	Cook County

170318205014	Bridgeview	Cook County
170318205015	Bridgeview	Cook County
170318205021	Bridgeview	Cook County
170318205022	Bridgeview	Cook County
170318205023	Bridgeview	Cook County
170318205024	Bridgeview	Cook County
170318206041	Bridgeview	Cook County
170318209011	Bridgeview	Cook County
170318210012	Bridgeview	Cook County
170318210013	Bridgeview	Cook County
170318210014	Bridgeview	Cook County
170318229001	Bridgeview	Cook County
170318237031	Bridgeview	Cook County
170318237032	Bridgeview	Cook County
170318237034	Bridgeview	Cook County
170318179001	Broadview	Cook County
170318179002	Broadview	Cook County
170318179003	Broadview	Cook County
170318179004	Broadview	Cook County
170318179005	Broadview	Cook County
170318188006	Brookfield	Cook County
170318194001	Brookfield	Cook County
170318194002	Brookfield	Cook County
170318194003	Brookfield	Cook County
170318024042	Buffalo Grove	Cook County
170318209011	Burbank	Cook County
170318209012	Burbank	Cook County
170318209013	Burbank	Cook County
170318209014	Burbank	Cook County
170318209021	Burbank	Cook County
170318209022	Burbank	Cook County
170318209023	Burbank	Cook County
170318209024	Burbank	Cook County
170318210011	Burbank	Cook County
170318210012	Burbank	Cook County
170318210013	Burbank	Cook County
170318210014	Burbank	Cook County
170318210021	Burbank	Cook County
170318210022	Burbank	Cook County
170318210023	Burbank	Cook County
170318210024	Burbank	Cook County
170318210025	Burbank	Cook County
170318211011	Burbank	Cook County
170318211012	Burbank	Cook County
170318211013	Burbank	Cook County
170318211014	Burbank	Cook County

170318211021	Burbank	Cook County
170318211022	Burbank	Cook County
170318211023	Burbank	Cook County
170318211024	Burbank	Cook County
170318257001	Burnham	Cook County
170318257002	Burnham	Cook County
170318257003	Burnham	Cook County
170318201013	Burr Ridge	Cook County
170318258011	Calumet City	Cook County
170318258013	Calumet City	Cook County
170318258021	Calumet City	Cook County
170318258022	Calumet City	Cook County
170318258023	Calumet City	Cook County
170318258031	Calumet City	Cook County
170318258032	Calumet City	Cook County
170318258033	Calumet City	Cook County
170318258034	Calumet City	Cook County
170318258035	Calumet City	Cook County
170318259001	Calumet City	Cook County
170318259002	Calumet City	Cook County
170318259003	Calumet City	Cook County
170318260001	Calumet City	Cook County
170318260002	Calumet City	Cook County
170318260003	Calumet City	Cook County
170318261001	Calumet City	Cook County
170318261002	Calumet City	Cook County
170318261003	Calumet City	Cook County
170318261004	Calumet City	Cook County
170318261005	Calumet City	Cook County
170318261006	Calumet City	Cook County
170318262021	Calumet City	Cook County
170318262022	Calumet City	Cook County
170318262023	Calumet City	Cook County
170318262024	Calumet City	Cook County
170318262025	Calumet City	Cook County
170318279011	Calumet City	Cook County
170318212001	Calumet Park	Cook County
170318214011	Calumet Park	Cook County
170318214012	Calumet Park	Cook County
170318214013	Calumet Park	Cook County
170318214014	Calumet Park	Cook County
170318214021	Calumet Park	Cook County
170318214022	Calumet Park	Cook County
170318214023	Calumet Park	Cook County
170310101001	Chicago	Cook County
170310101002	Chicago	Cook County

170310101003	Chicago	Cook County
170310102011	Chicago	Cook County
170310102012	Chicago	Cook County
170310102013	Chicago	Cook County
170310102014	Chicago	Cook County
170310102021	Chicago	Cook County
170310102022	Chicago	Cook County
170310103001	Chicago	Cook County
170310103002	Chicago	Cook County
170310104003	Chicago	Cook County
170310105031	Chicago	Cook County
170310105032	Chicago	Cook County
170310107011	Chicago	Cook County
170310107021	Chicago	Cook County
170310107022	Chicago	Cook County
170310107023	Chicago	Cook County
170310201001	Chicago	Cook County
170310201002	Chicago	Cook County
170310202002	Chicago	Cook County
170310203022	Chicago	Cook County
170310204002	Chicago	Cook County
170310204003	Chicago	Cook County
170310205001	Chicago	Cook County
170310205002	Chicago	Cook County
170310205003	Chicago	Cook County
170310205004	Chicago	Cook County
170310206011	Chicago	Cook County
170310206012	Chicago	Cook County
170310206013	Chicago	Cook County
170310206021	Chicago	Cook County
170310206022	Chicago	Cook County
170310206023	Chicago	Cook County
170310206024	Chicago	Cook County
170310207021	Chicago	Cook County
170310207022	Chicago	Cook County
170310207023	Chicago	Cook County
170310207024	Chicago	Cook County
170310208011	Chicago	Cook County
170310208012	Chicago	Cook County
170310208013	Chicago	Cook County
170310208014	Chicago	Cook County
170310208021	Chicago	Cook County
170310208022	Chicago	Cook County
170310208023	Chicago	Cook County
170310208024	Chicago	Cook County
170310209011	Chicago	Cook County

170310209012	Chicago	Cook County
170310209013	Chicago	Cook County
170310209021	Chicago	Cook County
170310209022	Chicago	Cook County
170310301011	Chicago	Cook County
170310301023	Chicago	Cook County
170310301041	Chicago	Cook County
170310303001	Chicago	Cook County
170310303002	Chicago	Cook County
170310306012	Chicago	Cook County
170310306013	Chicago	Cook County
170310306031	Chicago	Cook County
170310307011	Chicago	Cook County
170310307031	Chicago	Cook County
170310307033	Chicago	Cook County
170310307062	Chicago	Cook County
170310312001	Chicago	Cook County
170310312002	Chicago	Cook County
170310312003	Chicago	Cook County
170310313001	Chicago	Cook County
170310313004	Chicago	Cook County
170310313005	Chicago	Cook County
170310315012	Chicago	Cook County
170310315013	Chicago	Cook County
170310315021	Chicago	Cook County
170310317001	Chicago	Cook County
170310317002	Chicago	Cook County
170310317003	Chicago	Cook County
170310317004	Chicago	Cook County
170310402011	Chicago	Cook County
170310402012	Chicago	Cook County
170310402014	Chicago	Cook County
170310402021	Chicago	Cook County
170310402022	Chicago	Cook County
170310402023	Chicago	Cook County
170310402024	Chicago	Cook County
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170318255011	Country Club Hills	Cook County
170318201032	Countryside	Cook County
170318201033	Countryside	Cook County

