MI HEALTHY CLIMATE

Implementing the MI Healthy Climate Plan

MICHIGAN'S PRIORITY CLIMATE ACTION PLAN

EGLE

MICHIGAN DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY

March 2024

EGLE

MICHIGAN DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY

This report is available digitally at Michigan.gov/EGLE

CONTENTS

State of Michigan
Priority Climate Action Plan

DEFINITIONS AND ACRONYMS

DEFINITIONS

Priority Climate Action Plan (PCAP): a narrative report that includes a focused list of near-term, high-priority, and implementation-ready measures to reduce GHG pollution and an analysis of GHG emissions reductions.

Comprehensive Climate Action Plan (CCAP): a narrative report that provides an overview of the grantees' significant GHG sources/sinks and sectors, establishes near-term and long-term GHG emission reduction goals, and provides strategies and identifies measures that address the highest priority sectors to help the grantees meet those goals.

Greenhouse Gas (GHG) Inventory: a list of emission sources and sinks and the associated emissions quantified using standard methods.

Low Income / Disadvantaged Communities (LIDACs): communities with residents that have low incomes, limited access to resources, and disproportionate exposure to environmental or climate burdens. Although the Inflation Reduction Act does not formally define LIDACs, EPA strongly recommends grantees use the Climate and Economic Justice Screening Tool and the Environmental Justice Screening and Mapping Tool to identify LIDACs in their communities. 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.

Metropolitan Statistical Area (MSA): A geographic entity delineated by the Office of Management and Budget for use by federal statistical agencies. Metropolitan statistical areas consist of the county or counties (or equivalent entities) associated with at least one urban area of at least 50,000 population, plus adjacent counties having a high degree of social and economic integration with the core as measured through commuting ties. Metropolitan statistical areas as defined by the U.S. Census 2020 MSA population.

State: One of the 50 U.S. states and the District of Columbia and Puerto Rico.

ACRONYMS

AVERT	AVoided Emissions and geneRation Tool
BEVs	Battery electric vehicles
BIL	Bipartisan Infrastructure Law
CCAP	Comprehensive Climate Action Plan
CEJST	Climate and Economic Justice Screening Tool
CH_4	Methane
CO_2	Carbon dioxide
CO_2FFC	Carbon dioxide from Fossil Fuel Combustion
CO	Carbon monoxide
CPRG	Climate Pollution Reduction Grant
CRS	Carbon Reduction Strategy
DOE	United States Department of Energy
DTMB	Michigan Department of Technology, Management & Budget
EAT	Energy Auditor Training
EGLE	Michigan Department of Environment, Great Lakes, and Energy
EJScreen	EPA's Environmental Justice Screening and Mapping Tool
EPA	Environmental Protection Agency
EPS	Energy Policy Simulator
ETIP	Energy Transition Impact Project
EVSE	Electric vehicle supply equipment
EWR	Energy Waste Reduction
F-gases	Fluorinated greenhouse gases
FPL	Federal Poverty Line
GHG	Greenhouse gas
GHGRP	Greenhouse Gas Reporting Program
GVMC	Grand Valley Metro Council
HVAC	Heating, ventilation, and air conditioning

ICEs	Internal combustion engines
IIJA	Infrastructure Investment and Jobs Acts
IRA	Inflation Reduction Act
LIDAC	Low-income and disadvantaged community
LEO	Michigan Department of Labor and Economic Opportunity
LPO	Loan Program Office
LULUCF	Land Use, Land Use Change, and Forestry
MAC-EJ	Michigan Advisory Council on Environmental Justice
MDARD	Michigan Department of Agriculture and Rural Development
MDHHS	Michigan Department of Health and Human Services
MDOT	Michigan Department of Transportation
MHCP	MI Healthy Climate Plan
MMTCO2E	Million metric tons of carbon dioxide equivalent
MiEJScreen	Michigan's Environmental Justice Screening and Mapping Tool
MTEG	Michigan Tribal Environmental Group
MW	Megawatt
NEVI	National Electric Vehicle Infrastructure
NF_3	Nitrogen trifluoride
NOx	Nitrogen oxides
N_2O	Nitrous Oxide
NREL	National Renewable Energy Laboratory
OCE	EGLE's Office of Climate and Energy
PACE	Powering Affordable Clean Energy
PCAP	Priority Climate Action Plan
PFC	Perfluorocarbon
PM2.5	Particulate matter
RAISE	Rebuilding American Infrastructure with Sustainability and Equity
RECI	Resilient and Efficient Codes Implementation

State of Michigan
Priority Climate Action Plan

RFI	Request for Information
R-STEP	Renewable Energy Siting through Technical Engagement and Planning
SEMCOG	Southeast Michigan Council of Government
SF$_6$	Sulfur hexafluoride
SIT	EPA's State Inventory Tool
SMART	Strengthening Mobility and Revolutionizing Transportation
SOx	Sulfur oxides
TREC	Training for Residential Energy Contractors
UCPB	Utility Consumer Participation Board
UP	Michigan's Upper Peninsula
VOC	Volatile organic compound
WAP	Weatherization Assistance Program

LIST OF FIGURES

LIST OF TABLES

State of Michigan
Priority Climate Action Plan

EXECUTIVE SUMMARY

This document outlines the State of Michigan's Priority Climate Action Plan (PCAP), developed as part of the EPA's Climate Pollution Reduction Grant Program. Michigan's PCAP closely follows the framework and key strategies laid out in the MI Healthy Climate Plan (MHCP). The PCAP involved statewide community engagement and development of a greenhouse gas (GHG) inventory to establish priority reduction measures, quantify potential GHG emission reductions, analyze benefits for low-income and disadvantaged communities (LIDACs), and provide commentary on the authority to implement the identified measures, intersection with other funding opportunities, and information about the workforce required to realize the measures.

Of these elements, the key outcomes include:

- **Community Engagement:** Extensive statewide community engagement efforts, including public meetings, surveys, and focus groups, identified key priorities and concerns including topics around environmental justice and all areas of Michigan's economy.

- **Michigan's GHG Emissions Inventory:** As of 2019, Michigan's net GHG emissions were 166.73 MMTCO2E, a 15% decrease from the baseline year of 2005. The Energy inventory sector remains the largest emitter, followed by Industrial Processes and Waste.

- **Priority Reduction Measures:** GHG reduction measures were evaluated and prioritized for the PCAP in the following sectors:

  - Electricity Generation
  - Commercial and Residential Buildings
  - Transportation
  - Industry

  The selected reduction measures identify several strategic priorities inclusive of renewable energy deployment, expansion of energy efficiency, electrification of the transportation and built environment, increased access to public transit, emphasis on methane reductions, and more.

- **LIDAC Benefits Analysis:** The PCAP prioritizes measures that benefit LIDACs by reducing emissions, improving air quality, and creating clean energy jobs. These communities often experience disproportionate negative impacts from climate change and pollution, and the PCAP aims to analyze and address these disparities through its priority reduction measures.

- **Next steps**: Refinement of several areas to build off PCAP learnings in development of the Comprehensive Climate Action Plan (CCAP) include deeper analysis in all areas of the PCAP, additional engagement with communities across the state, preparation for implementation grant applications, and more.

The PCAP represents a significant opportunity in Michigan's efforts to address climate change and create a more sustainable future for all residents through the implementation of the MI Healthy Climate Plan. It is important to note that achieving these ambitious goals will require sustained commitment, collaboration, and investment from all levels of government, businesses, and communities.

1. INTRODUCTION

1.1 CLIMATE POLLUTION REDUCTION GRANT (CPRG) OVERVIEW

The United States Environmental Protection Agency (EPA) issued planning grants under Phase I of the Climate Pollution Reduction Grant (CPRG) program to support interested states, metropolitan statistical areas (MSAs), tribes, and territories to develop and implement plans for reducing greenhouse gas (GHG) emissions and other harmful air pollutants. The State of Michigan's Department of Environment, Great Lakes, and Energy (EGLE) received a $3 million planning grant to write both a Priority and Comprehensive Climate Action Plan due in early 2024 and mid-2025, respectively. The Priority Climate Action Plan (PCAP) provides the State of Michigan with funds to, at a minimum, develop a GHG inventory, select and quantify priority near-term GHG reduction measures, perform a low-income and disadvantaged communities (LIDAC) benefits analysis, and review the authority to implement selected GHG reduction measures. A Comprehensive Climate Action Plan (CCAP) will be developed following the completion of this PCAP to build upon these elements and expand to include an updated GHG inventory, GHG emissions projections and reduction targets, a statewide community benefits analysis, additional community engagement, and comprehensive reduction measures.

EGLE is consistently searching for ways to bring sustainable solutions to Michigan to reduce greenhouse gas emissions, opening the opportunity to improve the lives of Michiganders through economic and health benefits. EPA's CPRG program is another opportunity for the State of Michigan to define near-term goals and spur action in implementing the MHCP key strategies. Developing a PCAP allows eligible entities to apply for CPRG Implementation Funds to implement the priority reduction measures with the main objective to reduce greenhouse gases through policies and programs that focus on near-term, high impact reductions.

NOTE: There are recommendations throughout this document that may help in guiding individual application processes for eligible entities applying to the CPRG implementation grant.

1.2 PCAP OVERVIEW AND DEFINITIONS

The State of Michigan's PCAP covers all requirements as stipulated by the EPA in the following structure:

1. **Introduction:** Inclusive of PCAP document components, EGLE's high-level approach to the CPRG Program and the PCAP, the scope of this document, and methods used to develop each PCAP component.

2. **State Context:** Inclusive of details around the existing MI Healthy Climate Plan

3. **PCAP Elements:** Inclusive of the GHG inventory, an overview of statewide LIDACs, and each selected GHG reduction measure with its associated reduction measure description and quantification, LIDAC qualitative and quantitative community benefits analysis, a review of authority to implement, intersection with other funding availability, and a workforce planning analysis.

4. **Conclusion and Next Steps:** Inclusive of commentary on the strategy to develop the CCAP including a more detailed analysis on PCAP elements.

1.3 SCOPE OF THE PCAP

The geographic territory for EGLE's CPRG program covers the entire State of Michigan. Engagement sessions as part of the CPRG and the GHG inventory reached all regions of the state. In parallel, key sectors were identified for focus on the near-term PCAP requirements. These sectors represent the highest-emitting sectors in Michigan and oftentimes, the greatest ability to achieve near-term GHG reduction impact as emphasized by the EPA. The key sectors prioritized in the PCAP are as follows:

1. Electricity Generation
2. Commercial and Residential Buildings
3. Transportation
4. Industry

These sectors use language as suggested by the EPA[1], which align with key recommendations in the MHCP:

EPA Sector	MHCP Key Recommendation
Electricity Generation	Clean the Electric Grid
Commercial and Residential Buildings	Repair and Decarbonize Homes and Businesses
Transportation	Electrify Vehicles and Increase Public Transit
Industry	Drive Clean Innovation in Industry

---

[1] EPA Program Guidance

2. APPROACH TO DEVELOPING THE PCAP

The State of Michigan's approach to developing the PCAP is depicted in Figure 1: EGLE's approach to developing the PCAP. The PCAP is intended to help the State build upon and continue implementation of the MI Healthy Climate Plan released in 2022 while keeping the EPA strategic goals for the CPRG program top of mind. The MHCP is the state's roadmap with key actions to reach its goal of carbon neutrality by 2050, and is centered around the following six pillars:

1. Committing to Environmental Justice and Pursuing a Just Transition
2. Cleaning the Electric Grid
3. Electrifying Vehicles and Increasing Public Transit
4. Repairing and Decarbonizing Homes and Businesses
5. Driving Clean Innovation in Industry
6. Protecting Michigan's Land and Water

Several committees, plans, and follow-on commitments have been made to progress Michigan's journey towards carbon neutrality, illustrated more in depth in the following section. Michigan builds from the foundation established by the MHCP development process along with previous engagements to align CPRG requirements with existing initiatives, accelerating progress and amplifying impact.

Figure 1: EGLE's approach to developing the PCAP.
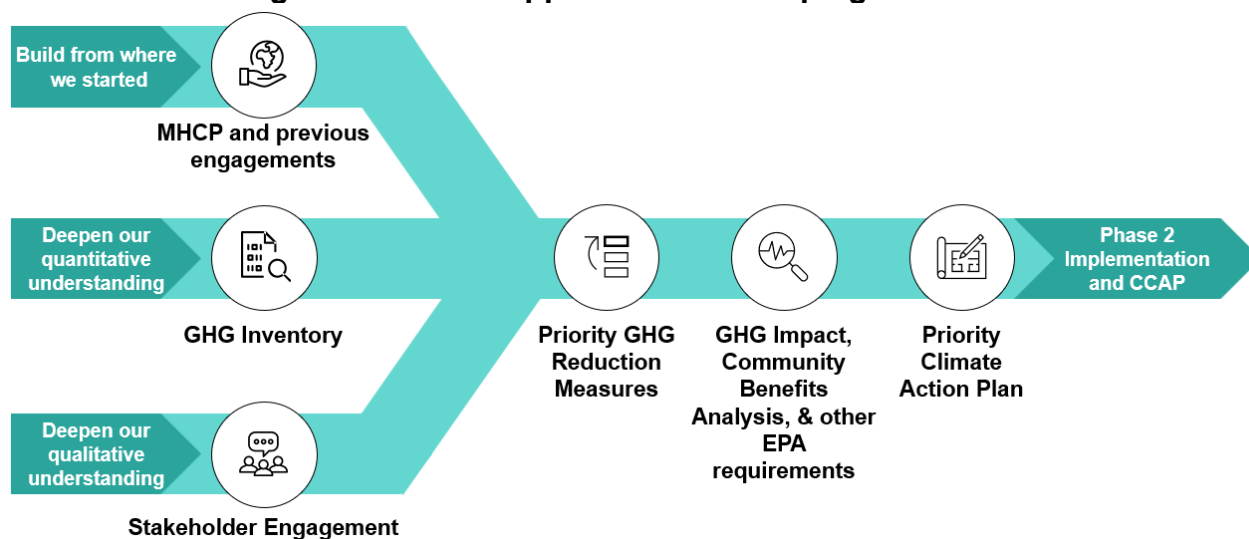
The CPRG program is an opportunity for Michigan to deepen both the qualitative and quantitative understanding of the impact of GHG emissions on the State with a focus on the priorities outlined in the MHCP. Qualitatively, Michigan was able to understand current barriers, needs, and solutions towards MHCP implementation through multiple novel and ongoing community engagement and a LIDAC benefits analysis. From a quantitative perspective, EGLE developed a GHG inventory to better understand the State's emissions profile and then, prioritize and quantify GHG reduction measures in addition to quantifying LIDAC benefits. The

State of Michigan
Priority Climate Action Plan

culmination of these analyses, along with initial workforce and funding analyses, further enables the understanding of Michigan's needs in securing a sustainable future and realizing its long-term vision for individuals, families, and the State more broadly (described in **Figure 2)**.

The CPRG program is an opportunity for Michigan to reach this long-term vision by augmenting existing actions and priorities within the state. Thus, EGLE carefully considered the EPA strategic goals and CPRG objectives and priorities while developing each action related to this PCAP. For example, upon prioritizing reduction measures, EGLE evaluated the durability, replicability, and near-term GHG reduction impact of potential measures. More details around the approach to collaboration, engagements, and analyses are described below.

Figure 2: The intended outcomes of the State's priority reduction measures exactly mirror those listed in the MHCP.

In Michigan in 2050...

Every individual has clean air to breath and clean water to drink.

Every business and household has access to affordable energy sourced from reliable, clean energy.

Every worker has a good-paying, sustainable job to support their family.

Every resident has access to clean, affordable transportation.

Every family lives in a healthy, sustainable, efficient home.

Every individual has easy access to healthy, affordable, local food.

Every resident has safe, natural spaces to enjoy.

Every community has the resources to be resilient to the impacts of climate change.

Michigan has addressed racial disparities in health outcomes.

Michigan is globally known for its leadership in clean innovation and industry.

Michigan's land and resources are abundant and healthy.

Michigan has mitigated the worst impacts of climate change and worked to adapt and become resilient to existing impacts of climate change

2.1 COLLABORATION AND COMMUNITY ENGAGEMENT METHODOLOGY

Throughout the CPRG PCAP process, the State of Michigan has developed various ways to engage communities and maintain ongoing collaboration with the goal of creating a holistic, inclusive PCAP composed of Michigan's highest priority needs influenced by citizens and experts alike.

EGLE has long-standing collaborative relationships with several entities that continued and broadened to incorporate PCAP-specific discussions. For instance, as Southeast Michigan Council of Government (SEMCOG) and Grand Valley Metro Council (GVMC) were the two Michigan MSAs that received funding to develop their own PCAPs, EGLE met with SEMCOG and GVMC on a biweekly basis to share approach, status, and provide overall collaboration and

alignment throughout the process. Separately, Michigan met with all twelve of Michigan's federally recognized tribal governments regularly and bi-weekly with those tribes that received a CPRG planning grant. Some other entities with ongoing relationships that provided input on the PCAP whether directly or indirectly include the Michigan Advisory Council on Environmental Justice (MAC-EJ), Upper Peninsula (UP) Clean Energy Coalition, Catalyst Communities, Council on Climate Solutions, EGLE Climate Liaisons, interagency groups, community members, regional planning districts, municipalities, utilities, universities, students, labor unions and associations, and more.

EGLE organized additional engagement as part of the PCAP process with three main objectives:

1. Educate and excite communities about sustainability goals and progress occurring in the state
2. Inform priority reduction measure selection and understand barriers and solutions for the implementation of reduction measures across key sectors through the lived experiences of affected communities
3. Play a role to organize projects with near-term focus on prioritizing high GHG emissions reductions initiatives

Community engagement content and activities were also developed with consideration of EGLE's core principles including empathy, equity, accessibility, transparency, continuous improvement, and place-based engagement for all engagement sessions. As part of ongoing collaboration and continuous improvement, EGLE released a Request for Information (RFI) to seek input from the public on topics related to community engagement and implementation of the MHCP. The feedback received from this RFI was used to develop the objectives and incorporated into the PCAP community engagement sessions.

The community engagement objectives and core principles were to be completed and incorporated within five in-person engagement sessions held for the public in different regions throughout the State (Detroit, Grand Rapids, Flint, Marquette, and Petoskey) and two virtual public listening sessions to capture ideas from as many people as possible while remaining aligned with EPA's PCAP deadline. One additional in-person session was held in Acme to gather specific input from Michigan's federally recognized tribes during a quarterly Michigan Tribal Environmental Group (MTEG) meeting. To accomplish these goals and principles, the in-person community engagement content and interactive exercises were iterated several times in preparation for facilitation and to achieve successful outcomes. EGLE made a deliberate effort to ensure that voices from low-income, disadvantaged, and historically underserved communities were included in these sessions.

To prioritize gaining community member feedback for each engagement session, events were held in the evening and locations were chosen with local partners, close to venues with public transit access in order to increase participation. Additionally, general locations were selected with low income and disadvantaged communities in mind. Of the six counties with the highest amount of census tracts identified as LIDACs, five of them are within close proximity to Detroit and Flint, comprising 55% of all census tracts identified by CEJST as LIDACs. The remaining county is Kent County, where the Grand Rapids engagement was held. Petoskey and Marquette also have identified LIDAC census tracts. Michigan's Upper Peninsula, where the Marquette engagement was held, is also identified by the DOE as a Priority Energy Community, meaning supplemental resources are provided to these communities as they are vulnerable to coal job loss impacts.[2]

EGLE focused most of each session on the group activity and discussion. As a result, about 25% of the time spent was used to educate and excite communities about Michigan's climate plans and progress and 75% of the time was spent on group activities. The sessions were organized around the MI Healthy Climate Plan pillars that correspond to key industry sectors as shown in Figure 3.

Figure 3: Industry sectors corresponding to the six pillars of the MHCP.