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170318202022	Countryside	Cook County
170318202041	Countryside	Cook County
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170317705001	Des Plaines	Cook County
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170318283002	East Hazel Crest	Cook County
170318044031	Elgin	Cook County
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170318044061	Elgin	Cook County
170317703001	Elk Grove Village	Cook County
170317705002	Elk Grove Village	Cook County
170318046074	Elk Grove Village	Cook County
170318107011	Elmwood Park	Cook County
170318107012	Elmwood Park	Cook County
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170318109003	Elmwood Park	Cook County
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170318217005	Evergreen Park	Cook County
170318218001	Evergreen Park	Cook County
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170318299021	Flossmoor	Cook County

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	170318297001	Ford Heights	Cook County
	170318297002	Ford Heights	Cook County
	170318297003	Ford Heights	Cook County
	170318161005	Forest Park	Cook County
	170318208001	Forest View	Cook County
	170318208003	Forest View	Cook County
	170318112005	Franklin Park	Cook County
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	170318283002	Glenwood	Cook County
	170318287014	Glenwood	Cook County
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	170318248003	Harvey	Cook County
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170318277002	Hazel Crest	Cook County
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170318206051	Hickory Hills	Cook County
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170318237021	Hickory Hills	Cook County
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170318183002	Hillside	Cook County
170318184012	Hillside	Cook County
170318201013	Hinsdale	Cook County
170318202021	Hodgkins	Cook County
170318202022	Hodgkins	Cook County

170318046031	Hoffman Estates	Cook County
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170318047152	Hoffman Estates	Cook County
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	170318233043	Merrionette Park	Cook County
	170318246025	Midlothian	Cook County
	170318247022	Midlothian	Cook County
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	170318050021	Mount Prospect	Cook County
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	170318051121	Mount Prospect	Cook County
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170318030173	Palatine	Cook County
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	170318268002	Posen	Cook County
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	170318025056	Prospect Heights	Cook County
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170318243003	Robbins	Cook County
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170978606001	Zion	Lake County
170978606002	Zion	Lake County
170978606003	Zion	Lake County
171118703011	Big Foot Prairie	McHenry County
171118703022	Big Foot Prairie	McHenry County
171118703012	Chemung	McHenry County
171118703011	Harvard	McHenry County
171118703012	Harvard	McHenry County
171118703013	Harvard	McHenry County
171118703021	Harvard	McHenry County
171118703022	Harvard	McHenry County
171118703023	Harvard	McHenry County
171118703011	Lawrence	McHenry County
171118703012	Lawrence	McHenry County
171118710032	Marengo	McHenry County
171118706054	McHenry	McHenry County
171118704022	Woodstock	McHenry County
171118709051	Woodstock	McHenry County
171978801052	Bolingbrook	Will County
171978801112	Bolingbrook	Will County
171978801131	Bolingbrook	Will County
171978801133	Bolingbrook	Will County
171978801141	Bolingbrook	Will County
171978801142	Bolingbrook	Will County
171978801173	Bolingbrook	Will County
171978802022	Bolingbrook	Will County
171978807022	Crest Hill	Will County
171978809052	Crest Hill	Will County

171978838091	Crete	Will County
171978838092	Crete	Will County
171978838103	Crete	Will County
171978807021	Fairmont	Will County
171978807022	Fairmont	Will County
171978807023	Fairmont	Will County
171978838091	Goodenow	Will County
171978823001	Ingalls Park	Will County
171978823002	Ingalls Park	Will County
171978823003	Ingalls Park	Will County
171978812011	Joliet	Will County
171978812012	Joliet	Will County
171978812021	Joliet	Will County
171978813011	Joliet	Will County
171978813012	Joliet	Will County
171978813021	Joliet	Will County
171978814011	Joliet	Will County
171978814012	Joliet	Will County
171978814013	Joliet	Will County
171978814021	Joliet	Will County
171978815001	Joliet	Will County
171978816032	Joliet	Will County
171978818001	Joliet	Will County
171978818002	Joliet	Will County
171978818003	Joliet	Will County
171978819001	Joliet	Will County
171978819002	Joliet	Will County
171978819003	Joliet	Will County
171978819004	Joliet	Will County
171978820001	Joliet	Will County
171978820002	Joliet	Will County
171978821001	Joliet	Will County
171978821002	Joliet	Will County
171978822001	Joliet	Will County
171978822002	Joliet	Will County
171978823003	Joliet	Will County
171978824001	Joliet	Will County
171978824002	Joliet	Will County
171978825001	Joliet	Will County
171978825002	Joliet	Will County
171978826012	Joliet	Will County
171978826013	Joliet	Will County
171978826021	Joliet	Will County
171978826022	Joliet	Will County
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171978828012	Joliet	Will County
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171978828022	Joliet	Will County
171978828023	Joliet	Will County
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171978829002	Joliet	Will County
171978830001	Joliet	Will County
171978830002	Joliet	Will County
171978830003	Joliet	Will County
171978831001	Joliet	Will County
171978831002	Joliet	Will County
171978831003	Joliet	Will County
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171978807022	Lockport	Will County
171978807023	Lockport	Will County
171978803072	Naperville	Will County
171978823002	New Lenox	Will County
171978831001	Preston Heights	Will County
171978831002	Preston Heights	Will County
171978831003	Preston Heights	Will County
171978812021	Ridgewood	Will County
171978822001	Ridgewood	Will County
171978822002	Ridgewood	Will County
171978829001	Rockdale	Will County
171978829002	Rockdale	Will County
171978802022	Romeoville	Will County
171978802031	Romeoville	Will County
171978804261	Romeoville	Will County
171978805091	Romeoville	Will County
171978805092	Romeoville	Will County
171978837001	Steger	Will County
171978837002	Steger	Will County
171978837003	Steger	Will County
171978838031	Steger	Will County
171978836051	University Park	Will County
171978836052	University Park	Will County
171978838092	University Park	Will County
180731011001	Rensselaer	Jasper County
180731011002	Rensselaer	Jasper County
180731011003	Rensselaer	Jasper County
180731011004	Rensselaer	Jasper County
180890208003	East Chicago	Lake County
180890301001	East Chicago	Lake County
180890302001	East Chicago	Lake County
180890302002	East Chicago	Lake County
180890303001	East Chicago	Lake County