Industry Sectors	MHCP Pillars
Across all industry sectors	Commit to environmental justice and pursue a just transition
Energy Production, Transmission, Distribution, and Storage	Clean the electric grid
Transportation and Mobility	Electrify vehicles and increase public transit
Building and Housing	Repair and decarbonize homes and businesses
Energy Intensive Industries	Drive clean innovation in industry
Natural and Working Lands and Forest Products	Protect Michigan's land and water

---

[2] energycommunities.gov/priority-energy-communities/

Prior to the group activity portion, the in-person sessions began with information on the MI Healthy Climate Plan, Climate Pollution Reduction Grant, other climate-related state programs, as well as other opportunities to get or stay involved. The interactive activities included the following:

Figure 4: In-person engagement session held in Detroit in November 2023.

1. **Breakout Group Activity**: Two rounds of participants selecting a key industry sector they want to discuss. As stated in the MI Healthy Climate Plan, each sector lists specific goals to achieve by 2030. Participants were tasked with discussing barriers, potential solutions, and benefits that may be realized by these solutions to achieve the goals set out in the MI Healthy Climate Plan.

2. **Gallery Walk**: Participants viewed the responses from the breakout group activity for all key sectors, added additional comments where they felt necessary, and uplifted any responses which they found most important, whether they be barriers, solutions, or benefits.

Figure 5: In-person engagement session held in Petoskey in December 2023.

3. **Report-out**: All participants came together as one group to discuss key takeaways or popular topics discussed throughout the session.

The sessions concluded with additional information and resources to stay up to date on progress. The in-person engagement sessions that occurred within the MSAs that received EPA CPRG planning grants were facilitated in collaboration with the lead agencies receiving the awards, SEMCOG and GVMC.

Virtual listening sessions were similar to an open-forum comment period for Michiganders to discuss any topic as it related to prioritization of measures for inclusion in the PCAP and broader MI Healthy Climate Plan implementation. To provide context and accomplish education around Michigan goals and progress in climate-related initiatives, each session began like the in-person sessions with a discussion of the MI Healthy Climate Plan, Climate Pollution Reduction Grant, other climate-related state programs, and other opportunities to get or stay involved prior to starting the open forum portion. The open forum portion consisted of participants raising their hand and taking turns to discuss any climate-related topic area they wish. Each participant had three minutes to speak to encourage feedback from all attendees on the call. Virtual listening sessions concluded by providing information and resources to stay involved with the MI Healthy Climate Plan.

2.2 GHG Inventory Methodology

The 2024 Michigan Greenhouse Gas Emissions Inventory was developed by EGLE to offer increased transparency and commitment to Michigan's sustainability goals. The purpose of the inventory is to provide the MI Healthy Climate Plan and other initiatives in pursuance of the Plan's goals with a quantifiable baseline of comparison for emissions reductions.[3]

The 2024 GHG Inventory is the second of two inventories developed for the State of Michigan, the first of which was developed in 2005 and compared emissions between 1990 and 2002.[4] Michigan's 2024 inventory examines 2005 and 2019 GHG emissions and overall trends from 1990 to 2019. The 2024 GHG Inventory was developed using the EPA's State Inventory Tool (SIT) (February 2023 version, with data updated through 2020) as a framework, while replacing and supplementing default emission data with state-specific data where appropriate. For more information on the methodology behind the greenhouse gas inventory, refer to the SIT Methodology which can be found via the module user guides available on the EPA's website.[5]

NOTE: For those applying for implementation grants within the State of Michigan under the EPA's CPRG program, please use 2019 as your reference year for emission data to ensure consistency between applications and comparability in emissions reduction calculations.

2.3 Priority Reduction Measure Selection and Quantification Methodology

Priority GHG Reduction Measures were selected and quantified based upon a rigorous process to vet and estimate the potential impact on Michigan's GHG emissions. To evaluate reduction measures, input was collected from numerous engagements with various groups including but not limited to:

- Catalyst Communities Initiative
- Request for Information on Community Engagement
- Public Call for Projects Form
- Council on Climate Solutions: Workgroup Recommendations[6]
- CPRG Engagement In-Person Engagement Sessions
- CPRG Engagement Virtual Listening Sessions
- Request for Information on the Implementation of the MI Healthy Climate Plan
- UP Energy Task Force Committee Recommendations
- Ad-hoc submittals to EGLE-OCE@Michigan.gov

---

[3] mhcp-egle.hub.arcgis.com/
[4] css.umich.edu/publications/research-publications/michigan-greenhouse-gas-inventory-1990-and-2002
[5] epa.gov/statelocalenergy/state-inventory-and-projection-tool
[6] michigan.gov/egle/about/Groups/Council-on-Climate-Solutions/Workgroup-Recommendations

Selection and prioritization of GHG reduction measures considered approximately 800 ideas provided by feedback received across engagement sessions, recommendations, and individual submittals. These 800 ideas were then sorted into the 6 pillars described in the MHCP before being evaluated. They then moved through the prioritization framework as described in Figure 6 to best identify the measures that were aligned to the MHCP, replicable across the state, had the greatest GHG reduction impact potential, and aligned with other CPRG requirements as established by the EPA.

By following this framework, EGLE aimed to:

- Focus on Michigan's highest-emitting sectors with the goal of high-impact, near-term GHG emissions reductions
- Continue the momentum the MHCP started by aligning initiatives
- Abide and prioritize by EPA requirements to best position Michigan to receive CPRG implementation funds

Figure 6: EGLE's Priority Reduction Measure Selection Methodology

Collect and Sort
Aggregate responses from 8 feedback sources and sort them by pillars and sectors

Ensure Replicability / Scalability
Determine if the idea can or should be scaled across the state due to state-wide issue and legislative ability

Quantify Measures
Begin quantification and LIDC analysis for measures to influence final decision making

1 → 2 → 3 → 4 → 5 → 6

Align to MHCP Strategies
Cross-reference ideas to ensure alignment with the key strategies described in the MHCP

Categorize and Combine
Aggregate similar ideas to expand impact of the measure and capture level of specificity for a reduction measure

Rank and Select
Order by greatest potential GHG reduction impact and select final reduction measures on holistic state-wide view

All received and ongoing feedback will be re-evaluated for the CCAP as changes in the legislative, economic, and technological environments occur upon development.

Quantifying priority reduction measures followed six steps to carry out the analyses:

1. Investigate emissions reduction source per reduction measure and best available quantification tool (whether federal, peer-reviewed, etc.)
2. Collect applicable data from reliable sources and existing MHCP goals, documenting assumptions related to data collection
3. Quantify emissions using the best identified tool

4. Validate emissions quantification with secondary tool as possible, documenting variances in quantification tool assumptions
5. Record the estimated annual emissions reduction, emissions reductions from 2024-2030, and emissions reductions from 2024-2050 for each priority reduction measure
6. Contextualize and include key assumptions in the write-up for each priority reduction measure

Quantification was completed across sectors, isolating emissions reductions across measures. Affected sectors for one reduction measure quantification were included where possible. Effects on one reduction measure were not compounded if another reduction measure were assumed to be implemented.

2.4 LIDAC BENEFITS ANALYSIS METHODOLOGY

The LIDAC benefits analysis is composed of three primary sections:
1. Understanding of low-income and disadvantaged communities across the State of Michigan
2. Research and analysis around the hardest-hitting areas for LIDACs across the State of Michigan
3. Analysis of the specific quantitative and qualitative nature of effects on emissions reductions for each priority reduction measure

The tools used in the LIDAC analysis include the Climate and Economic Justice Screening Tool (CEJST), the EPA's Environmental Justice Screening and Mapping Tool (EJScreen), and MiEJScreen, the State of Michigan's environmental justice screening tool. Each census tract deemed low-income and/or disadvantaged by the following EPA definition according to posted CPRG guidance was included in the overall analysis. A list of all identified census tracts can be found in **Appendix C: CEJST Census Tracts**.

LIDAC Definition:
1. Any census tract that is included as disadvantaged in the CEJST
2. 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 relevant state
3. Any geographic area within tribal lands as included in EJScreen

Following the analysis and comparison of how these three tools interact, research and analysis were completed to understand the greatest potential benefits communities may realize from implementation of the reduction measures, and the MHCP as a whole. These areas include air quality and public health, energy burden, workforce, and climate resilience. The benefits analysis then talks about the components included within each reduction measure including co-pollutants, avoided deaths by race, avoided lost workdays, avoided respiratory symptoms and bronchitis, avoided hospital admissions, and avoided minor restricted activity days. All priority

reduction measures aimed to quantify each of these areas, though, due to the variety of tools used in emissions reduction quantification, this is not always the case.

2.5 REVIEW OF AUTHORITY METHODOLOGY

The Michigan PCAP is designed to identify implementation ready and high-priority actions that can be taken to reduce GHG emissions in the near-term. The focus is on measures that can be implemented using existing authority, without the need for significant legislative changes. The PCAP measures are drafted with replicability and scalability in mind, allowing for various implementation approaches involving different state agencies or local governments. Additional context on Michigan's authority to implement measures, while not exhaustive, are further described in Section 4.4 and in each priority measure in Section 5.

2.6 INTERSECTION WITH OTHER FUNDING AVAILABILITY

Each priority reduction measure includes a subsection describing any existing federal funding the State of Michigan has received to implement projects related to specific measures. This analysis was completed by researching an exhaustive list of available federal funding opportunities for each measure and categorizing their status with the State of Michigan into received funds, applying for funds, planning to apply, did not receive funds, or did not apply. Additional context on the coordinated efforts Michigan manages to receive funds and implement the MHCP are described in Section 4.6 and in each priority measure in Section 5.

2.7 WORKFORCE PLANNING ANALYSIS

Each priority reduction measure includes a subsection detailing current and changing workforce metrics. The existing number of jobs in broad categories (e.g., renewable energy, energy efficiency, etc.) are included in each measure along with the types of jobs to be created and the projected change in number of jobs by implementing the measure, where possible. All information was researched or analyzed using the Energy Policy Simulator. Additional context on the existing workforce planning activities occurring within Michigan, while not exhaustive, are briefly described in Section 4.6 and in each priority measure in Section 5.

3. STATE CONTEXT

Michigan's GHG emissions come from a wide variety of sources, including the burning of coal and natural gas to produce electricity; the use of diesel and gasoline for transportation; heating of homes and buildings; industrial processes in industry; methane and other emissions from waste; and agricultural processes.

The State of Michigan's Executive Directive 2020-10 spurred the development and creation of the MI Healthy Climate Plan. The MHCP was released in April 2022 and developed with input from hundreds of Michigan residents, including leaders and advocates in environmental justice, public transit, local food, climate action, business, labor, academia, government, and people of all political persuasions and walks of life.

Figure 7: The seven objectives of the MHCP.

The MHCP lays out a pathway for Michigan to reach 100% carbon neutrality by 2050 to avert the worst impacts of the climate crisis, create good-paying jobs, and build a healthier, more prosperous, equitable, and sustainable Michigan for all Michiganders. It has seven objectives as listed in Figure 7.

The MHCP outlines key strategies across Michigan's economic sectors. It strongly emphasizes environmental justice to ensure Michigan's climate strategies uplift every portion of the State, including individuals and communities that have borne the brunt of climate impacts as well as associated criteria air pollutants and are at the greatest risk of being left behind in the transition ahead. Due to the robust research and development that went into the creation of the MHCP, all CPRG PCAP components use the data and information in the MHCP as a foundation for prioritizing and decision making on the State's near-term priorities. Executive Directive 2020-10 spurred several initiatives led by EGLE today such as the formation of councils, workgroups, opportunities for comment, and state grant programs which helped create the MHCP and now, they help progress the implementation of the MHCP. EGLE sees the EPA's CPRG program as an opportunity to bolster the MHCP and implement its key strategies. Therefore, the different components of this PCAP align with the goals set out in the MHCP.

The MHCP identifies what needs to happen for Michigan to reach carbon neutrality by 2050, with a priority on actions from now until 2030. It focuses most heavily on the areas in Michigan where the biggest, most rapid gains in GHG reductions can be made, namely energy, transportation, and buildings. The CPRG offered an opportunity to refresh Michigan's GHG Inventory. The inventory shows that Michigan's net GHG emissions as of 2019 are 166.73 $MMTCO_2E$ which is an overall decrease of approximately 15% since the baseline year of 2005, as used in the MHCP. Electric utilities and transportation lead in CO_2 emissions from fossil fuel combustion, accounting for 35% and 32% of total CO_2 emitted, respectively. The MHCP groups the climate actions needed to achieve the State's goals into six categories, each with targeted sub-goals as shown in Figure 9.

Figure 8: MI Healthy Climate Plan's long-term goals

Long-term MHCP Goals

Reduce greenhouse gas emissions 52% by 2030

Carbon neutrality by 2050 & maintain net negative GHG emissions thereafter

Address environmental injustices related to climate

2023 marked a transformative year for Michigan in the ability to implement the MHCP and transition to a sustainable economy due to the passing of several legislative initiatives. A series of bills were passed to mandate implementation of key provisions in the MHCP. These legislative wins include commitments to clean energy standards, renewable energy goals, expanded options for rooftop solar, energy efficiency initiatives, and measures to address environmental justice and workforce development. The legislation signed by Governor Whitmer in July and November 2023 positions Michigan as a national clean energy leader, including advancing priorities including, increasing renewable energy deployment, lowering energy costs, prioritizing environmental justice, and securing living wages for clean energy workers. These efforts aim to meet ambitious climate goals while supporting economic growth and equity in Michigan's transition to a cleaner energy future. For more information about the recent legislation, please view MI Healthy Climate Plan 2023 Report.

**Figure 9: MI Healthy Climate Plan's
sector-specific goals organized by MHCP Pillar**

MHCP Pillars	MHCP Goals
Commit to environmental justice and pursue a just transition	Ensure that at least 40 percent of state funding for climate-related and water infrastructure initiatives benefit Michigan's disadvantaged communities; that Justice40 is developed in partnership with leaders in disadvantaged communities; and that Michigan emphasizes a just transition for all workers through proactive engagement, job training, and workforce
Clean the electric grid	Generate 60 percent of the state's electricity from renewable resources and phase out remaining coal-fired power plants by 2030. Limit energy burden from powering and heating homes to not more than 6 percent of annual income for low-income households.
Electrify vehicles and increase public transit	Build the infrastructure necessary to support 2 million electric vehicles on Michigan roads by 2030. Increase access to clean transportation options – including public transit – by 15 percent each year.
Repair and decarbonize homes and businesses	Reduce emissions related to heating Michigan homes and businesses by 17 percent by 2030. Increase investments in repairing and improving buildings to reduce costs for working families and small businesses.
Drive clean innovation in industry	Encourage clean innovation hubs where private enterprises strategically co-locate and collaborate to develop and deploy new, cleaner manufacturing technologies and conduct research and development to reduce emissions from hard to decarbonize industries. Triple Michigan's recycling rate to 45 percent and cut food waste in half by 2030.
Protect Michigan's land and water	Protect 30 percent of Michigan's land and water by 2030 to naturally capture GHG emissions, maintain and improve access to recreational opportunities for all Michiganders, and protect biodiversity. Leverage innovative strategies to support climate-smart agriculture.

State of Michigan
Priority Climate Action Plan

4. PCAP ELEMENTS

This section discusses the results of:

1. Michigan's 2024 GHG Inventory
2. Community Engagement
3. LIDAC Benefits Analysis
4. Review of Authority to Implement Measures
5. Funding Opportunities in Michigan
6. Workforce Planning in Michigan

These findings directly aided in the selection of the priority reduction measures, further detailed in Section 5.

4.1 GREENHOUSE GAS INVENTORY

The State of Michigan completed its first GHG inventory in 2005 supported by the Center for Sustainable Systems at the University of Michigan.[7] The first inventory focused on profiling GHG emissions from 1990 and 2002 across the state. This subsequent inventory will contribute an updated methodology and corresponding calculations to the years previously covered and focus the analysis on GHG emissions across Michigan for the years of 2005 and 2019.

Since the original inventory was published, sustainability continues to be of ever-increasing importance given the threat of irreversible climate change and drastic weather events. In September 2020, Governor Whitmer signed Executive Directive 2020-10, which committed Michigan to achieve economy-wide carbon neutrality no later than 2050 and then maintain net-negative greenhouse gas emissions thereafter. The governor also reaffirmed the goals in Executive Directive 2019-12, which committed Michigan to pursue at least a 26-28% reduction below 2005 levels in GHG emissions by 2025. In addition to the goals set by these directives, Michigan joined 24 other states and Puerto Rico – under the umbrella of the U.S. Climate Alliance – in committing to an interim goal of a 52% GHG reduction by 2030.[8] In alignment with these goals, EGLE has developed this inventory to increase transparency surrounding the current state of GHG emissions, as well as provide a common and consistent baseline of comparison when analyzing potential emission reduction opportunities.[9]

Both iterations of the State of Michigan's GHG inventory use the EPA's State Inventory Tool (SIT) as a main source of data and modeling.[10] The SIT relies on data from both state and federal sources and consists of 11 modules, the makeup of which is shown in Table 1, to

---

[7] css.umich.edu/publications/research-publications/michigan-greenhouse-gas-inventory-1990-and-2002
[8] usclimatealliance.org/members/
[9] mhcp-egle.hub.arcgis.com/
[10] epa.gov/statelocalenergy/state-inventory-and-projection-tool

calculate state-wide GHG emissions. The SIT also includes a synthesis module to perform an inventory sector-based analysis of each module, and consequently organizes them into a single emission profile for a given state. The SIT provides default data from 1990 – 2020 which this inventory uses as the base for analysis, adding in state-specific data where default data is either unavailable or better represents Michigan's emissions activity. For detailed descriptions of data sources and other methodology, please refer to EPA's posted SIT documentation[11].

Table 1: Gases Emitted by Inventory Sector and Corresponding SIT Module

Inventory Sector	SIT Module	What gases are included?
Energy	CO$_2$ from Fossil Fuel Combustion Module	CO$_2$ from fossil fuel combustion for residential, commercial, industry, transportation, electric utilities economic sectors
	Stationary Combustion Module	CH$_4$ and N$_2$O emissions for residential, commercial, industrial, and electric utilities economic sectors
	Mobile Combustion Module	CH$_4$,N$_2$O for gasoline highway, diesel highway, non-highway, alternate fuel vehicles
	Coal Module	CH$_4$ for coal mining production *(not applicable to MI)*
	Natural Gas and Oil Module	CH$_4$ and N$_2$O for natural gas production, transmission, distribution, venting and flaring, and oil production, refining, and transportation
Industrial Processes	Industrial Processes Module	CO$_2$ for cement manufacturing, lime manufacturing, limestone and dolomite use, soda ash production, iron & steel production, and urea consumption
		N$_2$O for nitric acid production
		F-gases for ODS substitutes, semiconductor manufacturing, and distribution systems
Agriculture	Agriculture Module	CO$_2$ from liming
		CH$_4$ from enteric fermentation
		N$_2$O from manure management (direct and indirect soil management)
Waste	Solid Waste Module and Wastewater Module	CO$_2$ from waste combustion
		CH$_4$ from landfills
		N$_2$O from waste combustion
Land Use, Land Use Change, and Forestry	LULUCF Module	CO$_2$ sinks from net forest carbon flux, urban trees, and landfilled yard trimmings and food scraps
		N$_2$O from settlement soils

---

[11] epa.gov/statelocalenergy/download-state-inventory-and-projection-tool

The Energy sector comprises five modules including Carbon Dioxide (CO_2) from Fossil Fuel Combustion (across economic sectors including Residential, Commercial, Industrial, Transportation, Electric Power, and International Bunker Fuels), and additional modules which produce methane (CH_4), nitrous oxide (N_2O) and fluorinated greenhouse gases (F-Gases, consisting of hydrofluorocarbons (HFC), perfluorocarbons (PFC), nitrogen trifluoride (NF_3), and sulfur hexafluoride (SF_6)). These include Stationary Combustion (economic sectors which emit fossil fuels and wood including Residential, Commercial, Industrial, and Electric Power), Mobile Combustion (including Gasoline, Diesel, Non-Highway, and Alternative Fuel Types), Coal Mining, and Natural Gas & Oil. Additional analyses have been performed in the Electricity and Transportation sectors to translate the inventory sector approach to an economic sector approach. The State is committed to continued improvement and development of the inventory on an annual basis as new data and updated methodologies continue to become available.

NOTE: For those applying for implementation grants within the State of Michigan under the EPA's CPRG program, please use 2019 as your reference year for emission data to ensure consistency between applications and comparability in emissions reduction calculations.

4.1.1 Summary Results

Michigan's net GHG emissions as of 2019 equaled 166.73 MMTCO$_2$E, an overall decrease of approximately 15% since the baseline year of 2005 used in the MHCP. Figure 11 summarizes GHG emissions by inventory sector from 1990 to 2019. Energy, Industrial Processes, and Waste inventory sectors all experienced a reduction in emissions. Agriculture was the only inventory sector to experience an increase in emissions, with a 23% increase between 2005 and 2019. The Energy sector remains the largest emitting sector, making up 87% of Michigan's emissions in 2019 (see Figure 10). Refer to Refer to Appendix A: GHG Inventory Detailed Tables for a detailed look at GHG emissions by sector in 2005 and 2019.

Figure 10: Proportion of the State of Michigan's GHG emissions by inventory sector in 2019 as a percentage, demonstrating Energy as the highest emitting sector

Distribution of MI GHG Emissions by Inventory Sector (2019)

- Energy — 87.2%
- Industrial Processes — 6.0%
- Agriculture — 4.3%
- Waste — 2.5%
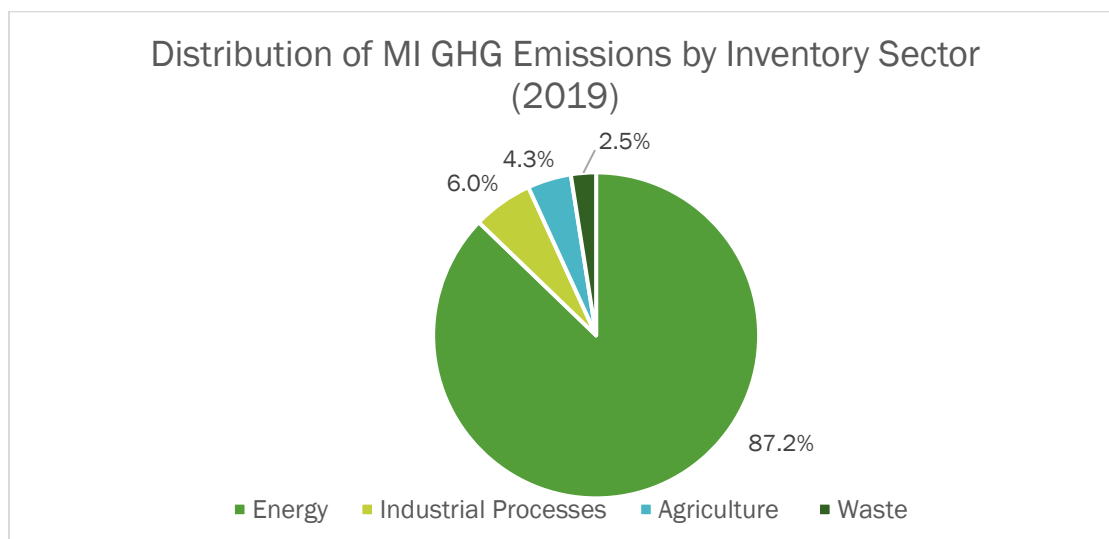
Figure 11: Michigan GHG Emissions by SIT Module in MMTCO2E (1990 to 2019)

Michigan GHG Emissions by Sector in MMTCO₂E (1990 to 2019)
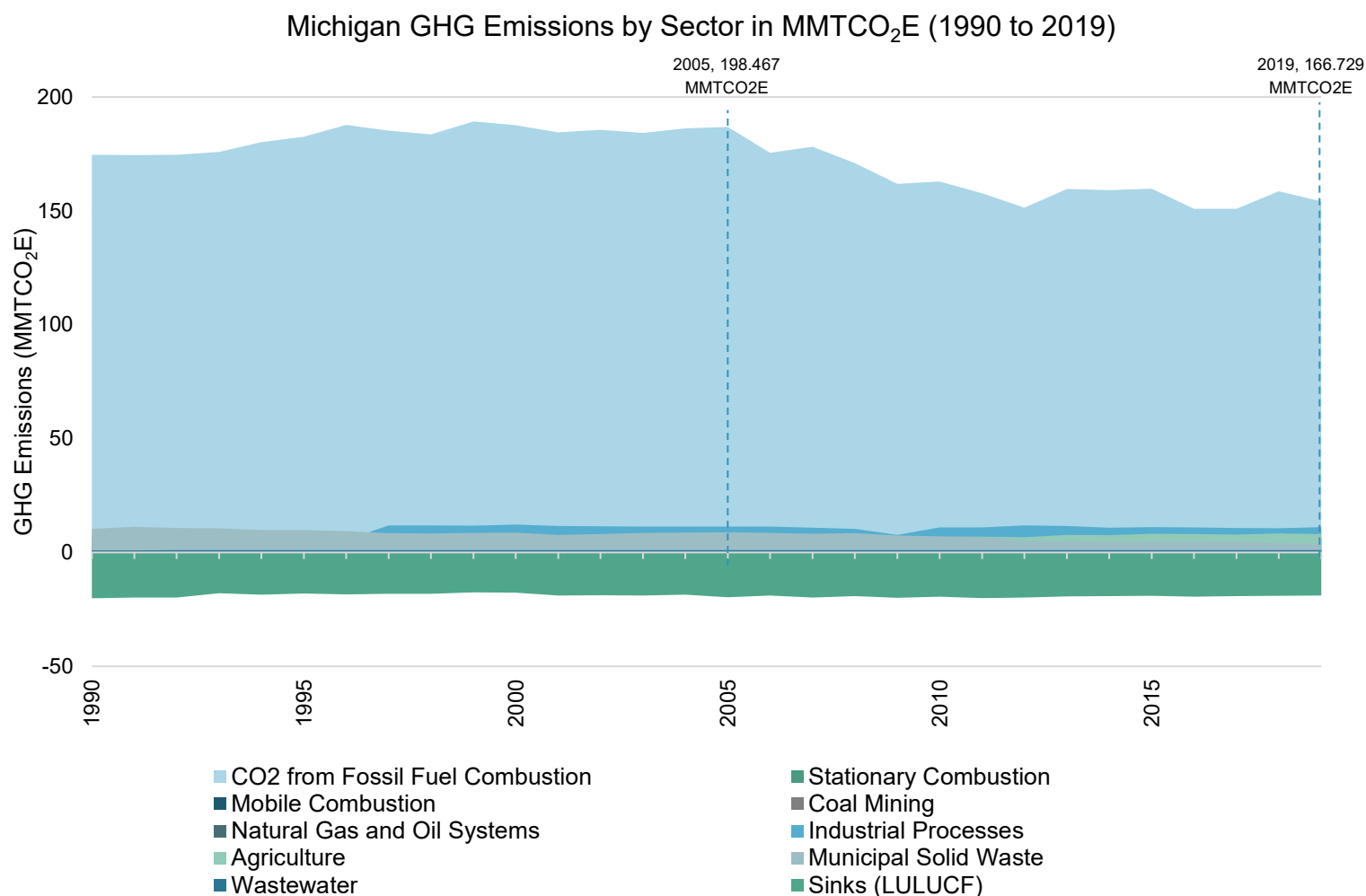
4.1.2 Detailed Results

GHG Emissions Trends

Quantifying and tracking annual GHG emissions as well as sector-based trends is critical to setting GHG reduction targets and developing a healthier, more equitable, and sustainable economy for Michiganders. Understanding where Michigan's emissions are most prevalent helps direct resources and efforts towards the largest emitting sectors as Michigan works in both the near- and long-term to prioritize deployment of sustainable technologies, policies, and programs.

Figure 12 shows the proportion of GHG emissions by inventory sector as a percentage of total GHG emissions from 1990 to 2019 for the State of Michigan. Inventory sectors include Waste, Agriculture, Industrial Processes, and Energy. As shown, Energy accounts for nearly 90% of Michigan's overall GHG emissions, and is made up from the following SIT modules:

Figure 12: The State of Michigan's GHG emissions by inventory sector between 1990 and 2019 as a percentage of overall emissions

Summary of MI's Gross GHG Emissions by Inventory Sector (1990 to 2019)
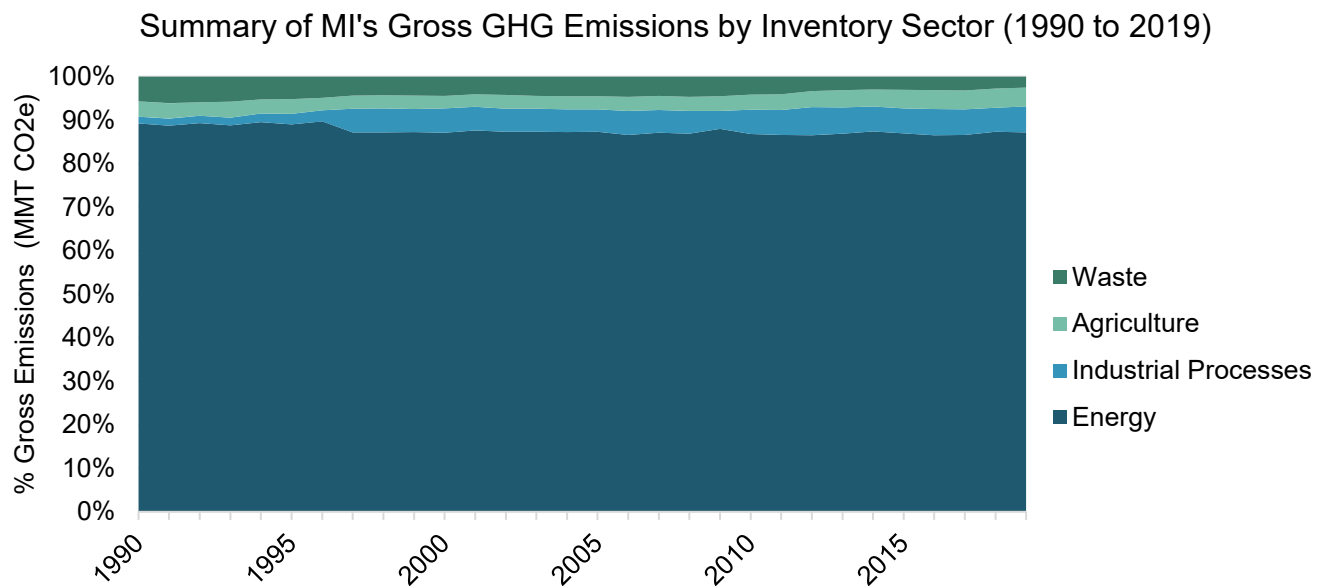
I. CO_2 from Fossil Fuel Combustion (CO_2FFC) (CO_2 emissions from fossil fuel combustion across economic sectors)
II. Stationary Combustion (CH_4 and N_2O)
III. Mobile Combustion (CH_4 and N_2O)
IV. Coal Mining (CH_4)
V. Natural Gas and Oil Systems (CH_4)

CO_2FFC makes up the vast majority of emissions (98.9% of emissions) from the Energy sector, followed by Natural Gas and Oil Systems which makes up 3.4%, and Stationary Combustion and Mobile Combustion with less than 1% of overall emissions in this sector.

Indirect CO_2 emissions from Electricity Consumption was excluded from total calculation values to avoid double counting emissions from the CO_2FFC module. The Land Use, Land Use Change, and Forestry (LULUCF) sector is not accounted for in net GHG emissions as they remove carbon dioxide from the atmosphere and thus, are not shown in Figure 12 as a percentage of total net emissions.

Figure 13 shows the change in gross GHG emissions from 2005 levels between the United States, Michigan, and other Midwest states. Despite some variability, a downward trend in Figure 13 shows a steady decline in Michigan's cumulative emissions since 2005. In 2019, Michigan's GHG emissions fell 15% below 2005 levels, compared to the U.S. 11% overall decline. Michigan's GHG emissions had a greater reduction than both Minnesota and Wisconsin as peer states based on 2005 levels.

Figure 13: Comparison of the percent change in Gross GHG Emissions across Michigan, the United States, and other Midwest States since 2005

Percent Change in Gross GHG Emissions from 2005 Base Year
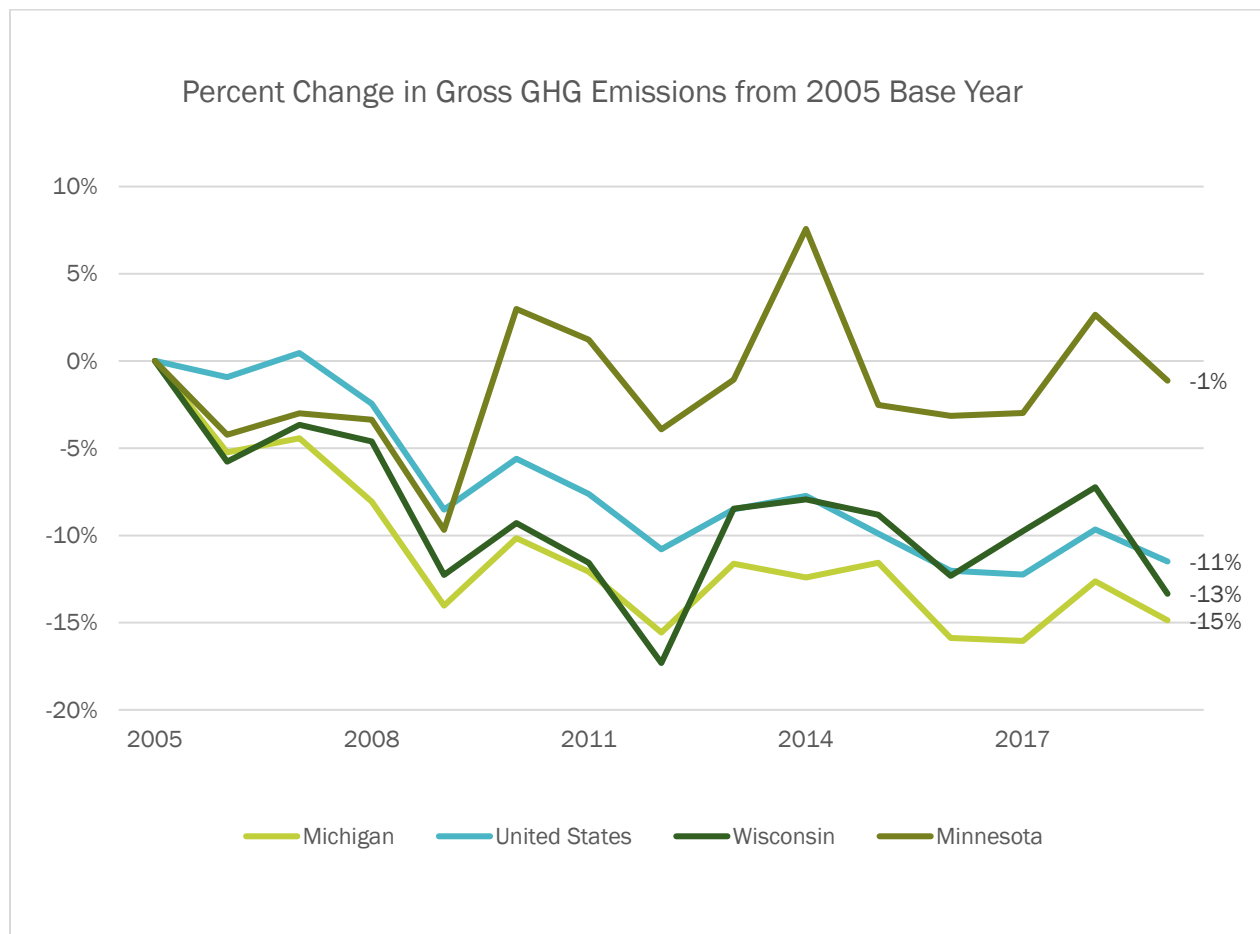
Alternatively, Figure 14 shows variability demonstrated by a year-over-year percentage change in emissions rather than the ultimate downward trend shown in Figure 13. A year-over-year analysis demonstrates how emission levels change when compared to the previous year, as opposed to comparing each year individually to a standard baseline. For example, Michigan's year-over-year emissions decreased by 2% from 2018 to 2019, while emissions in 2019 were 15% lower than those in 2005. The United States, Michigan, and Minnesota trendlines show similar trends in variability, fluctuating between positive and negative emissions every two to three years. Wisconsin shows consistent reductions since 2005 year over year, though there is variability in the size of reduction. Both the U.S. and Michigan experienced a stagnation in emission changes from 2008-2009, and subsequently reached an 11% YOY increase the following year in 2010. This emphasizes that year over year emissions generally follow a volatile pattern, while trending downward overall.

Figure 14: Comparison of the year-over-year (YOY) percent change in Gross GHG Emissions across Michigan, the United States, and other Midwest states since 2005
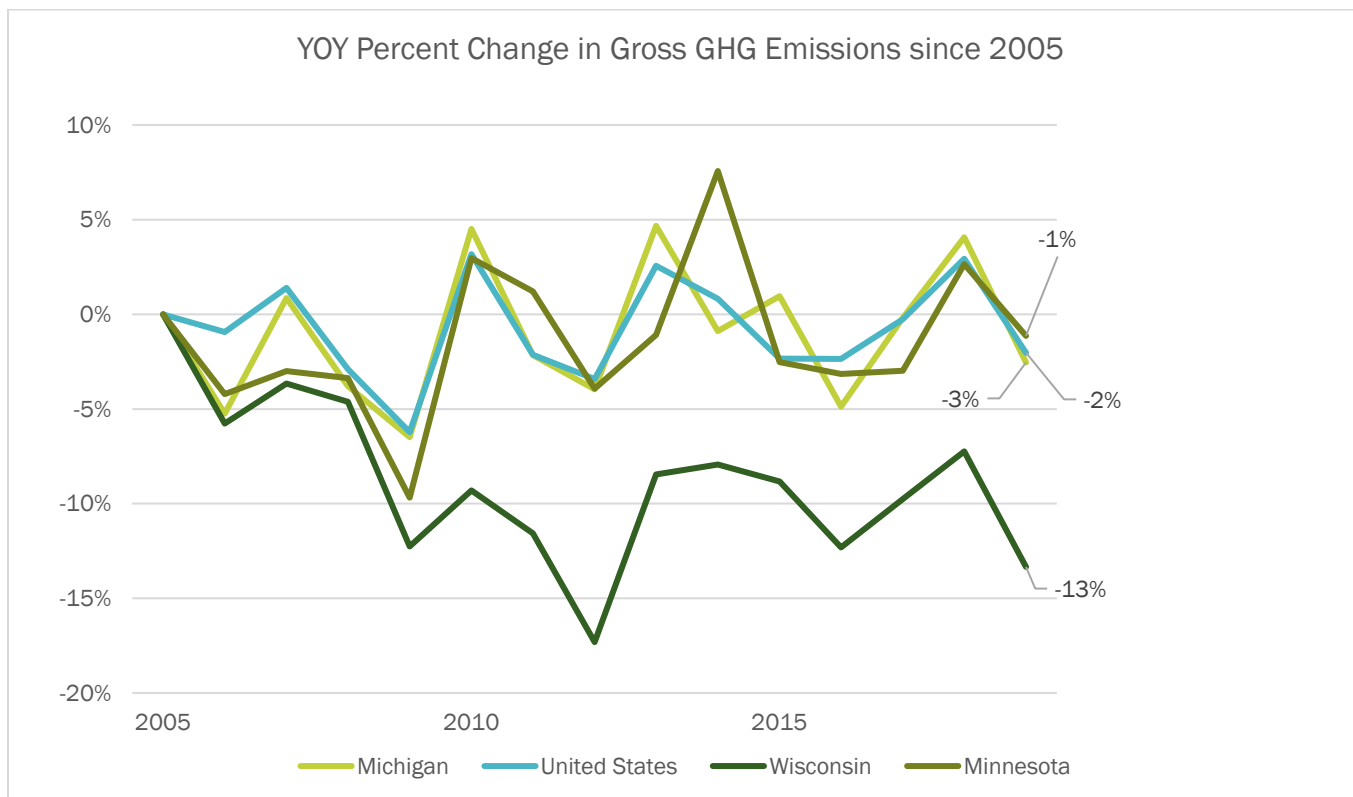
GHG Emissions Distribution by Gas

This section will take a deep dive into the different GHGs most prevalent in Michigan, the proportion of each of them, and what inventory sectors contribute most to each gases' emissions. GHGs act as a blanket which cover the Earth's atmosphere and cause warming, however, each greenhouse gas warms the Earth at different rates. Differences in rates are expressed via Global Warming Potential (GWP) which are the result of a GHG's ability to absorb energy ("radiative efficiency") and how long they stay in the atmosphere ("lifetime"). To gain additional information on global warming potentials, please refer to the EPA's site: epa.gov/ghgemissions/understanding-global-warming-potentials.