180890303002	East Chicago	Lake County
180890304001	East Chicago	Lake County
180890304002	East Chicago	Lake County
180890304003	East Chicago	Lake County
180890305001	East Chicago	Lake County
180890305002	East Chicago	Lake County
180890305003	East Chicago	Lake County
180890305004	East Chicago	Lake County
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180890306002	East Chicago	Lake County
180890306003	East Chicago	Lake County
180890306004	East Chicago	Lake County
180890307001	East Chicago	Lake County
180890307002	East Chicago	Lake County
180890308001	East Chicago	Lake County
180890308002	East Chicago	Lake County
180890308003	East Chicago	Lake County
180890308004	East Chicago	Lake County
180890309001	East Chicago	Lake County
180890309002	East Chicago	Lake County
180890309003	East Chicago	Lake County
180890310001	East Chicago	Lake County
180890310002	East Chicago	Lake County
180890101004	Gary	Lake County
180890102031	Gary	Lake County
180890102032	Gary	Lake County
180890102033	Gary	Lake County
180890102051	Gary	Lake County
180890102052	Gary	Lake County
180890102061	Gary	Lake County
180890102062	Gary	Lake County
180890102071	Gary	Lake County
180890102072	Gary	Lake County
180890103021	Gary	Lake County
180890103022	Gary	Lake County
180890103023	Gary	Lake County
180890103041	Gary	Lake County
180890103042	Gary	Lake County
180890103043	Gary	Lake County
180890103044	Gary	Lake County
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180890104002	Gary	Lake County
180890104003	Gary	Lake County
180890104004	Gary	Lake County
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180890106002	Gary	Lake County
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180890109002	Gary	Lake County
180890110001	Gary	Lake County
180890110002	Gary	Lake County
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180890111003	Gary	Lake County
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180890112001	Gary	Lake County
180890112002	Gary	Lake County
180890112003	Gary	Lake County
180890112004	Gary	Lake County
180890112005	Gary	Lake County
180890113001	Gary	Lake County
180890113002	Gary	Lake County
180890114001	Gary	Lake County
180890114002	Gary	Lake County
180890115001	Gary	Lake County
180890115002	Gary	Lake County
180890115003	Gary	Lake County
180890116001	Gary	Lake County
180890116002	Gary	Lake County
180890116003	Gary	Lake County
180890117001	Gary	Lake County
180890117002	Gary	Lake County
180890118001	Gary	Lake County
180890118002	Gary	Lake County
180890119001	Gary	Lake County
180890119002	Gary	Lake County
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180890120002	Gary	Lake County
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180890122001	Gary	Lake County
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180890123004	Gary	Lake County
180890124001	Gary	Lake County
180890124002	Gary	Lake County
180890124003	Gary	Lake County
180890124004	Gary	Lake County
180890124005	Gary	Lake County
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180890125002	Gary	Lake County
180890125003	Gary	Lake County
180890125004	Gary	Lake County
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180890126002	Gary	Lake County
180890126003	Gary	Lake County
180890127001	Gary	Lake County
180890127002	Gary	Lake County
180890127003	Gary	Lake County
180890127004	Gary	Lake County
180890128001	Gary	Lake County
180890128002	Gary	Lake County
180890128003	Gary	Lake County
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180890411002	Gary	Lake County
180890411003	Gary	Lake County
180890412001	Gary	Lake County
180890412002	Gary	Lake County
180890412003	Gary	Lake County
180890415001	Gary	Lake County
180890201001	Hammond	Lake County
180890201003	Hammond	Lake County
180890203001	Hammond	Lake County
180890203002	Hammond	Lake County
180890203003	Hammond	Lake County
180890203004	Hammond	Lake County
180890203005	Hammond	Lake County
180890204001	Hammond	Lake County
180890204002	Hammond	Lake County
180890204003	Hammond	Lake County
180890204004	Hammond	Lake County
180890205001	Hammond	Lake County
180890205002	Hammond	Lake County
180890205003	Hammond	Lake County
180890205004	Hammond	Lake County
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180890206002	Hammond	Lake County
180890207001	Hammond	Lake County
180890207002	Hammond	Lake County
180890207003	Hammond	Lake County
180890207004	Hammond	Lake County
180890207005	Hammond	Lake County
180890208001	Hammond	Lake County
180890208002	Hammond	Lake County
180890208003	Hammond	Lake County
180890208004	Hammond	Lake County

180890210001	Hammond	Lake County
180890210002	Hammond	Lake County
180890210003	Hammond	Lake County
180890210004	Hammond	Lake County
180890210005	Hammond	Lake County
180890211001	Hammond	Lake County
180890211002	Hammond	Lake County
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180890213003	Hammond	Lake County
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180890214002	Hammond	Lake County
180890214003	Hammond	Lake County
180890214004	Hammond	Lake County
180890215001	Hammond	Lake County
180890216001	Hammond	Lake County
180890217001	Hammond	Lake County
180890217002	Hammond	Lake County
180890217003	Hammond	Lake County
180890217004	Hammond	Lake County
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180890218002	Hammond	Lake County
180890218003	Hammond	Lake County
180890218004	Hammond	Lake County
180890219001	Hammond	Lake County
180890219002	Hammond	Lake County
180890219003	Hammond	Lake County
180890219004	Hammond	Lake County
180890220001	Hammond	Lake County
180890220002	Hammond	Lake County
180890220003	Hammond	Lake County
180890220004	Hammond	Lake County
180890211004	Highland	Lake County
180890406002	Highland	Lake County
180890418007	Hobart	Lake County
180890421001	Hobart	Lake County
180890421002	Hobart	Lake County
180890421003	Hobart	Lake County
180890421004	Hobart	Lake County
180890421005	Hobart	Lake County
180890422002	Hobart	Lake County
180890416001	Lake Station	Lake County
180890416003	Lake Station	Lake County
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180890417001	Lake Station	Lake County

	180890417002	Lake Station	Lake County
	180890417003	Lake Station	Lake County
	180890417004	Lake Station	Lake County
	180890417005	Lake Station	Lake County
	180890418001	Lake Station	Lake County
	180890418002	Lake Station	Lake County
	180890418003	Lake Station	Lake County
	180890418004	Lake Station	Lake County
	180890418006	Lake Station	Lake County
	180890418007	Lake Station	Lake County
	180890424013	Merrillville	Lake County
	180890424031	Merrillville	Lake County
	180890424032	Merrillville	Lake County
	180890424033	Merrillville	Lake County
	180890424052	Merrillville	Lake County
	180890425081	Merrillville	Lake County
	180890416001	New Chicago	Lake County
	180890416002	New Chicago	Lake County
	180890416003	New Chicago	Lake County
	180890421002	New Chicago	Lake County
180890413021		None	Lake County
180890413022		None	Lake County
180890414001		None	Lake County
180890414002		None	Lake County
	180890401001	Whiting	Lake County
	180890401002	Whiting	Lake County
	180890402001	Whiting	Lake County
	180890402002	Whiting	Lake County
	180890402003	Whiting	Lake County
	181111006001	Brook	Newton County
	181111006002	Brook	Newton County
	181111006002	Goodland	Newton County
	181111006003	Goodland	Newton County
	181111007001	Kentland	Newton County
	181111007002	Kentland	Newton County
	181111007003	Kentland	Newton County
	181111004003	Lake Village	Newton County
	181111004004	Lake Village	Newton County
	181111005002	Morocco	Newton County
	181111005003	Morocco	Newton County
	181111005002	Mount Ayr	Newton County
	181111004001	Roselawn	Newton County
	181111005001	Roselawn	Newton County
	181111004003	Sumava Resorts	Newton County
	181111004002	Thayer	Newton County
	181270502022	Chesterton	Porter County

181270505071		None	Porter County
	181270504072	Portage	Porter County
	181270504082	Portage	Porter County
	181270504091	Portage	Porter County
	181270504093	Portage	Porter County
	181270505011	Portage	Porter County
	181270505012	Portage	Porter County
	181270505081	Portage	Porter County
	181270505083	Portage	Porter County
	181270505091	Portage	Porter County
	181270505031	South Haven	Porter County
	181270505032	South Haven	Porter County
	181270505033	South Haven	Porter County
	181270507052	Valparaiso	Porter County
	181270509012	Valparaiso	Porter County
	550590027003	Bristol	Kenosha County
	550590001011	Kenosha	Kenosha County
	550590001021	Kenosha	Kenosha County
	550590003001	Kenosha	Kenosha County
	550590003002	Kenosha	Kenosha County
	550590003003	Kenosha	Kenosha County
	550590004004	Kenosha	Kenosha County
	550590005013	Kenosha	Kenosha County
	550590005023	Kenosha	Kenosha County
	550590006042	Kenosha	Kenosha County
	550590007001	Kenosha	Kenosha County
	550590007003	Kenosha	Kenosha County
	550590007004	Kenosha	Kenosha County
	550590007005	Kenosha	Kenosha County
	550590008001	Kenosha	Kenosha County
	550590008002	Kenosha	Kenosha County
	550590008003	Kenosha	Kenosha County
	550590009001	Kenosha	Kenosha County
	550590009002	Kenosha	Kenosha County
	550590009003	Kenosha	Kenosha County
	550590009004	Kenosha	Kenosha County
	550590009005	Kenosha	Kenosha County
	550590010001	Kenosha	Kenosha County
	550590010002	Kenosha	Kenosha County
	550590010003	Kenosha	Kenosha County
	550590011001	Kenosha	Kenosha County
	550590011002	Kenosha	Kenosha County
	550590011003	Kenosha	Kenosha County
	550590012001	Kenosha	Kenosha County
	550590012002	Kenosha	Kenosha County
	550590012003	Kenosha	Kenosha County

550590012004	Kenosha	Kenosha County
550590013001	Kenosha	Kenosha County
550590013002	Kenosha	Kenosha County
550590013003	Kenosha	Kenosha County
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550590015002	Kenosha	Kenosha County
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550590016001	Kenosha	Kenosha County
550590016002	Kenosha	Kenosha County
550590016003	Kenosha	Kenosha County
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550590017002	Kenosha	Kenosha County
550590017003	Kenosha	Kenosha County
550590018001	Kenosha	Kenosha County
550590018002	Kenosha	Kenosha County
550590021001	Kenosha	Kenosha County
550590021002	Kenosha	Kenosha County
550590021003	Kenosha	Kenosha County
550590021004	Kenosha	Kenosha County
550590022001	Kenosha	Kenosha County
550590021003	Pleasant Prairie	Kenosha County
550590029061	Salem Lakes	Kenosha County
550590001011	Somers	Kenosha County
550590001021	Somers	Kenosha County
550590003001	Somers	Kenosha County

15 Appendix F: Climate Risk and Vulnerability Assessment for Chicago Region

Climate Risk and Vulnerability Assessment for the Chicago Metropolitan Region - 2019

Hazards

Climate Hazard	Probability	Consequence	Risk
Extreme Heat	3	3	9
Drought	2	3	6
Severe Thunderstorms	2	2	4
Flooding	3	3	9
Severe Winter Weather	2	2	4

Adaptive Capacity

Factor	Degree of Challenge
Access to Basic Services	0
Public Health	0
Housing	0
Inequality	0
Economic Health	0
Government Capacity	0
Resource Availability	0

Extreme Heat

Determining Risk Level

Probability of Hazard

Determine the current probability (likelihood of occurrence) of the hazard based on the options provided (do not know, low, moderate, high).

Probability
3

GCoM Options		
3	High	Extremely likely that the hazard occurs (e.g., greater than 1 in 20 chance of occurrence)
2	Moderate	Likely that the hazard occurs (e.g., between 1 in 20 and 1 in 200 chance of occurrence)
1	Low	Unlikely that the hazard occurs (e.g., between 1 in 200 and 1 in 2,000 chance of occurrence)
0	Do not know	Region has not experienced or observed climate hazards in the past or has no ways of accurately reporting this information based on evidence of data

Consequence of Hazard

Determine the current consequence (outcome/impact/gravity) of the hazard based on the options provided (do not know, low, moderate, high).

Consequence
3

GCoM Options		
3	High	The hazard represents a high (or the highest) level of potential concern for your jurisdiction. When it occurs, the hazard results in (extremely) serious impacts to the jurisdiction and (catastrophic) interruptions to day-to-day life.
2	Moderate	The hazard represents a moderate level of potential concern for your jurisdiction. When it occurs, the hazard results in impacts to your jurisdiction, but these are moderately significant to day-to-day life.
1	Low	The hazard represents a lower (the lowest) level of potential concern for your jurisdiction. When it occurs, the hazard results in impacts to your jurisdiction, but these are deemed less significant (or insignificant) to day-to-day
0	Do not know	City has not experienced or observed climate hazards in the past of has no ways of accurately reporting this information based on evidence or data.