The EPA primarily uses the 100-year GWPs from IPCC Fifth Assessment Report (AR5) per international reporting standards. 100-year GWP is based on energy absorbed by a gas over 100 years. Another common reference is the 20-year GWP which assesses the energy absorbed by a gas over 20 years and is prioritized for gases with shorter lifetimes. For gases with lifetimes shorter than that of CO_2, the 20-year GWP will be larger than a 100-year GWP. Using CH_4 as an example, which has a short lifetime, it's 100-year GWP is 28 (according to IPCC AR5) while it's 20-year GWP is around 81-83.

Below is a summary view of the GWP for relevant GHGs to show the potential warming consequences for each according to a 100-year GWP. Carbon dioxide has a GWP of 1 since it is the most prevalent GHG and is often used as a baseline of comparison to evaluate the impact of other GHGs.

Table 2: Global Warming Potential for GHGs discussed in the State of Michigan's GHG inventory[12]

Greenhouse Gas	100-year Global Warming Potential
Carbon Dioxide (CO_2)	1
Methane (CH_4)	28
Nitrous Oxide (N_2O)	265
Hydrofluorocarbons (HFC)	4-12,400
Perfluorocarbons (PFC)	6,630 – 11,100
Sulfur hexafluoride (SF_6)	23,500
Nitrogen trifluoride (NF_3)	16,100

Despite CO_2 being the greatest source of GHG emissions in the state, the other GHGs assessed in this inventory have far greater GWP. Even with low proportions of the overall emissions, F-Gases (HFC, PFC, SF_6, and NF_3), often have GWPs over 1000, meaning they warm the Earth more than CO_2 over the same period of time. Emission reduction measures must pay attention to what GHGs they will impact and take special care to prioritize their reduction across the state.

Looking across the distribution of GHG emissions after adjusting all gases to a CO_2 equivalency (CO_2E) as shown in Figure 15, CO_2 emissions represent approximately 89% of overall GHG emissions in the State of Michigan. Methane is the second most present gas at 7%, followed by F-Gases (3%) and nitrous oxide (1%). Reference **Figure 16** for more details on the GHG emissions by gas in the State of Michigan.

---

[12] ghgprotocol.org/sites/default/files/ghgp/Global-Warming-Potential-Values%20%28Feb%2016%202016%29_1.pdf

Figure 15: Distribution of GHG as a percentage of 2019 Gross Emissions
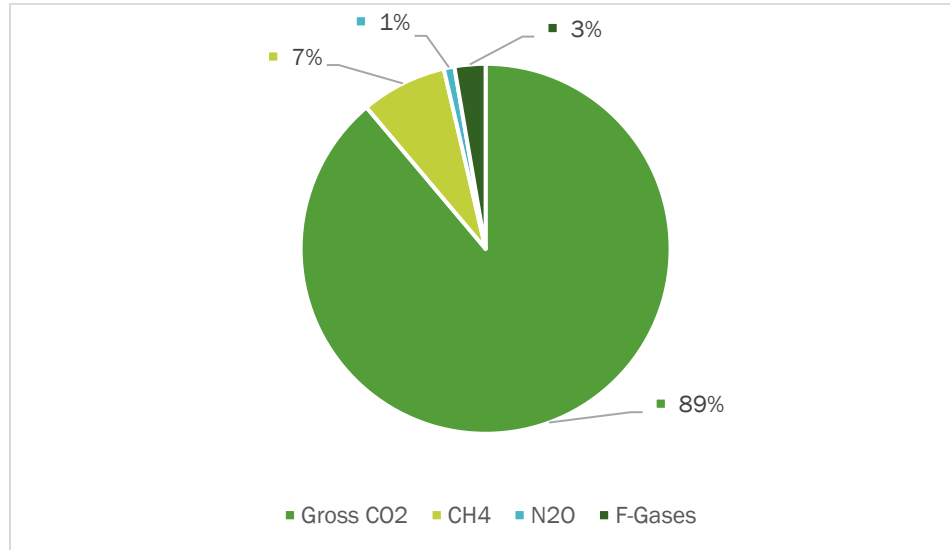
Around 90% of gross CO_2 emissions are accounted for within the CO_2FFC module within the Energy sector, while 10% come from industrial processes such as cement production, lime manufacturing, limestone and dolomite use, and iron & steel production.

The Natural Gas and Oil Systems module, Waste sector, and Agriculture sector contribute the most to CH_4 emissions, while N_2O is primarily attributed to the Mobile Combustion module and Agriculture sector. All F-Gases are attributed to the Industrial Processes sector as shown in Figure 16.

Figure 16: Distribution of Gas Types in Michigan by SIT Module in 2019

State of Michigan
Priority Climate Action Plan
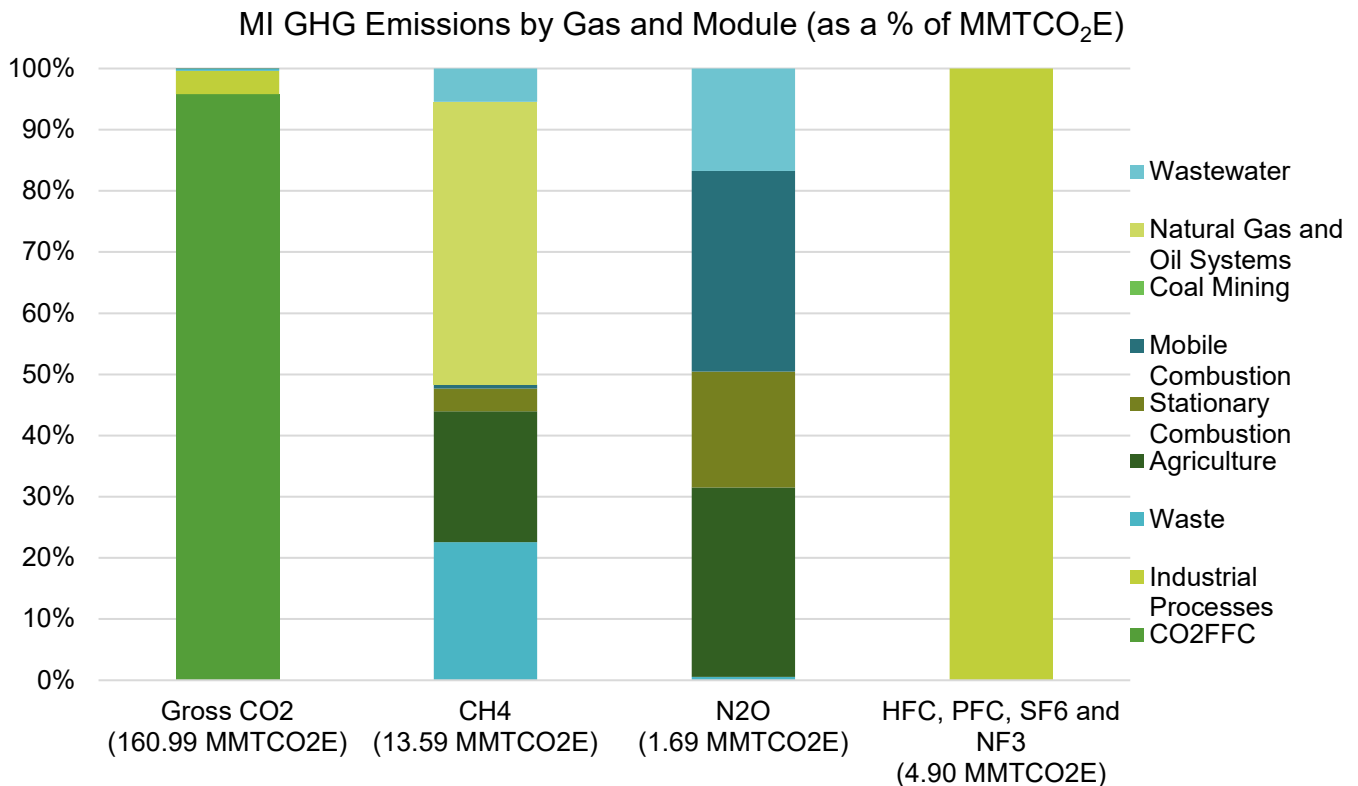
When exploring how these four GHG types have evolved between 2005 and 2019, CO_2 and N_2O decreased by 19% and 31%, respectively, while CH_4 and F-Gases increased by 4% and 14%, respectively. These emission profile changes may be due to lack of data prior to 2010 for certain modules such as Natural Gas & Oil, or simply due to a base increase in Agriculture and Industrial Processes, as some examples.

GHG Emissions by Inventory Sector

The Energy sector is by far the largest emitting inventory sector, representing 87.21% of Michigan's emissions profile in 2019, as shown in Figure 10. All sectors or modules are shown in **Table 3** and **Figure 17,** demonstrating their contribution to overall emissions in Michigan. The Energy sector is represented by five SIT modules – CO_2FFC, Stationary Combustion, Mobile Combustion, Coal Mining, and Natural Gas and Oil Systems – that will each be explored in the following sections. **Figure 18** displays the contribution of each SIT module towards overall Energy sector emissions.

Table 3: Impact Rank of GHG Emissions by Sector and Module in 2019

Sector or Module	Rank (in MMTCO$_2$E)
CO_2 from Fossil Fuel Combustion*	1
Industrial Processes	2
Agriculture	3
Natural Gas and Oil Systems*	4
Waste	5
Stationary Combustion*	6
Mobile Combustion*	7
Coal Mining*	8

Specifies SIT modules part of the Energy inventory sector

Figure 17: Proportion of GHG Emissions by Sector or Module in the State of Michigan in 2019

- CO2 from Fossil Fuel Combustion*
- Industrial Processes
- Agriculture
- Natural Gas and Oil Systems*
- Waste
- Stationary Combustion*
- Mobile Combustion*
- Coal Mining*

State of Michigan
Priority Climate Action Plan
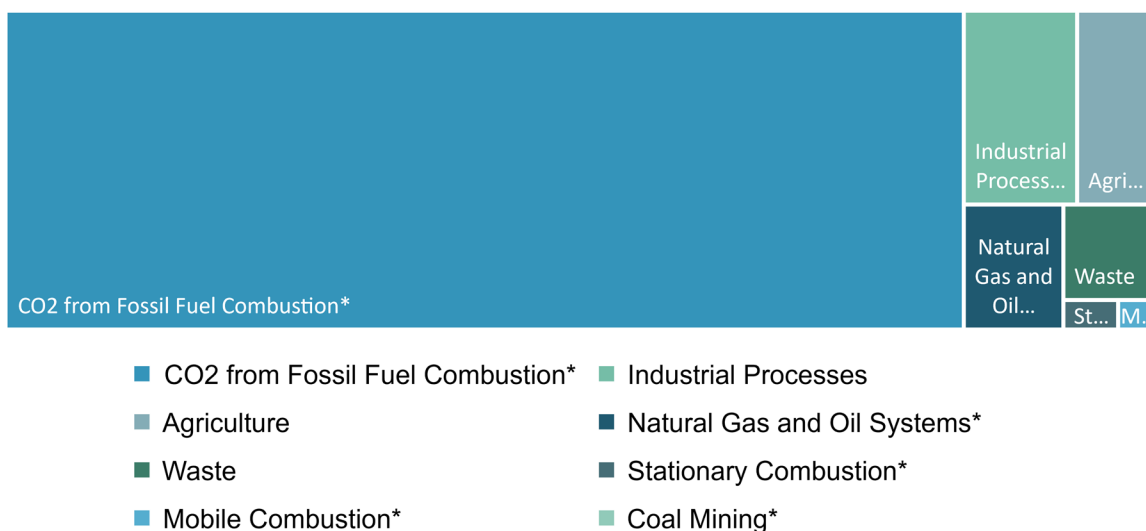
Figure 18: Breakdown of Energy Inventory Sector by SIT Module in 2019

- CO2 from Fossil Fuel Combustion
- Stationary Combustion
- Mobile Combustion
- Natural Gas and Oil Systems
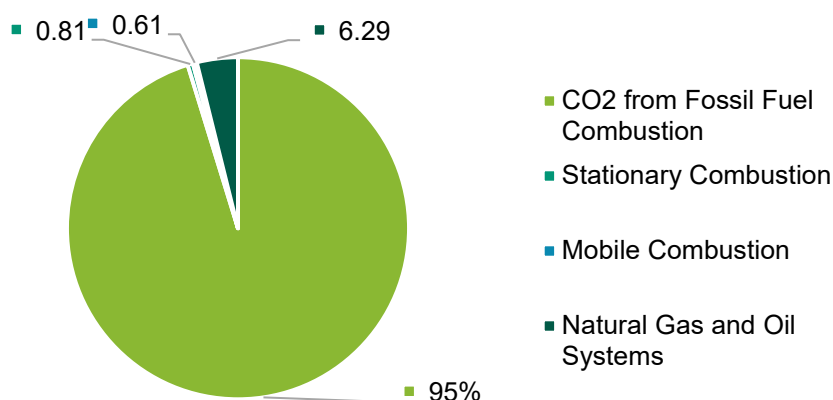
Energy

Carbon Dioxide Emissions from Direct Fossil Fuel Combustion

Carbon Dioxide Emissions from direct Fossil Fuel Combustion (CO_2FFC) is the largest emitting SIT module in Michigan for the GHG inventory and is included within the Energy inventory sector. CO_2 from Fossil Fuel Combustion is analyzed by economic sector, given its large contribution to the Energy emissions inventory sector. Economic sector analysis is pertinent to understand how the majority of GHG emissions are divided within the energy sector.

CO_2FFC emissions decreased by 17% overall from 2005 to 2019 with four of the six economic sectors (Residential, Commercial, Industrial, Transportation, Electric Utilities, and International Bunker Fuel) reducing emissions cumulatively across four different fuel types. Coal and petroleum CO_2 emissions decreased across all economic sectors from 2005 to 2019, whereas natural gas emissions increased. Table 4 shows 2005 and 2019 emissions data along with the percentage change between 2005 and 2019 across all six economic sectors and all three fuel types.

Figure 19: Proportion of CO2FFC emissions by Economic Sector in Michigan in 2019

CO$_2$ Emissions from Fossil Fuel Combustion by Economic Sector

Legend:
- Residential
- Commercial
- Industrial
- Transportation
- Electric Utilities
- International Bunker Fuels
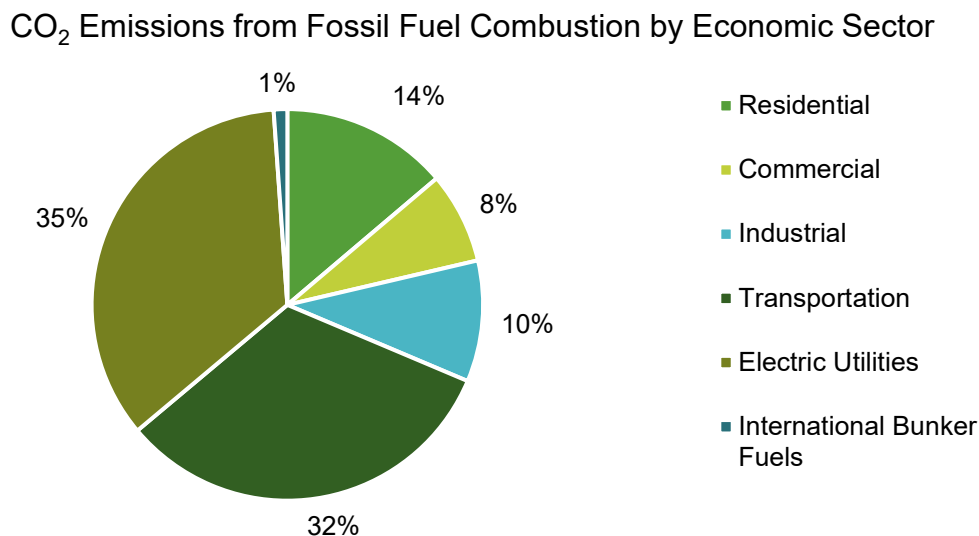
Gross CO$_2$FFC emissions are heavily dependent on several factors from varying economic sectors, including overall energy demand, energy generation mix and capacity, and number of import/exports of energy demand in that year. Combustion from Electric Utilities was the highest emitting economic sector accounting for 35% of the overall CO$_2$ emissions from Fossil Fuel Combustion, closely followed by the Transportation sector at 32% (Figure 19).

Unsurprisingly, there has been a large decrease of carbon dioxide emissions from coal across all economic sectors, with a cumulative decrease of 46% between 2005 and 2019 (Table 4). Only the Electric Utilities and Industrial sectors generated emissions via coal combustion in 2019, with coal combustion decreasing by 45% between 2005 and 2019 in the Electric Utilities sector. Decrease of coal consumption is likely due to its increased cost, as compared to other energy sources such as natural gas which saw a cumulative increase of CO$_2$ emissions by 14% across economic sectors. Electric Utilities was observed to have the greatest increase in natural gas emissions between 2005 and 2019, likely due to its substitution for coal; however, the Residential economic sector remains the largest contributor of CO$_2$ emissions from natural gas at 18.58 MMTCO$_2$E, or 86.26% of all natural gas CO$_2$ emissions.

Petroleum fluctuates in its contribution to CO$_2$ emissions across all sectors, but overall saw a decrease in cumulative emissions by 9% from 2005 to 2019. A large increase in petroleum emissions occurred across the Commercial sector (83%), Electric Utilities sector (41%), and International Bunker Fuels sector (285%). The remaining economic sectors saw a decrease in petroleum emissions by 37% for Residential and 8% for both Industrial and Transportation. Despite the fluctuations, the cumulative decrease observed for petroleum is in in large part due to the 8% decrease in Transportation sector emissions, where petroleum makes up ~97% of CO$_2$ emissions in 2019.