Risk Level

A hazard risk level is determined for current and future scenarios. Risk is determined based on the probability and consequence of a particular hazard. [Risk = Probability x Consequence]

Risk
9

Qualifying Impacts

Past Impacts

Include a description of the impacts experienced in the past including loss of human lives, economic and non-economic losses, environmental and other impacts.

Heat waves have caused illnesses, hospitalizations, and deaths in vulnerable communities [1]

The Chicago region experienced a historic heat wave in 1995 that led to 700 heat-related deaths, followed by another heat wave in 1999 with more than 100 deaths. The 1995 heat wave resulted in major reforms to Chicago's emergency response programs: The city formed a Commission on Extreme Weather Conditions, developed a comprehensive Extreme Weather Operations Plan, and established better coordination among emergency responders call centers, and traffic management. [1]

Intensity

How strong the hazard is

Change in Intensity
Increase | Decrease | No change | Not known
Increase

Frequency

How often the hazard occurs in the region

Change in Frequency
Increase | Decrease | No change | Not known
Increase

Timescale

The timescale at which these changes are expected to o

Timescale
Immediately | Short Term (by 2025) | Medium Term (by 2050) | Long Term (after 2050) | Not known
Short Term

Future Impacts

Select the sectors, assets, or services that are currently most impacted by the hazard and those that will be most impacted in the future. A general assessment of the magnitude of impact for each sector, asset, or service must be included.

Sectors, Assets, and Services	Magnitude of Future Impact *Low | Moderate | High | Unknown*	Description
Public Health		Air pollution, especially ozone, would get worse because of higher temperatures, aggravating chronic health conditions [4] Heat waves have caused illnesses, hospitalizations, and deaths in vulnerable communities [1] Additional heat-related deaths [1]
Residential		
Environment, Biodiversity, and Forestry		Increased temperatures are expected to exacerbate the presence of invasive species and diseases that have affected the region's forestry [1] Overnight low temperatures over 80F have the potential to have even more harmful effects on humans, livestock, and vegetation [3] Tree deterioration and fire risk [5]
Transport		During the summer months, extreme heat could cause more pavement and railways to buckle, disrupting traffic and endangering commuters. [4]
Energy		More extreme heat would also increase demand for energy, leading to more blackouts and brownouts as demand surpasses capacity [4]
Emergency Services		Strain on emergency services [5]
Food and Agriculture		Higher average temperatures throughout the wider Midwest region may lead to declines in the productivity of commercial crops and contribute to invasive species growth and pollinator declines that impact overall agricultural producitivity. Projected higher temperatures by the end of the century are likely to cause negative impacts to livestock and breeding operations. This may lead to reduced milk and egg production. [6]

Vulnerable Groups

[OPTIONAL] Determine the population groups in the region that are most vulnerable to the climate hazards and impacts. Vulnerable groups can be matched with each impacted sector or presented as a whole for each hazard.

Vulnerable Groups		Description
Women and Girls	**Persons with Chronic Diseases**	Elderly population; people of color; limited English proficiency; family income below poverty level; no health insurance coverage; people without air conditioning; people with chronic diseases [1] People living in lands with high- and medium-intensity developments (defined as having greater than 50% impervious surfaces) are 5-6°F hotter than the regional average [1]
Children and Youth	**Low-Income Households**	
Elderly	Unemployed Persons	
Indigenous Populations	**Persons in Sub-Standard Housing**	
Marginalized Groups	**Other**	
Persons with Disabilities		

Table 2. Heat Vulnerability

Socioeconomic Characteristic[49]	Regional Population		Top 10 Percent Hottest Census Tracts Based on Land Surface Temperature	
	Count	Percent	Count	Percent
Total Population	8,459,768	100%	511,171	100%
Elderly Population (over 65 years)	1,013,640	12.0%	45,368	9.2%
People of Color[50]	4,030,135	47.6%	381,249	73.7%
Limited English Proficiency[51]	1,029,670	12.2%	144,993	27.2%
Family Income below Poverty Level[52]	1,160,842	13.7%	101,134	19.7%
No Health Insurance Coverage	1,146,328	13.6%	125,787	23.0%

Source: 2010-14 American Community Survey, 2010 U.S. Census, and CMAP analysis derived from Landsat 8.

Drought

Determining Risk Level

Probability of Hazard

Determine the current probability (likelihood of occurrence) of the hazard based on the options provided (do not know, low, moderate, high).

Probability
2

GCoM Options		
3	High	Extremely likely that the hazard occurs (e.g., greater than 1 in 20 chance of occurrence)
2	Moderate	Likely that the hazard occurs (e.g., between 1 in 20 and 1 in 200 chance of occurrence)
1	Low	Unlikely that the hazard occurs (e.g., between 1 in 200 and 1 in 2,000 chance of occurrence)
0	Do not know	Region has not experienced or observed climate hazards in the past or has no ways of accurately reporting this information based on evidence of data

Consequence of Hazard

Determine the current consequence (outcome/impact/gravity) of the hazard based on the options provided (do not know, low, moderate, high).

Consequence
3

GCoM Options		
3	High	The hazard represents a high (or the highest) level of potential concern for your jurisdiction. When it occurs, the hazard results in (extremely) serious impacts to the jurisdiction and (catastrophic) interruptions to day-to-day life.
2	Moderate	The hazard represents a moderate level of potential concern for your jurisdiction. When it occurs, the hazard results in impacts to your jurisdiction, but these are moderately significant to day-to-day life.
1	Low	The hazard represents a lower (the lowest) level of potential concern for your jurisdiction. When it occurs, the hazard results in impacts to your jurisdiction, but these are deemed less significant (or insignificant) to day-to-day
0	Do not know	City has not experienced or observed climate hazards in the past of has no ways of accurately reporting this information based on evidence or data.

Risk Level

A hazard risk level is determined for current and future scenarios. Risk is determined based on the probability and consequence of a particular hazard. [Risk = Probability x Consequence]

Risk
6

Qualifying Impacts

Past Impacts

Include a description of the impacts experienced in the past including loss of human lives, economic and non-economic losses, environmental and other impacts.