Table 4: Total CO$_2$ Emissions from Fossil Fuel Combustion (MMTCO$_2$E) in Michigan

Emissions (MMTCO$_2$E)	2005	2019	% Change (2005 to 2019)
Residential	23.99	21.54	-10%
Coal	0.03	0.00	-100%
Petroleum	4.66	2.96	-37%
Natural Gas	19.30	18.58	-4%
Commercial	10.59	11.75	11%
Coal	0.33	0.00	-100%
Petroleum	0.86	1.58	83%
Natural Gas	9.40	10.17	8%
Industrial	20.62	15.63	-24%
Coal	4.42	1.82	-59%
Petroleum	4.97	4.56	-8%
Natural Gas	11.23	9.25	-18%
Transportation	55.20	50.74	-8%
Coal	0.00	0.00	-
Petroleum	53.70	49.14	-8%
Natural Gas	1.50	1.60	7%
Electric Utilities	76.50	54.57	-29%
Coal	68.69	38.04	-45%
Petroleum	0.78	1.10	41%
Natural Gas	7.03	15.42	119%
International Bunker Fuels	0.45	1.75	285%
Petroleum	0.45	1.75	285%
Total	**186.89**	**154.24**	**-17%**
Coal	73.46	39.87	-46%
Petroleum	64.98	59.34	-9%
Natural Gas	48.45	55.03	14%

Stationary Combustion

Stationary Combustion is the 3rd smallest module included in the energy inventory sector in Michigan, accounting for 0.43% of Michigan's overall GHG emissions in 2019. Between 2005 and 2019, emissions from this module decreased by 11%.

Across economic sectors, Electric Utilities and Industrial decreased in both CH_4 and N_2O emissions while the Residential and Commercial sectors increased both CH_4 and N_2O emissions. Emissions of N_2O and CH_4 decreased by 30% and increased by 19%, respectively (Table 5).

The Residential economic sector accounts for 50% of emissions from the Stationary Combustion module in 2019 as the primary emitter of CH_4, amounting to 0.36 $MMTCO_2E$ or 72% of CH_4 emissions from stationary combustion in 2019. Electric Utilities emit N_2O three times as much as any other economic sector within this module, leading to it being the second-highest emitting economic sector within Stationary Combustion in 2019. In comparison, the Commercial and Industrial sectors make up only a small portion of overall emissions from Stationary Combustion when accounting for methane and nitrous oxide (Table 5).

**Table 5: Total CH_4 and N_2O Emissions from the
Stationary Combustion Module in Michigan ($MMTCO_2E$)**

Emissions ($MMTCO_2E$)	2005	2019	% Change (2005 to 2019)
Residential	0.32	0.41	28%
N_2O	0.05	0.05	16%
CH_4	0.27	0.36	30%
Commercial	0.07	0.09	19%
N_2O	0.01	0.01	14%
CH_4	0.06	0.07	20%
Industrial	0.12	0.10	-15%
N_2O	0.07	0.06	-15%
CH_4	0.05	0.04	-14%
Electric Utilities	0.34	0.21	-40%
N_2O	0.31	0.18	-42%
CH_4	0.04	0.03	-22%
Total	**0.85**	**0.81**	**-6%**
N_2O	0.43	0.30	-30%
CH_4	0.42	0.50	19%

State of Michigan
Priority Climate Action Plan

Mobile Combustion

Mobile Combustion was the 2nd smallest emitting module of GHG emissions in Michigan in 2019, included under the Energy inventory sector at 0.33% of overall emissions in the state. The Mobile Combustion module measures CH_4 and N_2O across transportation. Between 2005 and 2019, CH_4 and N_2O emissions for Mobile Combustion decreased by 56%, equating to cumulative emissions decrease of ~0.076 $MMTCO_2E$. This value is equivalent to removing approximately 16,522 cars off the road. In large part this was due to a significant decrease in Gasoline Highway Passenger Car emissions, which decreased by 0.42 $MMTCO_2E$ or 55.38% of the total decrease in Mobile Combustion emissions from 2005 to 2019.

Michigan's Mobile Combustion accounting is separated into four categories: Gasoline Highway, Diesel Highway, Non-Highway, and Alternative Fuel Vehicles with subcategories of specific vehicle types for each.

Table 6 shows the emissions profile for each category and subcategory for 2005 and 2019.

Among the categories, Diesel Highway, Non-Highway, and Alternative Fuel Vehicles all increased in CH_4 and N_2O emissions, while Gasoline Highway was the only vehicle category to decrease in CH_4 and N_2O emissions from 2005 to 2019. The Non-Highway and Gasoline Highway categories claim the vast majority of CH_4 and N_2O emissions in the Mobile Combustion module.

The largest cumulative increase in CH_4 and N_2O emissions from Mobile Combustion came from Diesel Highway vehicles with over 0.08 $MMTCO_2E$, or 783% from 2005 to 2019. Heavy-Duty (HD) Vehicles are primarily responsible for this increase but all vehicle types under Diesel Highway CH_4 and N_2O emissions increased between these two reference years.

Under the Gasoline Highway category, Passenger Cars were responsible for the majority of CH_4 and N_2O emissions in 2019 as compared to other vehicle types, despite decreasing CH_4 and N_2O emissions by 72% since 2005 levels. All vehicle types included in Gasoline Highway vehicles have decreased their CH_4 and N_2O emissions since 2005.

Table 6: Total CH$_4$ and N$_2$O Emissions from Mobile Sources in Michigan (MMTCO$_2$E)

Fuel/Vehicle Type Emissions (MMTCO$_2$E)	2005	2019	% Change (2005 to 2019)
Gasoline Highway	1.130	0.248	-78%
Passenger Cars	0.586	0.166	-72%
Light-Duty Trucks	0.504	0.071	-86%
Heavy-Duty Vehicles	0.038	0.011	-72%
Motorcycles	0.001	0.000	-70%
Diesel Highway	0.011	0.094	783%
Passenger Cars	0.000	0.002	1713%
Light-Duty Trucks	0.000	0.004	777%
Heavy-Duty Vehicles	0.010	0.081	739%
Heavy-Duty Buses	0.001	0.008	1416%
Non-Highway	0.224	0.263	18%
Boats	0.011	0.032	177%
Locomotives	0.002	0.001	-43%
Farm Equipment	0.025	0.026	1%
Construction Equipment	0.057	0.075	32%
Aircraft	0.013	0.037	180%
Other*	0.114	0.092	-19%
Alternative Fuel Vehicles	0.001	0.001	82%
Light Duty Vehicles	0.000	0.000	18%
Heavy Duty Vehicles	0.000	0.000	67%
Buses	0.001	0.001	85%
Total	**1.365**	**0.607**	**-56%**

Natural Gas & Oil

The Natural Gas & Oil sector is the 4th largest emitting module in Michigan's 2024 GHG inventory, included under the Energy inventory sector. Between 2005 and 2019, CH$_4$ and N$_2$O emissions increased by 381% for a cumulative 6.29 MMTCO$_2$E emitted in 2019. This large increase can be attributed to the addition of state-specific data since 2010. Oil emissions include CH$_4$ and N$_2$O emissions from production, refining, and transportation within the state of Michigan. CH$_4$ and N$_2$O emissions from the Natural Gas sector represent emissions from gathering, transmission and distribution. Table 7 demonstrates both CH$_4$ and N$_2$O emissions for Natural Gas and Oil in 2005 and 2019.

Table 7: Natural Gas and Oil CH$_4$ and N$_2$O Emissions in Michigan (MMTCO$_2$E)

Emissions (MMTCO$_2$E)	2005	2019	% Change (2005 to 2019)
Natural Gas	1.18	6.23	427%
Oil	0.12	0.06	-52%
Total	**1.31**	**6.29**	**381%**

Coal Mines

Michigan does not have any operational coal mines, with the last mine closing in 1952. Therefore, data is excluded for this module. An opportunity for further analysis may be done on residual emissions from abandoned coal mines, but no data has been found to support this analysis.

Industrial Processes

Industrial Processes emissions remained relatively flat from 2005 to 2019, decreasing by 2% overall. Industrial Processes cumulatively make up the 2nd largest emitting inventory sector in Michigan. They include non-direct combustion GHG emissions related to the handling and use of certain chemicals in processes such as cement production, lime manufacturing and iron & steel production. Industrial Processes account for 5.97% of Michigan's overall emissions in 2019. Table 8 demonstrates Industrial Processes emissions by type for 2005 and 2019.

Industrial Processes emissions are categorized across three greenhouse gas types:
    a. Carbon Dioxide emissions
    b. Nitrous Oxide emissions
    c. HFC, PFC, SF$_6$ and NF$_3$ (F-Gases) emissions

Non-combustion related carbon dioxide emissions from industrial processes decreased by 13%, largely due to the decrease in cement manufacturing and iron & steel production that make up the majority of these emissions.

Emissions from F-Gases increased from 2005 to 2019 by 14% due to the replacement of Ozone Depleting Substances (ODS) with F-gas substitutes. F-gas substitutes for ODS are often found in refrigeration, air-conditioning, and aerosol applications. F-Gases have high global warming potentials as compared to other greenhouse gas types included in Industrial Processes, so though the amount of F-Gas emissions may not be large, their ability to retain heat in the atmosphere over their lifetime is what contributes to their large Global Warming Potential (refer to Table 2). Other processes including Semiconductor Manufacturing and Electric Power Transmission and Distribution Systems decreased in overall emissions but are comparatively low to ODS substitutes, clarifying the aggregate increase.

Nitric acid production data is not available for the State and therefore, is excluded in this Inventory. In addition, adipic acid is not produced in Michigan and thus, not included in the inventory.

Table 8: GHG Emissions related to Industrial Processes in Michigan (MMTCO$_2$E)

Emissions (MMTCO$_2$E)	2005	2019	% Change (2005 to 2019)
Non-Combustion Related Carbon Dioxide Emissions	7.072	6.182	-13%
Cement Manufacture	2.126	1.600	-25%
Lime Manufacture	-	0.341	-
Limestone and Dolomite Use	0.251	0.475	89%
Soda Ash**	0.087	0.060	-32%
Aluminum Production, CO2*	-	-	-
Iron & Steel Production	4.596	3.692	-20%
Ammonia Production*	-	-	-
Urea Consumption	0.011	0.014	27%
Nitrous Oxide Emissions	-	-	-
Nitric Acid Production*	-	-	-
Adipic Acid Production**	-	-	-
F-Gases	4.291	4.898	14%
ODS Substitutes	3.986	4.779	20%
Semiconductor Manufacturing	0.045	0.002	-95%
Magnesium Production*	-	-	-
Electric Power Transmission and Distribution Systems	0.260	0.116	-55%
HCFC-22 Production*	-	-	-
Aluminum Production, PFCs*	-	-	-
Total	**11.363**	**11.080**	**-2%**

*Data is unavailable via SIT, additional state-specific data is needed
**Adipic Acid Production and Soda Ash Manufacturing do not occur in the State of Michigan and therefore, no emissions are accounted for (Soda Ash Consumption is accounted for)

Transportation

The transportation sector makes up 32% of CO$_2$ emissions across the CO$_2$FFC module. To allow for a holistic view of the Transportation sector, inclusive of CH$_4$ and N$_2$O emissions related to Mobile Combustion, emissions data from both groups of emissions were combined and are represented in Table 9.

In 2019, non-highway vehicles made up 43% of transportation's GHG emissions. Gasoline Highway vehicles make up slightly less than half of the overall GHG emissions for Transportation at 41% of total emissions shown in Figure 20. Gasoline Passenger Cars had the greatest emissions contribution of any vehicle type, making up 27.4% of total Transportation emissions and 67% of Gasoline Highway vehicles overall, as shown in Table 9.

Non-Highway vehicle emissions are spread across construction equipment and the "other" category which includes Snowmobiles, Small Gasoline Powered Utility Equipment, and Heavy-Duty Diesel-Powered Utility Equipment, Aircrafts, Boats, and Farm Equipment. Construction equipment makes up 28% of Non-Highway Transportation emissions and 12% of total GHG emissions. Diesel Highway vehicles make up 16% of total emissions, mainly sourced from HD vehicles (vehicles greater than 8,500 lbs.).[13] Alternative Fuel vehicles remain the smallest percentage of GHG emissions, making up less than 0.05% the total.

Overall, most fuel and vehicle types have increased in GHG emissions from 2005 to 2019 – however, Gasoline Highway emissions have reduced by 55%, with the greatest reduction from light-duty (LD) trucks (<8,500 lbs.). 99% of total emissions for Transportation were from CO_2 emissions, while CH_4 and N_2O emissions made up 1% of overall emissions.

Table 9: Transportation Sector Emissions by Fuel and Vehicle Type in Michigan (MMTCO$_2$E)

Fuel Type/Vehicle Type (MMTCO$_2$E)	2005	2019	% of Total Emissions (2019)	% Change (2005 to 2019)
Gasoline Highway	46.824	20.994	41%	-55%
Passenger Cars	24.286	14.072	27%	-42%
Light-Duty Trucks	20.901	5.969	12%	-71%
Heavy-Duty Vehicles	1.580	0.918	2%	-42%
Motorcycles	0.057	0.035	0%	-38%
Diesel Highway	0.442	7.966	16%	1702%
Passenger Cars	0.004	0.147	0%	3601%
Light-Duty Trucks	0.018	0.321	1%	1690%
Heavy-Duty Vehicles	0.398	6.810	13%	1612%
Heavy-Duty Buses	0.022	0.688	1%	2994%
Non-Highway	9.264	22.269	43%	140%
Boats	0.473	2.672	5%	465%
Locomotives	0.100	0.117	0%	16%
Farm Equipment	1.050	2.167	4%	106%
Construction Equipment	2.364	6.376	12%	170%
Aircraft	0.552	3.155	6%	472%
Other*	4.726	7.783	15%	65%
Alternative Fuel Vehicles	0.032	0.121	0%	272%
Light Duty Vehicles	0.001	0.002	0%	141%
Heavy Duty Vehicles	0.001	0.003	0%	241%
Buses	0.031	0.116	0%	277%
Total	**56.563**	**51.350**	-	**-9%**

---

[13] afdc.energy.gov/data/10380

Figure 20: Total GHG Emissions for Transportation Sector (includes CO2FFC & Mobile Combustion modules) in Michigan in 2019

NOTE: 0% of total emissions signifies emissions less than 0.05%

Transporatation Sector Emissions by Fuel and Vehicle Type

■ Gasoline Highway ■ Diesel Highway ■ Non-Highway ■ Alternative Fuels
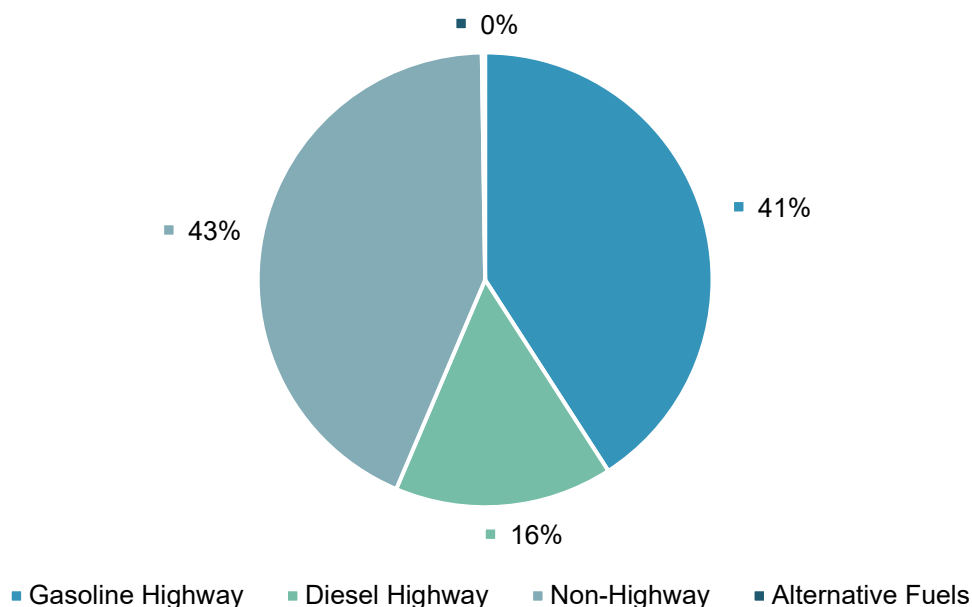
Electricity Sector

The Electricity sector includes electricity generated and consumed within Michigan, as well as imports and exports (refer to Table 10 and

Figure *21*). Though this inventory is primarily inventory sector-based, this section will aid in illustrating indirect CO_2 emissions from Electricity Combustion as well.

The Electricity sector is the greatest emitter of CO_2 from fossil fuel combustion in the State of Michigan, emitting 35% of total CO_2 from fossil fuel combustion, equivalent to 54.57 MMTCO$_2$E. To gather total direct electricity generation, this inventory collects electric power data from both stationary combustion activities and CO_2 from fossil fuel combustion. Stationary combustion makes up a small portion of overall direct electricity generation (.03%), making the total equal to 54.75 MMTCO$_2$E in 2019. From 2005 to 2019, there was a 29% reduction in electricity generation GHG emissions.

The EIA's State Energy Data System (SEDS) provides detailed import and export data via the EIA's State Electricity Profiles.[14] Using these data, this inventory considers the net import and export of electricity into the State of Michigan both between states and internationally (international imports are typically from Canadian power plants). In 2005, an overall net export of interstate electricity trade resulted in a reduction of 1.99 MMTCO$_2$E emissions based on

---

[14] eia.gov/electricity/state/Michigan/

negative net international and interstate imports. Conversely, in 2019, there was an overall net import of electricity resulting in 5.51 MMTCO₂E increase in GHG emissions accounted for in the State (Table 10 and Figure 22). Please refer to EPA's posted SIT documentation[15] and the EIA's posted SEDS database documentation[16] for additional information on net imports.

The EPA's State Inventory Tool provides analysis of Indirect CO_2 emissions from Electricity Consumption by sector; however, it is important to note that end-use sector consumption is not reflected in total GHG emissions for the state due to overlap with electricity generation. Overall, the inventory reflects a 32% reduction in electricity consumption by end-use sector from 2005 to 2019. Specifically, the Industrial, Residential, and Commercial end-use sectors all reflected emissions reductions between 29% and 36% (See Table 11). The Commercial sector represented the greatest GHG emissions from electricity consumption with 18.34 MMTCO₂E. **Appendix A** details the specific end-use activities across Residential, Commercial, Industrial and Transportation sectors.

Despite electricity making up the largest portion of CO_2 emissions from fossil fuel combustion across the State, electricity generation and consumption have seen a decline in emissions for every year since 2008, while imports of electricity have been oscillating as certain years have net exports verses imports (see Figures 21 and 22).

Table 10: Electricity Sector Emissions by Generation, Imports, and End-Use Consumption (MMTCO₂E)

Electricity Sector Emissions (MMTCO₂E)	2005	2019	% Percent Change from 2005 to 2019
Total Direct Electricity Generation	76.84	54.77	-29%
Stationary Combustion from Electric Power (CH_4 and N_2O)	0.34	0.21	-40%
CO_2 from FFC from Electric Power	76.50	54.57	-29%
Total Net Imports	-1.99	5.51	-377%
Net Interstate Trade	-0.80	4.36	-642%
Net International Imports	-1.18	1.15	-197%
Indirect CO_2 from Electricity Consumption	72.16	49.05	-32%

---

[15] epa.gov/statelocalenergy/download-state-inventory-and-projection-tool
[16] eia.gov/state/seds/

Table 11: Indirect CO_2 from Electricity Consumption by Sector*

Indirect CO2 from Electricity Consumption (MMTCO2E)	2005	2019	% Change (2005 to 2019)
Residential	23.582	16.226	-31%
Commercial	25.871	18.340	-29%
Industrial	22.699	14.477	-36%
Transportation	0.003	0.003	-4%
Total	**72.16**	**49.05**	**-32%**

*Refer to Appendix A - Table 3 for list of end-uses by sector

Figure 21: Total Electricity Generation, Interstate Trade, and End-Use Consumption in Michigan from 2005 to 2019

State of Michigan
Priority Climate Action Plan
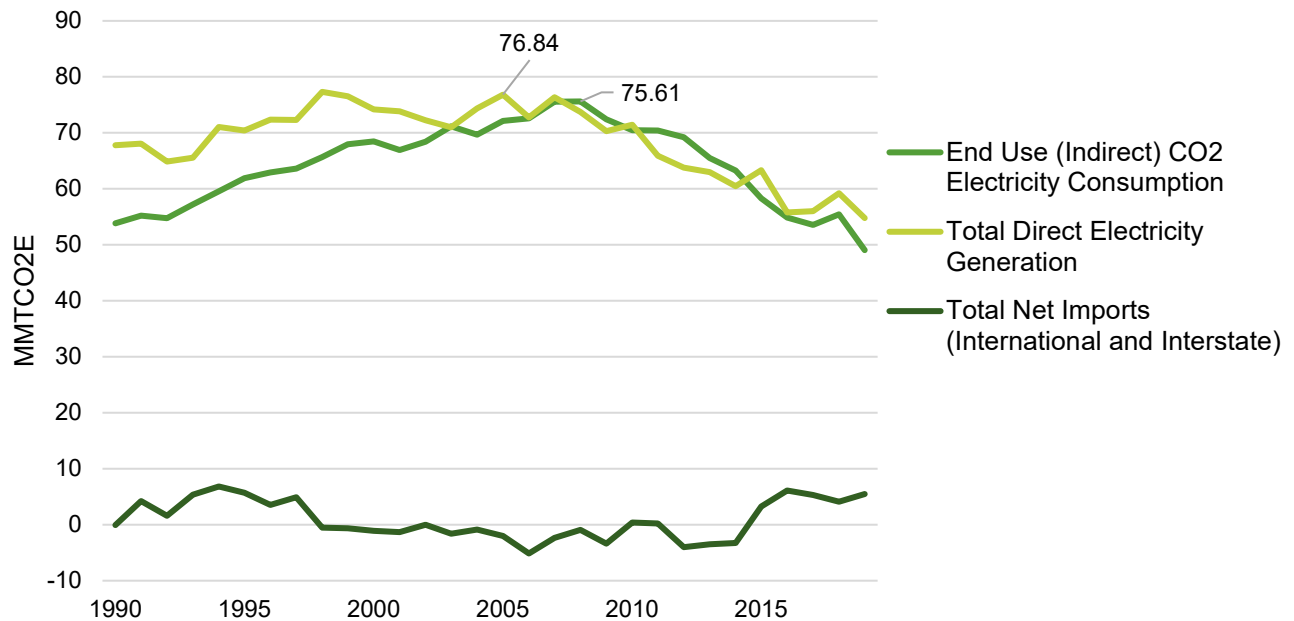
**Figure 22: Net Total, Interstate, and International
Electricity Imports in Michigan from 1990 – 2019**
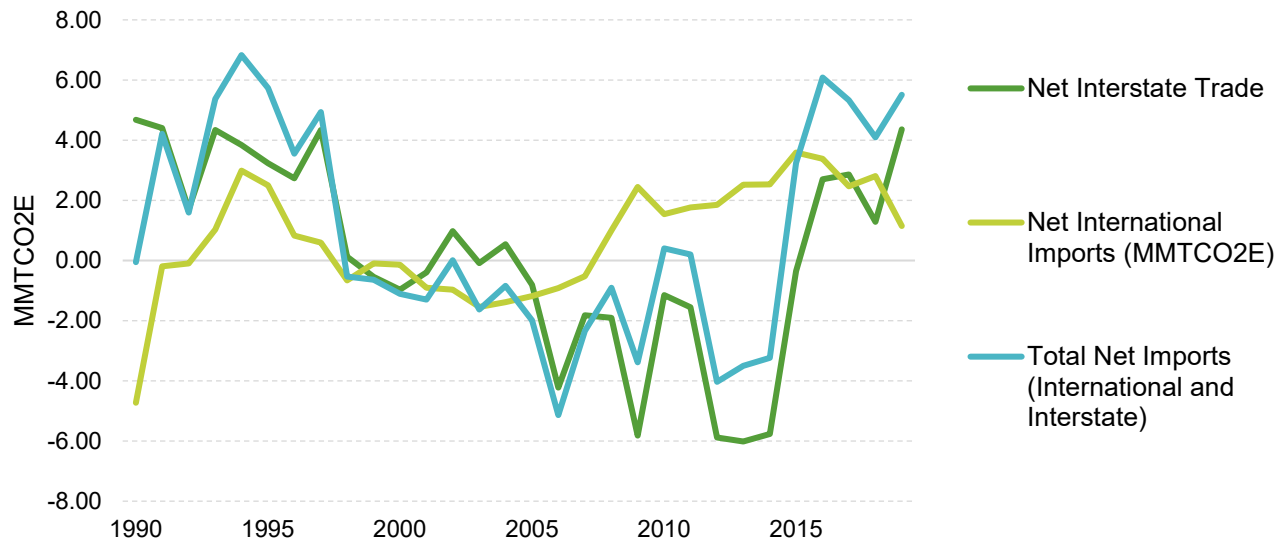
4.2 COMMUNITY ENGAGEMENT OUTCOMES

As a result of community engagement, EGLE facilitated five in-person public engagement sessions across the state and two virtual public listening sessions. All sessions were hosted in the evening between 6-8pm local time. The in-person sessions were held at the following venues in the respective towns:

1. Detroit – Zero Net Energy Center – International Brotherhood of Electrical Workers Local 58
2. Grand Rapids – Dan & Pamela DeVos Center for Interprofessional Health
3. Flint – Michigan State University College of Human Medicine
4. Marquette – Northern Michigan University
5. Petoskey – North Central Michigan College

One additional engagement session was held during the quarterly Michigan Tribal Environmental Group (MTEG) meeting in Acme at the Grand Traverse Resort.
Outcomes of the in-person and virtual sessions solicited approximately 400 attendees who provided ~1,500 comments. In addition, more than 600 pieces of feedback were received during the gallery walk exercise which helped to highlight the most important topics discussed during the sessions. 350 of the 1,500 comments received were in line with existing considerations for EGLE as part of the PCAP process, insinuating that Michiganders have a firm vision of what they want to see as part of MHCP implementation. The comments also provided 237 new

State of Michigan
Priority Climate Action Plan

reduction measure ideas which were evaluated as part of the reduction measure prioritization framework. A feedback survey circulated to attendees following the sessions indicated:

90%	**90%**	**75% +**
of attendees increased their understanding of the MHCP	of attendees found the breakout group activities engaging	of attendees indicated they are interested in attending future EGLE events
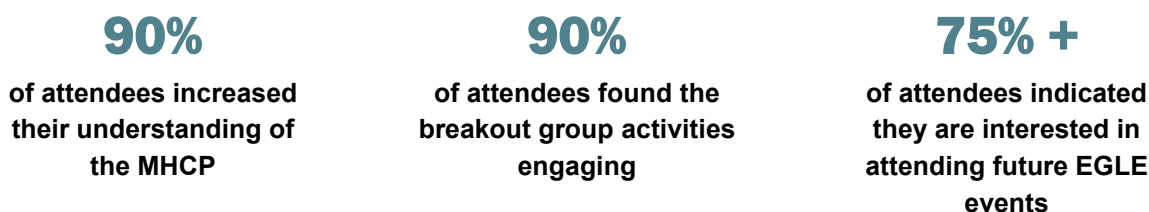
Figure 23: Common topics discussed during engagement sessions held between November and December 2023

Educate Michiganders across MHCP topic areas	Increase coordination and partnerships of all kinds	Focus on workforce development
Simplify grant applications, rebates and incentives	Prioritize robust public transportation infrastructure and funding	Ensure climate justice and protecting Michigan's land and water are top of mind
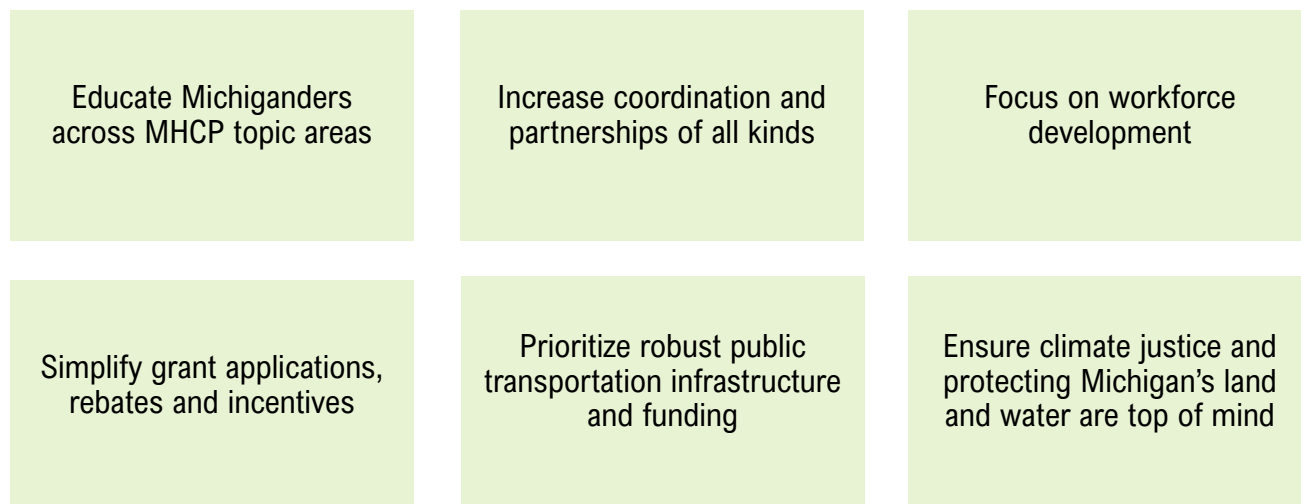
Engagements were facilitated by providing clear expectations of the intended outcomes of the session to demonstrate transparency and focused on place-based engagements to meet communities where they are. EGLE strives for continuous improvement, as demonstrated by requesting feedback via surveys to attendees. A subset of major themes that emerged across engagement sessions are depicted in Figure 23.

The last piece of engagement EGLE organized through its PCAP development in relation to the CPRG PCAP Phase was releasing a draft list of priority reduction measures for public comment prior to PCAP submission. EGLE received 66 responses from the open comment period. The feedback indicated that more explicit consideration should be given to LIDACs, and EGLE has incorporated this feedback into each reduction measure as a result. Additionally, there were several comments or clarification questions regarding what is and is not included in some of the measures. For instance, if rental properties apply to Reduction Measure #4 describing household decarbonization. To clarify these comments, the summary included within each reduction measure provides example entities or use-cases that may be implemented. However, these examples are not exhaustive and there are several other entities or infrastructure that may fall within reduction measures.

4.3 LIDAC BENEFITS ANALYSIS

The State of Michigan has many areas that are identified as low income disadvantaged communities. Many of these communities are also disproportionally negatively impacted by injustices in categories including climate change, energy, health, housing, legacy pollution, transportation, water and wastewater, and workforce development. To identify communities throughout the country facing especially negative impacts in these areas, the White House Council on Environmental Quality developed the Climate and Economic Justice Screening Tool (CEJST), a geospatial mapping tool which highlights disadvantaged census tracts across all 50 states, the District of Columbia, and the U.S. territories.

The CEJST screening tool methodology considers a census tract to be disadvantaged if it meets one of two requirements:

1. They are in census tracts that meet the thresholds for at least one of the tool's categories of burden
2. They are on land within the boundaries of Federally Recognized Tribes

Based on the CEJST screening tool, the State of Michigan has 996 census tracts that are identified as disadvantaged, making 35% of Michigan communities considered low income and disadvantaged. The map shown in Figure 24 provides an illustration of how widespread the identified disadvantaged communities are throughout the State of Michigan.

Within the 996 census tracts identified as disadvantaged, four of the census tracts were identified as disadvantaged due to tribal overlap. These tracts are located in Isabella County and at least 99% of the census tract is within Federally Recognized Tribal Areas.

In addition to the CEJST screening tool, the 996 identified disadvantaged census tracts were also analyzed using the EPA's Environmental Justice Screening and Mapping Tool (EJScreen). The EJScreen provides the EPA with a nationally consistent dataset and approach for combining environmental and demographic socioeconomic indicators. The EJScreen also includes information on supplemental indexes, which provides a combination of environmental and socioeconomic information based on thirteen specific environmental indicators, including: Particulate Matter 2.5 (PM2.5), Ozone, Diesel Particulate Matter, Air Toxics Cancer Risk, Air Toxics Respiratory Hazard Index, Toxic Releases to Air, Traffic Proximity, Lead Paint, RMP Facility Proximity, Hazardous Waste Proximity, Superfund Proximity, Underground Storage Tanks, and Wastewater Discharge. Based on the EJScreen tool, many of the 996 identified disadvantaged census tracts within the State of Michigan were also ranked in the 90th national percentile for seven out of the thirteen specific environmental indicators as described in Table 12.

Figure 24: Map of Michigan State showing the LIDACs among three different tools
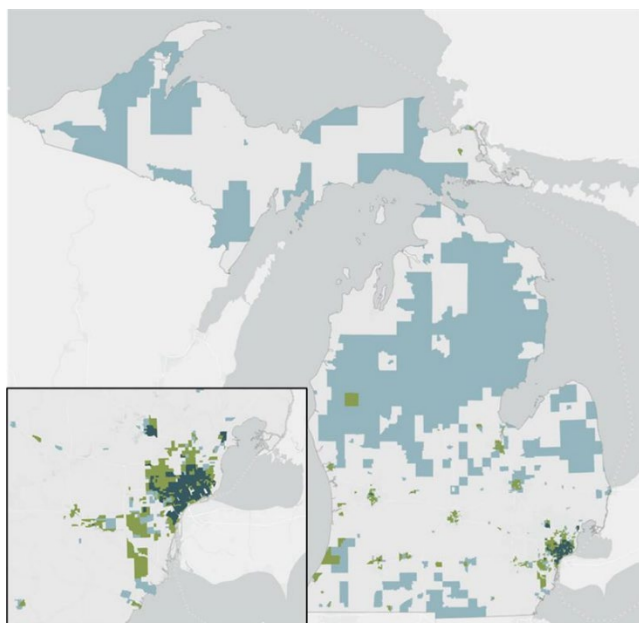
Legend

- **CEJST Justice40 Disadvantaged, MiEJScreen 90th percentile or above, and EPA EJScreen 90th national percentile or above in 1 or more categories (All three tools)**
- **CEJST Justice40 Disadvantaged, EPA EJScreen 90th national percentile or above in 1 or more categories**
- **CEJST Justice40 Disadvantaged**

Table 12: Environmental and socioeconomic information from EPA's EJScreen corresponding to the number of census tracts in Michigan affected by those indicators.

Supplemental Indexes (EJScreen) 90TH National Percentile

Indicator	Number of Census Tracts
Traffic Proximity	226 census tracts
Lead Paint	366 census tracts
Hazardous Waste Proximity	16 census tracts
Superfund Proximity	125 census tracts
RMP Facility Proximity	107 census tracts
Wastewater Discharge	47 census tracts
Underground Storage Tanks	492 census tracts

Figure 25: Overlay of the State of Michigan's LIDACs with the highest emitting facilities in the state.
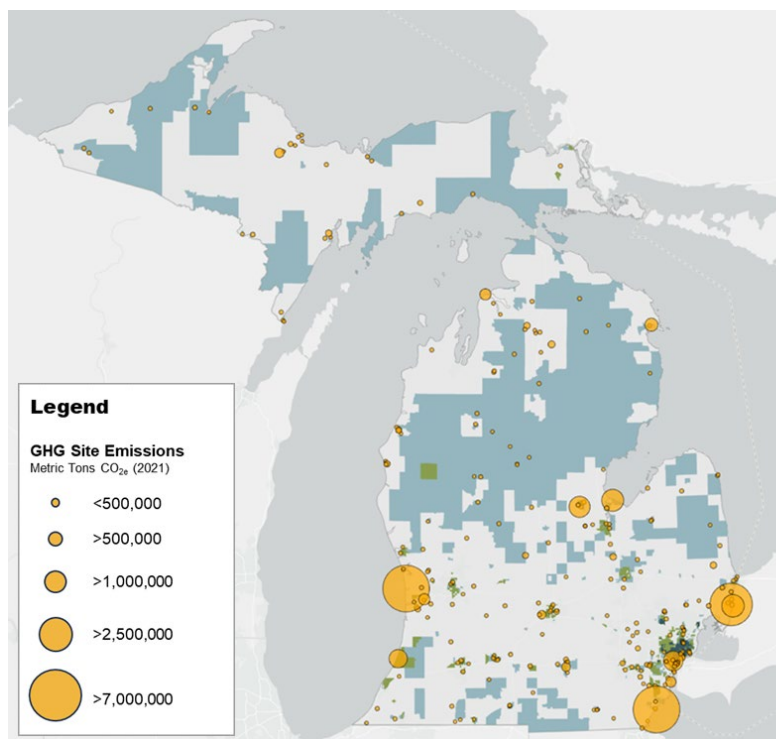
Legend

GHG Site Emissions
Metric Tons CO2e (2021)

- <500,000
- >500,000
- >1,000,000
- >2,500,000
- >7,000,000

The majority of Michigan's GHG emissions are located in multiple clusters throughout the state. Figure 26 provides a representative view of GHG site emissions throughout the State of Michigan. The clusters represent the GHG site emissions based on metric tons emitted within the geographical area. As the maps show, many of the low income and disadvantaged communities throughout the State of Michigan are impacted by these clusters.[17]

The State of Michigan has engaged with community members and leaders throughout many of the identified disadvantaged communities. These engagements have included a variety of different methodologies, including surveys, questionnaires, in-person and virtual forums to ensure that the concerns and desired outcomes for the low income and disadvantaged communities throughout the state were identified. The in-person sessions held in the cities of Detroit, Grand Rapids, Flint, Marquette, Petoskey, and Acme collectively contain 505 of the 996 disadvantaged census tracts representing nearly 51% of the LIDACs within the state. Additionally, the two virtual sessions held were attended by individuals representing over 100 communities, and approximately 13% of those registered were from LIDACs based on zip codes provided.

4.3.1 Climate Impacts and Risks in LIDACs

Air Quality and Public Health

Residents in Michigan, especially in the southwest of Detroit, experience heavy pollution emitted from a variety of different sources. For example, the southwest and surrounding areas of Detroit are home to many factories, such as oil refineries and automobile manufacturing facilities. The emissions from these facilities, combined with daily automobile, truck traffic and other environmental stressors can adversely affect the health of those in the community. There are over 150 sites in southwest Detroit alone that release chemicals and particles which result in air pollution. These sites emit dangerous chemicals and particles such as PM2.5, sulfur dioxide, nitrous oxide and ozone. These air pollutants have caused increases in the asthma hospitalization rates in southwest Detroit and the surrounding areas, which are nearly triple the state average.[18]

Michigan anticipates that the investment in the priority climate action measures will provide benefits to LIDAC communities. Further, Michigan commits to involving and engaging LIDAC community members early and often throughout the planning process to influence decision-making. As a result, it is anticipated that the overall public health of residents will see improvements in these communities.

Based on available data from the CEJST screening tool, many of the identified LIDAC census tracts across the state also have adult residents with major health concerns that adversely impact their quality of life. Table 13 below shows the number of identified LIDAC census tracts

---

[17] epa.gov/ghgreporting
[18] iqair.com/us/usa/michigan

in which 90% or more of the adult residents have either asthma, diabetes, or coronary heart disease. The chart also provides information on the number of adults living with these serious health conditions across all identified LIDAC census tracts.

Table 13: Health conditions among low-income disadvantaged communities

Health Condition	# Census Tracts 90th National Percentile or Above	# of adults 18 or older in All LIDAC Census Tracts
Asthma	677	1,286,397
Diabetes	350	1,477,425
Heart Disease	324	800,560

Studies have shown that many of these health conditions can be linked to poor air quality, which is a consistent issue facing many communities located in LIDAC census tracts throughout the state. As these communities begin to engage and take part in projects and initiatives designed to improve overall air quality, the residents in many of the identified LIDAC areas should begin to realize tangible improvements in the overall health of the residents.