Drought has had significant adverse effects on the region's agricultural sector and natural areas [1]

Intensity

How strong the hazard is

Change in Intensity
Increase | Decrease | No change | Not known

Frequency

How often the hazard occurs in the region

Change in Frequency
Increase | Decrease | No change | Not known
Increase

Timescale

The timescale at which these changes are expected to o

Timescale
Immediately | Short Term (by 2025) | Medium Term (by 2050) | Long Term (after 2050) | Not known

Future Impacts

Include a description of the impacts experienced in the past including loss of human lives, economic and non-economic losses, environmental and other impacts.

The aquifer that provides water for many parts of northwest Will County and the eastern portion of Kane County could be completely depleted in 2050 -- and aquifers that supply water to areas in Kane County, southeast Kendall County, and northern Kendall County could be at least partially desaturated.20 With limited access to Lake Michigan for drinking water, 21 communities who are dependent upon already stressed groundwater supplies could face growing water supply issues during periods of drought. Municipalities may need to switch water sources and build new wells and treatment plants, which could increase the costs of water. Furthermore, because groundwater feeds into multiple water bodies, withdrawals from shallow aquifers would also negatively impact the ecosystems of streams,

Select the sectors, assets, or services that are currently most impacted by the hazard and those that will be most impacted in the future. A general assessment of the magnitude of impact for each sector, asset, or service must be included.

Sectors, Assets, and Services	Magnitude of Future Impact *Low | Moderate | High | Unknown*	Description
Water Supply and Sanitation		Water demand from all sectors is expected to increase by up to 12% under a high-emissions scenario [1]
Food and Agriculture		Irrigation for agriculture is projected to see the largest relative increase in water demand compared to any other water use [1]
Environment, Biodiversity, and Forestry		An increase in projected summertime droughts will lead to ecosystem stress and habitat loss [1]

Vulnerable Groups

[OPTIONAL] Determine the population groups in the region that are most vulnerable to the climate hazards and impacts. Vulnerable groups can be matched with each impacted sector or presented as a whole for each hazard.

Vulnerable Groups		Description
Women and Girls	Persons with Chronic Diseases	Communities who are dependent upon already stressed groundwater supplies [4]
Children and Youth	Low-Income Households	
Elderly	Unemployed Persons	
Indigenous Populations	Persons in Sub-Standard Housing	
Marginalized Groups	Other	
Persons with Disabilities		

Severe Thunderstorms

Determining Risk Level

Probability of Hazard

Determine the current probability (likelihood of occurrence) of the hazard based on the options provided (do not know, low, moderate, high).

Probability
2

GCoM Options		
3	High	Extremely likely that the hazard occurs (e.g., greater than 1 in 20 chance of occurrence)
2	Moderate	Likely that the hazard occurs (e.g., between 1 in 20 and 1 in 200 chance of occurrence)
1	Low	Unlikely that the hazard occurs (e.g., between 1 in 200 and 1 in 2,000 chance of occurrence)
0	Do not know	Region has not experienced or observed climate hazards in the past or has no ways of accurately reporting this information based on evidence of data

Consequence of Hazard

Determine the current consequence (outcome/impact/gravity) of the hazard based on the options provided (do not know, low, moderate, high).

Consequence
2

GCoM Options		
3	High	The hazard represents a high (or the highest) level of potential concern for your jurisdiction. When it occurs, the hazard results in (extremely) serious impacts to the jurisdiction and (catastrophic) interruptions to day-to-day life.
2	Moderate	The hazard represents a moderate level of potential concern for your jurisdiction. When it occurs, the hazard results in impacts to your jurisdiction, but these are moderately significant to day-to-day life.
1	Low	The hazard represents a lower (the lowest) level of potential concern for your jurisdiction. When it occurs, the hazard results in impacts to your jurisdiction, but these are deemed less significant (or insignificant) to day-to-day
0	Do not know	City has not experienced or observed climate hazards in the past of has no ways of accurately reporting this information based on evidence or data.

Risk Level

A hazard risk level is determined for current and future scenarios. Risk is determined based on the probability and consequence of a particular hazard. [Risk = Probability x Consequence]

Risk
4

Qualifying Impacts

Past Impacts

Include a description of the impacts experienced in the past including loss of human lives, economic and non-economic losses, environmental and other impacts.

Intensity

How strong the hazard is

Change in Intensity
Increase | Decrease | No change | Not known
Increase

Frequency

How often the hazard occurs in the region

Change in Frequency
Increase | Decrease | No change | Not known
Increase

Timescale

The timescale at which these changes are expected to o

Timescale
Immediately | Short Term (by 2025) | Medium Term (by 2050) | Long Term (after 2050) | Not known

Future Impacts

Select the sectors, assets, or services that are currently most impacted by the hazard and those that will be most impacted in the future. A general assessment of the magnitude of impact for each sector, asset, or service must be included.

Sectors, Assets, and Services	Magnitude of Future Impact *Low | Moderate | High | Unknown*	Description
Public Health		More frequent and intense storms would also increase the risk of accidents, particularly on roads. [4]
Energy		Severe thunderstorms, ice storms, and strong winds could damage overhead power lines, and cause power outages that disrupt business productivity and threaten public safety. [4]

Vulnerable Groups

[OPTIONAL] Determine the population groups in the region that are most vulnerable to the climate hazards and impacts. Vulnerable groups can be matched with each impacted sector or presented as a whole for each hazard.

Vulnerable Groups		Description
Women and Girls	Persons with Chronic Diseases	
Children and Youth	Low-Income Households	
Elderly	Unemployed Persons	
Indigenous Populations	Persons in Sub-Standard Housing	
Marginalized Groups	Other	
Persons with Disabilities		

Flooding

Determining Risk Level

Probability of Hazard

Determine the current probability (likelihood of occurrence) of the hazard based on the options provided (do not know, low, moderate, high).

Probability
3

GCoM Options		
3	High	Extremely likely that the hazard occurs (e.g., greater than 1 in 20 chance of occurrence)
2	Moderate	Likely that the hazard occurs (e.g., between 1 in 20 and 1 in 200 chance of occurrence)
1	Low	Unlikely that the hazard occurs (e.g., between 1 in 200 and 1 in 2,000 chance of occurrence)
0	Do not know	Region has not experienced or observed climate hazards in the past or has no ways of accurately reporting this information based on evidence of data

Consequence of Hazard

Determine the current consequence (outcome/impact/gravity) of the hazard based on the options provided (do not know, low, moderate, high).