Energy Burden

Energy burden is a measure of the proportion of household income spent on energy costs, and in Michigan, this issue disproportionately affects economically vulnerable families. Michigan households with an income below the Federal Poverty Line (FPL) spend 18% of their income on energy, compared to an average of 3% for the overall population.[19] The financial impact is evident as these families allocate a substantial portion of their earnings to meet basic energy needs. Energy burden contributes to a cycle of poverty by limiting resources for other essential needs such as healthcare, education, and housing.

Recognizing the urgency of addressing energy burden, the State of Michigan has set ambitious goals to alleviate the strain on low-income families. EGLE has spearheaded initiatives to enhance energy efficiency, promote renewable energy sources, and provide financial assistance to vulnerable communities to limit energy burden from powering and heating homes to not more than 6% of annual income for low-income households. Programs such as the Weatherization Assistance Program (WAP) aim to improve energy efficiency in low-income homes, reducing energy consumption and subsequently lowering utility bills. Additionally, Michigan's Community Action Agencies collaborate to implement outreach and education programs to inform residents about available resources, energy-saving practices, and financial assistance options, fostering a comprehensive approach to alleviate energy burden. For every $1 invested in reducing energy waste in MI homes – through more efficient windows, lighting, and other energy-saving

---

[19] US DOE

technologies – homeowners save more than $3.20 in reduced future energy bills.[20] Energy efficiency also reduces energy burden by as much as 2%, translating into more than $400 in annual savings for households.[21]

In 2023, clean energy legislation in Michigan doubled funding for the Utility Consumer Participation Board (UCPB), which provides resources for organizations to advocate on behalf of ratepayers before the Michigan Public Service Commission, specifically for environmental justice and high energy burden communities. By funding more robust participation, these increased resources will continue to help mitigate energy burden among Michigan families, despite progress already trending in the right direction. The average energy burden between 2022 and 2023 decreased by 3% for households whose income is 0%-100% of the FPL. Although, the distribution of average annual energy cost and average energy burden across income categories as defined by the FPL remain relatively consistent between 2022 and 2023, accentuating the disproportionate impacts felt by LIDACs.

Addressing energy burden in low-income communities presents an opportunity to enhance overall well-being, with impacts on economic, social, and health. Weatherizing and repairing homes emerge as pivotal strategies, encompassing improvements such as insulation, air sealing, and energy-efficient appliance upgrades. Such measures not only result in immediate cost savings for families but also contribute to a more sustainable environment. Furthermore, investing in energy efficiency initiatives not only reduces energy bills but also enhances the comfort and health of homes, creating a positive ripple effect on the residents' overall quality of life. Getting access to these technologies and improvements for Michigan's low-income and disadvantaged communities continues to be a challenge and requires a concerted effort from government agencies, non-profit organizations, and private sector partners. By implementing these opportunities, Michigan can pave the way for a more equitable and sustainable energy landscape, fostering resilience and improved living conditions for its most vulnerable citizens.

Workforce

Michigan leads the Midwest states in clean energy jobs with nearly 124,000 Michigan residents employed by clean energy companies at the end of 2022. Michigan ranked 5th in the nation for clean energy jobs in 2022 after growing nearly 5% year-over-year, and the industry is poised for continued growth due to federal climate investments passed last year.

Table 14: Michigan Clean Energy Jobs in 2022, totaling 123,983 jobs

Clean Energy Job Categories	Number of Jobs in 2022
Renewable Energy	12,002
Energy Efficiency	75,085
Clean Transportation	32,271
Grid & Storage	3,944
Clean Fuels	682

---

[20] michigan.gov
[21] ACEEE

Figure 26: Michigan Clean Energy Jobs in 2022, totaling 123,983 jobs

Michigan Clean Energy Jobs in 2022

■ Renewable Energy   ■ Energy Efficiency   ■ Clean Transportation
■ Grid & Storage   ■ Clean Fuels
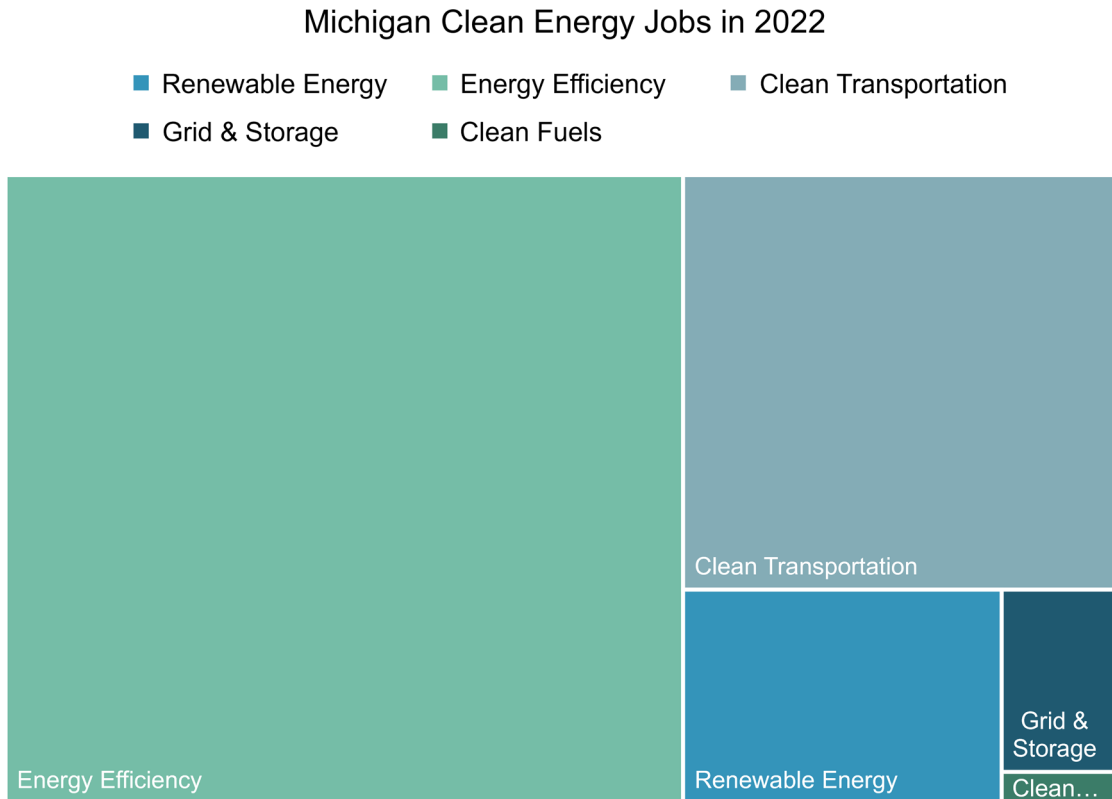
Currently, clean energy jobs now account for over 40% of all energy workers in America[22], and it is anticipated that this upward trend will continue. As Michigan implements initiatives designed to promote renewable energy, energy efficiency, clean vehicles, grid modernizations and other pollution reduction initiatives, clean energy jobs are expected to continue to grow. The majority of the clean energy jobs in Michigan fall into the sector categories described in Table 14 and Figure 27[23].

The largest sector in Michigan's clean energy industry is energy efficiency, comprising over 60 percent of the state's clean energy workforce. Workers in Michigan's energy efficiency industry manufacture ENERGY STAR-rated appliances, install efficient lighting, heating, ventilation, and air conditioning (HVAC) systems, and install advanced building materials in homes and commercial buildings. Additionally, as more automakers and their suppliers continued to shift to electric vehicles, the clean transportation sector saw an increase in employment of over 14 percent in 2022 in Michigan[24].

Since August 2022, there has been more than $20 billion in investments for clean energy projects throughout the State of Michigan, which has resulted in the creation of more than 13,500 jobs[25]. As more communities in identified LIDAC census tracts continue to implement

---

[22] Clean Jobs America 2023
[23] Clean Jobs Midwest
[24] Clean Jobs Midwest
[25] Clean Jobs for MI

State of Michigan
Priority Climate Action Plan

clean energy projects, it is anticipated that the number of clean jobs available to LIDAC members will continue to grow, especially with the prioritization of local hiring. Several bills passed in Michigan in 2023 consider environmental justice and workforce development holistically. For example, new laws stipulate strong labor standards for clean energy projects, prioritize worker benefits in long-term utility plans, and encourage diverse workforce hiring from environmental justice and low-income communities.

Climate Resilience

As global temperatures continue to rise, the State of Michigan, as well as other areas throughout the country, have experienced land, water, and atmospheric changes. These changes create an increasing risk to the livelihood of Michigan residents. Michigan communities have already been exposed to changing and intensifying weather patterns, and as shifts in climate, economics and technology continue to rapidly occur, it is imperative that local governments proactively and innovatively seek out ways to understand and address the anticipated challenges that these shifts will bring to communities and residents throughout the state to ensure community resiliency.

Climate concerns in Michigan include extreme heat, heavy precipitation and flooding, air pollution, impacts to the Great Lakes and natural ecosystems, and impacts to agriculture.[26] Communities in identified LIDAC areas are often more vulnerable to climate impacts due to several factors, including historic practices of redlining and land use decisions. Climate impacts can exacerbate existing health and social inequities. For example, extreme heat can exacerbate asthma symptoms and other pulmonary illnesses because it amplifies air pollutants and particulate matter. Heat also amplifies ground-level ozone levels, which are associated with higher hospitalization rates for asthma, more severe allergic reactions, and premature deaths for people with heart and lung disease. As previously discussed, many LIDAC areas have poor air quality and high rates of asthma. As heat indexes continue to reach record levels, this can increase the need for public health care services in LIDACs which may be ill-equipped to address these heightened healthcare needs, placing LIDAC residents at further risk.

Heavy rains and flooding are another area of concern for LIDAC areas, as they increase the likelihood of runoff, which can weaken public infrastructure, pollute bodies of water and spread water-borne illnesses and infections throughout the community. Water-borne diseases and poor drinking water quality are public health issues that can affect thousands of people in LIDAC areas prone to flooding. Flooded homes, if not properly and quickly cleaned up, can create unhealthy conditions for residents as they can lead to the development of mold and reduce indoor air quality.[27] Mental health problems can increase after people experience extreme weather events, such as floods.[28]

---

[26] What Climate Change Means for Michigan, EPA, August 2016
[27] Michigan Climate and Health Profile Report, 2015, MDHHS
[28] CDC.gov

As LIDAC community leaders continue to engage in conversations with the State of Michigan about resiliency strategies and initiatives, collaboratively the state can work to reduce climate change risks and improve overall resiliency for LIDAC residents.

Tribal Climate Impacts and Risks in Michigan

Michigan recognizes that tribal nations have also faced disproportionate burdens in our fossil fuel economy and are especially vulnerable to the impacts of climate change because of their deep ties to the land and reliance on hunting, fishing, and gathering. Oil spills and other such contamination have impacted significant resources like wild rice. The changing climate threatens the sustainability of the Great Lakes fishery which tribal fishers rely upon to earn a living and feed their families. Many cultural practices and traditions require access to species, like the maple tree, that are put at risk by climate change. Michigan's climate strategies and actions must honor, embrace, benefit, and not interfere with the cultural heritage and treaty rights of federally recognized tribal nations in Michigan and preserve the fragile balance of the Great Lakes ecosystem at the heart of that heritage and those rights.

In the implementation of the PCAP and CCAP, for programs and projects that are located near tribal lands, tribal governments should be included in robust outreach and communication efforts. As applicable, EGLE will follow the Department Policy and Procedure 09-031, "Consultation and Coordination with Indian Tribal Governments." Additionally, EGLE will continue to work with and coordinate efforts with tribes and tribal consortiums that are implementing their own PCAPs and CCAPs.

4.3.2 Analyzing LIDAC Quantitative Benefits

The implementation of the priority reduction measures will provide a crucial step towards environmental justice, mitigating the disproportionate impacts low income and disadvantaged communities often face. The impact measurements on the LIDACs were chosen due to their tangible benefit on the health, economic well-being, and overall quality of life of individuals within these communities. The following metrics are quantified in the discussion of the priority reduction measures in Section 5. Due to the statewide scope of this PCAP, these benefits can be reasonably expected to affect all census tracts listed in **Appendix C: CEJST Census Tracts** when considering the priority reduction measures emission reduction impact at an aggregated level.

> **Emissions by Pollutant (including co-pollutant)**: Tracking emissions by pollutant, including co-pollutants such as sulfur oxides (SOx), nitrogen oxides (NOx), particulate matter (PM2.5), volatile organic compounds (VOC), and carbon monoxide (CO), is crucial for environmental justice. Different pollutants have distinct health and environmental effects, and certain populations, especially those in lower-income and disadvantaged communities, may be disproportionately exposed to higher concentrations of specific pollutants. For example, PM2.5 and VOCs can trigger asthma and other respiratory

issues, while NOx and SOx contribute to acid rain and respiratory problems, which can disproportionately impact communities living near industrial facilities.

Avoided Deaths by Race: Avoidable deaths by race sheds light on the unequal environmental burdens faced by different communities. Different racial groups can have varying degrees of vulnerability to environmental hazards due to factors like housing quality and access to healthcare. By minimizing air pollution and improving overall air quality, the risk of respiratory diseases and cardiovascular issues decreases. By looking at preventable deaths linked to harmful pollution, we can pinpoint communities that bear a disproportionate burden. This approach allows policymakers to develop targeted interventions that address specific community needs.

Avoided Lost Workdays: Lower-income communities often bear the brunt of health-related challenges, leading to increased absenteeism from work. Lost workdays capture the immediate and ongoing economic harm caused by environmental issues, which is crucial for communities often dealing with financial insecurity. This metric captures the short-term health issues, respiratory problems, and mental health impacts that significantly disrupt lives and causes an economic toll on LIDACs. Implementation of GHG reduction measures should reduce the occurrences of respiratory illnesses, resulting in fewer lost workdays, impacting the economic well-being of individuals in these communities, and fostering greater productivity and financial stability.

Avoided Respiratory Symptoms and Bronchitis: Greenhouse gas reduction measures play a pivotal role in reducing air pollution, a major contributor to respiratory issues and bronchitis. Respiratory issues like coughs, wheezing, and shortness of breath are often early indicators of exposure to environmental pollutants. Tracking avoided cases of these symptoms provides an early warning system for potential long-term health problems like chronic respiratory diseases or asthma. Tracking avoided respiratory symptoms also captures the day-to-day burdens faced by communities living in polluted environments. Additionally, reducing the prevalence of respiratory symptoms not only enhances the overall health of individuals in lower-income communities but also alleviates the burden on healthcare systems, leading to a more equitable distribution of health resources.

Avoided Hospital Admissions: This metric highlights the significant burden of illness caused by environmental factors and encompasses a wide range of health problems from acute respiratory infections to chronic conditions exacerbated by pollution. Avoided hospital admissions provides a more comprehensive picture of environmental health impacts. In addition, hospital admissions are expensive, both for individuals and healthcare providers. Tracking avoided admissions reveals the substantial economic burden placed on communities disproportionately exposed to environmental hazards.

Avoided Minor Restricted Activity Days: Unlike more severe outcomes such as deaths and hospital admissions, this metric captures the subtler, everyday impacts of environmental hazards on people's lives. This includes days when individuals experience symptoms like headaches, fatigue, or mild respiratory issues that restrict their usual activities like exercise or outdoor time. Access to clean air promotes a healthier lifestyle and enhances the overall quality of life for community members. Tracking minor restricted activity days can highlight the cumulative burden of exposure to pollution. A single day of feeling unwell might seem minor, but the repeated occurrence can significantly impact mental well-being and quality of life, particularly for children and vulnerable populations.

4.4 REVIEW OF AUTHORITY TO IMPLEMENT MEASURES

The State of Michigan has the authority to implement the priority action GHG reduction measures identified in this document. In alignment with direction from the EPA, the PCAP prioritizes measures that have achievable, significant GHG reductions within the program period. To achieve this, the State of Michigan has current implementation authority, and many measures are voluntary and implementation ready, building on existing programs. In addition, the PCAP incorporates measures that have potential to be scaled up and positively impact Michigan communities state-wide, especially those in or adjacent to LIDACs as designated by the EPA.

The Michigan state constitution (Const. 1963, Art. V, § 2, Eff. Jan. 1, 1964) established the concept of 20 principal departments and gave the governor authority to reorganize. Governor Engler created the Department of Environmental Quality in EO 1995-18, which was one of the original 20 principal departments referenced in the state constitution and subsequently allocated by the legislature. Governor Whitmer's Executive Order 2019-06 renamed the Michigan Department of Environmental Quality (MDEQ) as the Michigan Department of Environment, Great Lakes, and Energy (EGLE) effective April 22, 2019. The mission of EGLE is to protect Michigan's environment and public health by managing air, water, land, and energy resources.

To implement many of these measures, additional financial support will be necessary. The State of Michigan has the authority to receive and accept "any grant, devise, bequest, donation, gift or assignment of money, bonds or choses in action, or of any property, real or personal" per MCL §§ 21.161. In addition, MCL §§ 18.1384 authorizes EGLE to follow state budget processes to apply for and receive, and appropriate federal funds.

4.5 FUNDING OPPORTUNITIES IN MICHIGAN

Recent investments by the federal government through the Bipartisan Infrastructure Law (BIL) and Inflation Reduction Act (IRA) are an opportunity for Michigan to implement the key strategies of the MI Healthy Climate Plan and deliver outcomes that curb the worst impacts of climate change, improve public health, create economic opportunity, lower costs, shore up energy independence, protect our natural resources, and make investments to address historic, current, and future environmental injustices. These investments will also position Michigan's communities and Michiganders for leadership in the years and decades ahead.

Michigan has a highly coordinated effort to obtain funding for transitioning the state to a more sustainable future by implementing the key strategies described in the MHCP. The State coordinates across agencies pursuit of outcoming federal funding opportunities through the Michigan Infrastructure Office, with the Office of Climate and Energy leading coordination and pursuit of climate and clean energy related funding. This coordination includes weekly interagency meetings with agency principals, as well as frequent internal and external application collaborations. Opportunities relevant for entities across the state are also regularly shared out through a comprehensive network of contacts at universities, community-based organizations, tribal entities, and further. Several trackers and tools have been developed to find, coordinate, and keep track of the many funding opportunities flowing to entities from the aforementioned government legislation, as well as other recurring federal funding such as the State Energy Program. The State of Michigan regularly shares funding opportunities via public resources and invites public commentary around the use of federally pursued funds and programs via Requests for Information (RFIs) and other mediums. Further, state agencies regularly provide letters of support for applicants across the state. Cross-cutting to climate and energy, in late 2023 the state issued an RFI around the creation of a State Energy Finance Institution via the Energy Policy Act of 2005 Section 1703 managed by the U.S. Department of Energy's (DOE) Loan Program Office (LPO). Recent updates to this and other DOE LPO managed programs and IRS tax credits have expanded the opportunity for Michigan entities to receive funds and create impactful clean energy projects by decreasing the requirements for participation. The State of Michigan is in conversations with possible recipients and raising awareness across the state for these opportunities, and many more like the direct pay tax credits. EGLE's agile approach underscores the complex coordination and flexibility needed to secure maximum funding opportunities for the entire state.

Each priority reduction measure in Section 5 describes the relevant opportunities the State of Michigan has applied to, is evaluating as upcoming opportunities, and what funds have already been secured related to a particular measure.

4.6 WORKFORCE PLANNING IN MICHIGAN

The reduction measures described in the Priority Climate Action Plan, in tandem with the efforts being implemented by the MI Healthy Climate Plan, will require a skilled and prepared workforce to navigate the emerging changes across the economy. As described in the LIDAC Benefits Analysis section, Michigan leads the Midwest states in clean energy jobs at 123,983 jobs which saw 5% growth in 2022 across all

Clean Vehicles

Michigan's fastest-growing sector in 2022

+14.4% growth

sectors – twice as fast as the economy. Several projects under development in the state estimate the anticipated jobs that will be created from them such as the Midwest Alliance for Clean Hydrogen (MachH2) project projecting 13,600 direct jobs[29], and Ford Motor Company supporting 5,700 jobs in new electric vehicle manufacturing. Since the IRA, Michigan has secured a total of $21.3 billion in investment as of 2023. The projects funded by this amount and more anticipate the addition of 167,000 clean energy jobs[30] in total throughout the next decade.