Consequence
3

GCoM Options		
3	High	The hazard represents a high (or the highest) level of potential concern for your jurisdiction. When it occurs, the hazard results in (extremely) serious impacts to the jurisdiction and (catastrophic) interruptions to day-to-day life.
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0	Do not know	City has not experienced or observed climate hazards in the past of has no ways of accurately reporting this information based on evidence or data.

Risk Level

A hazard risk level is determined for current and future scenarios. Risk is determined based on the probability and consequence of a particular hazard. [Risk = Probability x Consequence]

Risk
9

Qualifying Impacts

Past Impacts

Include a description of the impacts experienced in the past including loss of human lives, economic and non-economic losses, environmental and other impacts.

Flooding has led to major road, rail, and utility outages, sewer overflows, mold, damaged property, disruptions to freight traffic, and financial losses for local businesses [1]

Flooding in urban areas has resulted in $1.975 billion of documented damages in the CMAP region from 2007-2014 alone (85.2% of pay-outs in the entire state) [1]

Intensity

How strong the hazard is

Change in Intensity
Increase | Decrease | No change | Not known
Increase

Frequency

How often the hazard occurs in the region

Change in Frequency
Increase | Decrease | No change | Not known
Increase

Timescale

The timescale at which these changes are expected to o

Timescale
Immediately | Short Term (by 2025) | Medium Term (by 2050) | Long Term (after 2050) | Not known
Short Term

Future Impacts

Include a description of the impacts experienced in the past including loss of human lives, economic and non-economic losses, environmental and other impacts.

In areas along rivers and streams, floodplains would flood more frequently. Drainage systems in built-out parts of the region would often be overwhelmed, causing more basement backups and ponding in yards and parks, while impairing access on roads. By mid-century, federal and state governments, residents, businesses, and municipalities will likely be paying significantly more to address property damage and accidents caused by flooding and rain. Private insurers may also choose to exclude flood prone areas, particularly where stormwater infrastructure has not been upgraded, from coverage, leading to greater dependence on federal programs. [4]

Select the sectors, assets, or services that are currently most impacted by the hazard and those that will be most impacted in the future. A general assessment of the magnitude of impact for each sector, asset, or service must be included.

Sectors, Assets, and Services	Magnitude of Future Impact *Low | Moderate | High | Unknown*	Description
Transport		Heavier rains are expected to increase scouring and deterioration of bridges [1] Flooding and severe weather will likely impair surface transportation -- including cars, busses, trucks, and trains -- more frequently by causing congestion, road closures, and accidents, leading to time lost and increased costs due to repeated rerouting [4]
Water Supply and Sanitation		More severe storms and flooding are likely to increase non-point source pollution [1]
Residential		
Commercial		Flooding and transportation or electricity outages can affect local business operations and employee commutes [1]
Environment, Biodiversity, and Forestry		Ravine and slope degradation [5]
Public Health		Flooded areas that remain stagnant may harbor insect growth and could result in vector-borne disease outbreaks and persistent moisture inside buildings due to flooding and seepage can lead to mold growth which decreases indoor air quality and compromises respiratory health [5]

Vulnerable Groups

[OPTIONAL] Determine the population groups in the region that are most vulnerable to the climate hazards and impacts. Vulnerable groups can be matched with each impacted sector or presented as a whole for each hazard.

Vulnerable Groups		Description
Women and Girls	Persons with Chronic Diseases	
Children and Youth	Low-Income Households	
Elderly	Unemployed Persons	
Indigenous Populations	Persons in Sub-Standard Housing	
Marginalized Groups	Other	
Persons with Disabilities		

Severe Winter Weather

Determining Risk Level

Probability of Hazard

Determine the current probability (likelihood of occurrence) of the hazard based on the options provided (do not know, low, moderate, high).

Probability
2

GCoM Options		
3	High	Extremely likely that the hazard occurs (e.g., greater than 1 in 20 chance of occurrence)
2	Moderate	Likely that the hazard occurs (e.g., between 1 in 20 and 1 in 200 chance of occurrence)
1	Low	Unlikely that the hazard occurs (e.g., between 1 in 200 and 1 in 2,000 chance of occurrence)
0	Do not know	Region has not experienced or observed climate hazards in the past or has no ways of accurately reporting this information based on evidence of data

Consequence of Hazard

Determine the current consequence (outcome/impact/gravity) of the hazard based on the options provided (do not know, low, moderate, high).

Consequence
2

GCoM Options		
3	High	The hazard represents a high (or the highest) level of potential concern for your jurisdiction. When it occurs, the hazard results in (extremely) serious impacts to the jurisdiction and (catastrophic) interruptions to day-to-day life.
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0	Do not know	City has not experienced or observed climate hazards in the past of has no ways of accurately reporting this information based on evidence or data.

Risk Level

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Risk
4

Qualifying Impacts

Past Impacts

Include a description of the impacts experienced in the past including loss of human lives, economic and non-economic losses, environmental and other impacts.

Intensity

How strong the hazard is

Change in Intensity
Increase | Decrease | No change | Not known
Increase

Frequency

How often the hazard occurs in the region

Change in Frequency
Increase | Decrease | No change | Not known
Decrease

Timescale

The timescale at which these changes are expected to o

Timescale
Immediately | Short Term (by 2025) | Medium Term (by 2050) | Long Term (after 2050) | Not known
Long Term

Future Impacts

Select the sectors, assets, or services that are currently most impacted by the hazard and those that will be most impacted in the future. A general assessment of the magnitude of impact for each sector, asset, or service must be included.

Sectors, Assets, and Services	Magnitude of Future Impact *Low | Moderate | High | Unknown*	Description
Transport		These winter temperature patterns may lead to more freeze-thaw events, which lead to wear and tear on the built environment [1]
Energy		More frequent freeze-thaw cycles would increase the risk of water pipes bursting [4] Severe thunderstorms, ice storms, and strong winds could damage overhead power lines, and cause power outages that disrupt business productivity and threaten public safety. [4]
Water Supply and Sanitation		Water supply service interruptions due to increased cold and the extreme freeze/thaw cycle is leading to increased applications of salt during the winter to combat more frequent ice buildup on roadways. The snow melt runoff, contaminated with this higher level of salt, will eventually reach the lake where it may have negative impacts on the ecosystem [5]
Public Health		More frequent and intense storms would also increase the risk of accidents, particularly on roads. [4]

Vulnerable Groups

[OPTIONAL] Determine the population groups in the region that are most vulnerable to the climate hazards and impacts. Vulnerable groups can be matched with each impacted sector or presented as a whole for each hazard.

Vulnerable Groups		Description
Women and Girls	Persons with Chronic Diseases	
Children and Youth	Low-Income Households	
Elderly	Unemployed Persons	
Indigenous Populations	Persons in Sub-Standard Housing	
Marginalized Groups	Other	
Persons with Disabilities		

Adaptive Capacity

Determining Adaptive Capacity of the Region

Adaptive Capacity

Determine the degree in which the region is able to adapt to climate change. Select factors that will affect the region's adaptive capcity and influence climate resilience efforts by hindering the climate change adaptation actions within the regional jurisdiction.

Factor *Select from dropdown*	**Effect on Adaptive Capacity**	**Degree of Challenge** *High | Moderate | Low | No Change/Do Not Know*
Access to Basic Services	Transportation and power disruptions [1]	
Public Health	Heat waves have led to heat-related illnesses and mortality. Elderly residents, people with chronic diseases, and people without access to air conditioning are particularly susceptible to heat waves [1]	
Housing	Widespread and chronic flooding has damaged homes (sometimes irreparably), causing evacuations and significant costs [1]	
Inequality	With fewer financial resources, lower income residents would be less able to afford housing in areas that are less exposed to the urban heat island effect [4]	
Economic Health	Slow rate of growth, declining sales and manufacturing production [1]	
Government Capacity	Some issues are for the private sector or other levels of government to address. In some cases, the range of solutions available to municipalities is shaped by policies at other levels of government [2]	
Resource Availability	The aquifer that provides water for many parts of northwest Will County and the eastern portion of Kane County could be completely depleted in 2050 [4]	

Sources

1 CMAP Climate Resilience Strategy

2 CMAP Climate Adaptation Toolkit

3 CMAP Climate Adaptation Toolkit (Appendix A: Primary Impacts

4 CMAP Changed Climate Memo

5 City of Highland Park Climate Hazard Assessment

6 Guidebook, Using Climate Information in Local Planning

16 Appendix G: Plans Reviewed in the Creation of the Chicago MSA PCAP

Area or Organization	Plan name	Year
Barcelona Region, Spain	Pla d’Adaptació al Canvi Climàtic de l’Àrea Metropolitana de Barcelona	2018
Brussels Region, Belgium	Brussels Capital Region’s Energy and Climate Plan 2030	2019
City and County of Denver	Climate Adaptation Plan	2014
City of Asheville, NC	Building a Climate Resilient Asheville	2019
City of Aurora	Sustainability Plan	2008
City of Batavia	Environmental Identity	2013
City of Chicago	Chicago’s 2022 Climate Action Plan	
City of Chicago	Chicago Climate Action Plan	2008
City of Chicago	Resilient Chicago	2019
City of Chicago	Sustainable Chicago	2012
City of Columbus	Columbus Climate Adaptation Plan	2018
City of Des Plaines	Sustain Des Plaines	2011
City of Elgin	Sustainability Action Plan	2013
City of Elmhurst	Comprehensive Plan, Sustainability Chapter Climate	2009
City of Evanston	Climate Action and Resilience Plan	2018
City of Highland Park	Climate Hazard Assessment	2019
City of Highland Park	Sustainability Strategic Plan	2010
City of Indianapolis	Thrive Indianapolis	2019
City of Naperville	Environmental Sustainability Plan	2010
City of New Orleans, LA	Climate Action for a Resilient New Orleans	2017
City of Normal	Community-Wide Sustainability Plan	2010
City of Oakland, CA	Equitable Climate Action Plan	2020
City of Santa Monica, CA	Climate Action & Adaptation Plan	2019
City of Seattle, WA	Seattle Climate Action Plan	2013
City of St. Louis, MO	Climate Action & Adaptation Plan	2017
City of Woodstock	Environmental Plan	2010
Climate Action KC (Kansas City region)	Climate Action Playbook	2019
CMAP	Climate Adaptation Guidebook for Municipalities in the Chicago Region	2013
CMAP	ON TO 2050 Regional Comprehensive Plan	2018
CMAP	Plan of Action for Regional Transit	2023
ComEd	Beneficial Electrification Plan	2022

Cook County	Cook County Climate Change and Public Health Action Plan	2012
Global Covenant of Mayors for Climate and Energy	Common Reporting Framework	2018
Lake County	Strategy for Sustainable Lake County	2009
Metropolitan Mayors Caucus	Greenest Region Compact	2016
Metropolitan Washington Council of Governments (Washington, DC region)	Metropolitan Washington 2030 Climate and Energy Action Plan	2020
NIRPC	NWI 2050+	2023
RTA	Transit is the Answer	2023
U.N. Office for Disaster Risk Reduction	Disaster Resilience Scorecard for Cities	2018
U.N. Office for Disaster Risk Reduction	Sendai Framework for Disaster Risk Reduction 2015-2030	2015
Verband Region Stuttgart (Stuttgart region, Germany)	Climate Planning Strategy	2019
Village of Algonquin	Environmental Action Plan	2010
Village of Buffalo Grove	Environmental Plan	2014
Village of Deer Park	Deer Park Sustainability Report	2020
Village of Deerfield	Climate Action Report	2022
Village of Elburn	Comprehensive Plan, Sustainability Chapter	2013
Village of Homer Glen	Green Vision	2004
Village of Hoffman Estates	Sustainability Plan	2013
Village of La Grange Park	Sustainability Plan	2012
Village of Lombard	Local Climate Action Plan	2012
Village of Millbrook	Comprehensive Plan	2009
Village of Monee, Peotone, University Park	Green Communities Vision	2009
Village of Niles	Environmental Action Plan	2013
Village of Northbrook	Northbrook Climate Action Plan	2021
Village of Oak Park	Climate Ready Oak Park	2022
Village of Oak Park/River Forest	Sustainability Plan	2012
Village of Orland Park	Comprehensive Plan, Sustainability Chapter	2013
Village of Park Forest	Growing Green: Park Forest Sustainability Plan	2012
Village of Park Forest	Park Forest Climate Action and Resilience Plan	2019
Village of Robbins	Green Communities Vision	2004
Village of Schaumburg	Comprehensive Green Action Plan	2008
Village of Skokie	Environmental Sustainability Plan	2022
Village of Sleepy Hollow	Green Communities Vision	2004
Village of Winnetka	Environmental & Forestry Commission, Strategic Plan	2010

Priority Climate Action Plan for the Chicago Metropolitan Statistical Area, 2024

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