The importance of bringing clean jobs to Michigan goes beyond the ability to implement the MHCP and reduce carbon emissions; it also brings an immense opportunity for economic growth for Michiganders. The clean energy legislation passed in 2023 had two callouts for growing a clean energy workforce:

1. Requires all projects approved in IRPs and renewable siting cases pay workers prevailing wage, enter into project labor agreements, and utilize Department of Labor certified apprenticeships.

2. Encourages diverse workforce development and hiring from environmental justice and low-income communities for EWR programs.

The distinction between growing the clean energy workforce and growing the clean energy workforce with an emphasis on diversity and inclusion has great impact on environmental justice. Below describes the current workforce planning activities in Michigan as of Q1 2024.

- Michigan has several robust apprenticeship programs that are growing both in number of completions and nontraditional programs. These apprenticeship programs also have increasing participation in underrepresented demographic groups and create high-paying jobs across the state. As the shift towards a sustainable economy continues, so will the need for clean energy jobs and the ability to train individuals for those jobs through new apprenticeship programs. Read more in the Registered Apprenticeships in Michigan 2022 report.

---

[29] michiganbusiness.org/news/2023/12/hydrogen/
[30] climatepower.us/wp-content/uploads/sites/23/2023/10/200k-Clean-Energy-Boom_Michigan.pdf

- Governor Whitmer and the Michigan Department of Labor and Economic Opportunity (LEO) launched a Michigan Electric Vehicle Jobs Academy in 2023 to connect industry and talent in automotive and electrification roles.

- Michigan launched a MI Healthy Climate Corps program to advance the goals of the MHCP by building capacity in governments and nonprofit organizations, guiding federal and state resources to communities, and fostering networking and professional development opportunities for Corps members, building Michigan's workforce in climate action. This aligns with existing climate-focused AmeriCorps programs in the state.

- Michigan is a leader in the country in customized workforce training lead by LEO. With a newly appointed Community and Worker Economic Transition Office, the state can use this strength to tailor innovative programs for future clean energy workforce needs.[31]

- Goodwill Detroit is launching a Clean Technology Accelerator to pilot in Quarter 2 of 2024 for electric vehicle technicians. The program has the opportunity to expand to different locations along with energy efficiency, solar and storage, and heat pump technicians following the pilot.

- Several partnerships throughout Michigan make the above-described programs a reality, including but not limited to MI Energy Workforce Development Consortium, MI Energy Innovation Business Council, MI Energy Efficiency Contractors Association, Michigan Works!, and Center for Energy Workforce Development each of which help grow and develop workforce programs in the state.

In Section 5, the estimated number of jobs to be created by the priority reduction measures along with the types of jobs that will be needed are discussed as analyses allowed.

5. PRIORITY REDUCTION MEASURES BY KEY SECTOR

This section discusses the individual greenhouse gas reduction measures identified as part of the prioritized framework. Each measure includes the following analyses and quantifications:

- Reduction measure description and quantification, including key implementing agency or agencies, implementation schedule and milestones, and metrics for tracking progress.

- LIDAC qualitative and quantitative benefits analysis

- Review of authority to implement

- Intersection with other funding availability

- Workforce planning analysis

---

[31] michigan.gov/leo/bureaus-agencies/economic-transition

State of Michigan
Priority Climate Action Plan

Each measure is intended to be applicable statewide. They are organized by the following sectors:

1. Electricity Generation
2. Commercial and Residential Buildings
3. Transportation
4. Industry

The following is a summary list of the priority reduction measures organized by key sector.

ID	Key Sector	Priority Reduction Measure
1	Electricity Generation	Drive clean energy deployment including improving siting for renewable energy and energy storage across Michigan, including on brownfields and former industrial sites and emphasizing equitable access for Michigan's LIDACs.
2	Electricity Generation	Invest in energy storage and necessary electric grid investments to enable earlier coal plant retirements and better integrate renewable energy into the electric grid.
3	Commercial and Residential Buildings	Drive building electrification and fuel-switching in existing buildings including an emphasis on LIDACs and electrifying households that currently rely on delivered fuels such as propane and home heating oil.
4	Commercial and Residential Buildings	Reduce household fossil energy use through home repairs, electrical upgrades for building and vehicle electrification, weatherization, and other energy waste reduction investments with an emphasis on ensuring equitable access.
5	Commercial and Residential Buildings	Decarbonize government and nonprofit facilities and infrastructure, with an emphasis on LIDACs, by reducing energy waste, investing in decarbonization solutions, and reducing emissions from fossil fuel combustion.
6	Transportation	Electrify state government, municipal, tribal, and other public fleets, prioritizing equitable access for Michigan's LIDACs.
7	Transportation	Support just access to public transit and non-motorized transportation options by improving infrastructure, and by increasing routes, frequency, and reliability of available options.

State of Michigan
Priority Climate Action Plan

ID	Key Sector	Priority Reduction Measure
8	Transportation	Encourage adoption of electric vehicles by increasing deployment of electric vehicle charging infrastructure, prioritizing equitable access for Michigan's LIDACs.
9	Industry	Encourage industrial innovation to advance energy efficiency, fuel-switching, and deployment of cleaner manufacturing technologies prioritizing facilities in LIDACs that may receive significant benefits from reduced industrial sector emissions.
10	Industry	Reduce methane emissions from various sources, including but not limited to food waste, organics diversion, and wastewater treatment facilities with a focus on methane reduction strategies that will bring significant benefits for LIDACs.

5.1 ELECTRICITY GENERATION REDUCTION MEASURES

Michigan's power sector emitted 58.2 $MMTCO_2E$ in 2019. Compared to 2005 levels, the energy sector has reduced overall emissions by 24%. Michigan's electric power sector is primarily driven by natural gas generation (34%), followed by coal (29%), nuclear (22%), and renewable energy (12%) as of 2022[32]. Decarbonizing the electric power sector is a vital part to decarbonizing Michigan's economy. As other sectors deploy electrification technologies such as electric vehicles and heat pumps, the faster electricity generation is decarbonized, the higher impact we will have through emissions reductions. Michigan has ambitious goals in this regard to decarbonize the power sector and reduce energy burden in LIDACs while maintaining grid security.

Reduction Measure #1 - Drive clean energy deployment including improving siting for renewable energy and energy storage across Michigan, including on brownfields and former industrial sites and emphasizing equitable access for Michigan's LIDACs.

Reduction Measure Description and Quantification

Deploying clean energy to Michigan's electric grid will create significant emission reductions across all sectors of the economy. The energy sector inventory is Michigan's largest emitting sector, with the burning of fossil fuels to produce electricity as a major contributor to energy-derived emissions. As other energy subsectors, such as transportation and heating for buildings,

---

[32] eia.gov/state/print.php?sid=MI

State of Michigan
Priority Climate Action Plan

Page 62

increasingly electrify, the resource mix for generating electricity will play a transformational role in meeting Michigan's decarbonization goals.

Through this measure, Michigan will drive clean energy deployment through initiatives like incentivizing siting of utility-scale and distributed renewable energy and storage. For example, in 2023, Governor Whitmer allocated $30 million of the Fiscal Year 2024 budget to EGLE to launch Renewables Ready Communities, a program that incentivizes communities to host utility-scale renewables. Providing additional resources to this program and expanding it to include siting on brownfields and former industrial sites can catalyze Michigan's clean energy deployment. In addition, technical assistance and educational resources can address potential barriers to implementation through providing incentives to municipalities and clean energy developers, increasing community capacity, sharing siting and permitting best practices, and streamlining the siting process for renewable energy systems.

While the MHCP set the goal to generate 60% of the state's electricity from renewable resources by 2030, including a call for a 50% renewable energy standard by 2030 and increased investments in customer-driven renewable energy such as voluntary green pricing programs and distributed solar. To codify parts of the MHCP, state legislation passed in 2023 which requires 50% of electricity to be sourced by renewable energy by 2030, maintained Michigan's voluntary green pricing programs, and made changes to increase access to distributed solar across Michigan. Currently, 15% of Michigan's electricity is generated from renewable energy, which means reaching the 50% renewable energy standard by 2030 requires a 200%+ increase in renewable energy generation in the state between 2024 and 2030, resulting in significant GHG emission reduction potential. Regarding the implementation schedule and milestones for this measure, EGLE does not anticipate any major obstacles. Meeting the goals of the 2023 legislation and the MI Healthy Climate Plan will need the rapid build out of renewable energy and energy storage, which will require improvements in siting and permitting to enable an additional 5-6% more renewable energy generation coming online each year between 2024 and 2030.

Entities that may participate in implementing this reduction measure (but are not necessarily eligible to apply directly for CPRG implementation grants) include but are not limited to investor-owned utilities, public utilities, electric cooperatives, tribes, renewable energy developers, and others. Metrics that may be used to track this reduction measure include the amount of renewable energy generated in the state, the number and size of renewable energy projects approved by entities such as the Michigan Public Service Commission (MPSC), the number of brownfield and other industrial sites remediated with plans for renewable energy or storage development, and other metrics as identified.

Driving clean energy deployment was quantified using RMI's Energy Policy Simulator. Major assumptions include:

1. This reduction measure allows for the state to reach their renewable energy standard of 50% by 2030, 60% by 2035, and renewable energy goal of 100% by 2050.

2. Estimates include a range of renewable energy technologies being deployed, including nuclear as a clean energy.

Table 15: Estimated GHG emission reductions as a result of priority reduction measure #1

Estimated Emissions Reductions	Time Scale
1.640 MMTCO$_2$e	Annual near-term average
20.856 MMTCO$_2$e	Between 2024 – 2030
42.651 MMTCO$_2$e	Between 2024 – 2050

Validation of this quantification was performed using EPA's AVERT tool with estimates of year-over-year renewable energy deployment across onshore wind, utility-scale solar, and rooftop solar.

Note: This reduction measure was quantified under a large umbrella of implementation strategies. When applying for implementation grants for specific projects, ensure the appropriate emissions are calculated to result in reductions of the specific project.

LIDAC Qualitative and Quantitative Benefits Analysis

By accelerating clean energy deployment in Michigan, the analysis reveals that we can expect a range of positive outcomes for low income and disadvantaged communities. Cumulative emissions are projected to decrease significantly for SOx and NOx translating to cleaner air, especially for front line communities formerly near industrial sites and power plants. Emissions are expected to decrease for VOCs and CO as well, improving overall air quality and reducing the risk of chronic diseases. The cumulative decrease in pollutants will drive overall improvements in air quality leading to fewer respiratory issues, resulting in fewer hospitalizations and lost workdays, improving the physical, mental, and economic well-being for LIDAC residents.

Table 16: Change in co-pollutants as a result of priority reduction measure #1 in thousand metric tons of emissions

Pollutant	Change in Cumulative Emissions (2024-2030)	Change in Cumulative Emissions (2024-2050)
SOx	-7.619	-3.487
NOx	-8.163	-13.347
PM2.5	0.874	4.657
VOC	-2.576	-3.881
CO	-48.632	-150.443

Figure 28: Avoided deaths categorized by race between 2024 and 2030 as a result of priority reduction measure #1

5 4
18
89

■ White ■ Black ■ Asian ■ Other

Figure 28: Avoided deaths categorized by race between 2024 and 2050 as a result of priority reduction measure #1

44 41
148
650

■ White ■ Black ■ Asian ■ Other
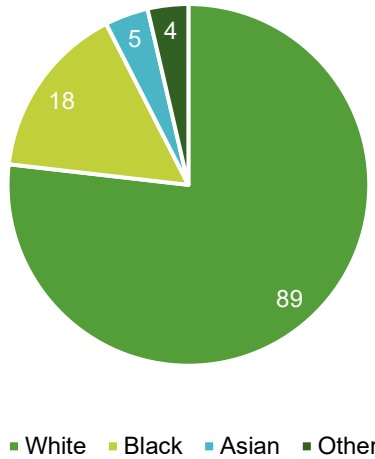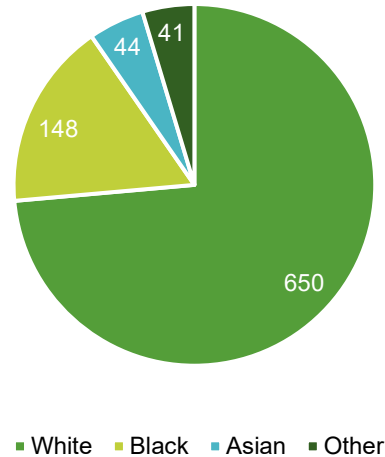
Table 17: Additional estimated community benefits in the near-term and long-term throughout Michigan as a result of priority reduction measure #1

Community Benefits	2024-2030 Cumulative Value	2024-2050 Cumulative Value
Avoided Lost Workdays	7,156	54,854
Avoided Respiratory Symptoms and Bronchitis	2,500	19,203
Avoided Hospital Admissions	25	187
Avoided Minor Restricted Activity Days	42,516	325,763

Review of Authority to Implement

The State of Michigan has existing legislative and regulatory authority to implement this measure without additional action. In addition to the statutes in Section 4.4 and other relevant laws, the "Clean and Renewable Energy and Energy Waste Reduction Act" -- as amended most recently in 2023 – provides authority to implement this measure along with PA 3 of 1939 – as amended most recently in 2023 -- which provides the authority for the Michigan Public Service Commission to regulate investor-owned utilities in the state.

Intersection with Other Funding Availability

In addition to the broader coordination of funding opportunities across Michigan as noted in Section 4.5, the State of Michigan has both received and is waiting to hear back on multiple grant opportunities related to this reduction measure. The EPA awarded the State of Michigan $9.3 million in 2023 to cleanup brownfield sites[33], preparing the sites for reuse in the future. As part of the State and Tribal Response Program Grants, Michigan has also received funding from Brownfield categorical grants.[34] These funding opportunities are examples of efforts that will reduce barriers to siting renewable energy and energy storage on brownfields. Additionally, as a state program, EGLE currently offers grants and low-interest loans to promote the re-use of contaminated sites.

The State of Michigan is waiting to hear back on two other programs currently under review:

1. Solar for All through the Greenhouse Gas Reduction Fund
2. Renewable Energy Siting through Technical Engagement and Planning (R-STEP)

This measure also intends to leverage the complementary funding available through elective pay (sometimes called direct pay) of certain clean energy tax credits (§45Y, §48E). These tax credits only cover up to 30% of the projects contemplated under this measure, which may be insufficient for some projects to achieve a return on investment through cost-savings from energy bills. In addition to directly supporting projects through technical assistance and deployment of renewable energy and storage systems, this measure will also serve to educate Michiganders on the available tax credits and provide technical assistance to communities in designing such systems. As a result, this measure will catalyze widespread adoption of renewable energy and storage systems.

Workforce Planning Analysis

Currently in Michigan, there are approximately 12,000 renewable energy jobs across five different technologies[35]. By increasing renewable energy generation across the state, Michigan will create jobs across the value chain in manufacturing, professional services, maintenance, engineering, and more fields. This reduction measure is estimated to increase renewable energy jobs to around 22,000 (increase by about 10,000 jobs) by 2030[36].

---

[33] EPA
[34] java.epa.gov/acrespub/stvrp/
[35] Clean Jobs Midwest
[36] Energy Policy Simulator

Reduction Measure #2 - Invest in energy storage and necessary electric grid investments to enable earlier coal plant retirements and better integrate renewable energy into the electric grid.

Reduction Measure Description and Quantification

Investing in and implementing energy storage not only facilitates the integration of additional renewable energy sources but also enables phased retirement of remaining coal plants in the State of Michigan. It is necessary to widely deploy grid-scale energy storage to maintain energy security within the state and decarbonize the electric grid. The clean energy legislation passed in 2023 requires the study of long-duration storage and establishes a new energy storage standard of 2,500 megawatts (MW), making Michigan one of just a few states that require energy storage standards. Regarding the implementation schedule and milestones for this measure, EGLE does not anticipate any major obstacles. A major milestone to achieve this measure includes closing all coal-fired power plants by 2030 which would equate to interim milestones of removing about 1,050 MW of coal-fired capacity per year between 2024 and 2030.

Example entities that may participate in implementing this reduction measure (but are not necessarily eligible to apply directly for CPRG implementation grants) include but are not limited to state government, local municipalities, tribes, utilities, battery energy storage developers, and others. Metrics that may be used to track this reduction measure include tracking the closure timeline of coal plants located within Michigan, the number, location, and size of battery storage projects approved by entities such as the Michigan Public Service Commission, localized air pollution surrounding corresponding coal plants, and other metrics as identified.

Table 18: Estimated GHG emission reductions as a result of priority reduction measure #2

Estimated Emissions Reductions	Time Scale
2.794 MMTCO$_2$e	Annual near-term average
16.762 MMTCO$_2$e	Between 2024 – 2030
23.593 MMTCO$_2$e	Between 2024 – 2050

This measure was quantified using EPS under the following assumptions:

1. The deployment of grid-scale energy storage at a rate of 1,050 MW per year allows for remaining coal-fired power plants to phase out by 2030
2. Phase-out is completed on a linear implementation schedule beginning in 2025
3. Grid-scale electricity storage was set to 30% of overall possible deployment by 2030 (though this policy scenario had no effect on emissions reductions)

Validation of this quantification occurred under manual calculation of displacing all coal-fired electricity generation with zero-emission electricity generation using 2022 generation data.

State of Michigan
Priority Climate Action Plan

LIDAC Qualitative and Quantitative Benefits Analysis

Investing in grid-scale energy storage and necessary electric grid upgrades in Michigan will generate benefits for low-income and disadvantaged communities. By accelerating the retirement of coal plants and better integrating renewable energy sources, this measure can lead to substantial improvements in air quality, health, economic opportunities, and overall well-being. There is a projected decrease in pollutant emissions for SOx, NOx, and CO, translating to cleaner air. This will significantly reduce respiratory problems, asthma attacks, and cardiovascular diseases, leading to fewer hospital admissions and improved health outcomes for residents, especially those living near coal plants.

Table 19: Change in co-pollutants as a result of priority reduction measure #2 in thousand metric tons of emissions

Pollutant	Change in Cumulative Emissions (2024-2030)	Change in Cumulative Emissions (2024-2050)
SOx	-15.129	-7.810
NOx	-10.753	-10.396
PM2.5	0.910	5.426
VOC	-0.006	2.720
CO	-50.749	-149.636

Figure 30: Avoided deaths categorized by race between 2024 and 2030 as a result of priority reduction measure #2
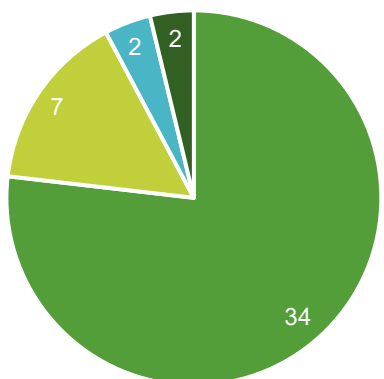
White, Black, Asian, Other

Figure 29: Avoided deaths categorized by race between 2024 and 2050 as a result of priority reduction measure #2
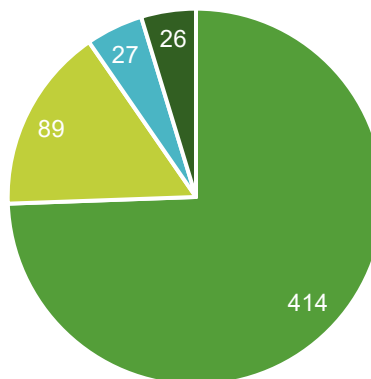
White, Black, Asian, Other

**Table 20: Additional estimated community benefits in the
near- and long-term throughout Michigan as a result of priority reduction measure #2**

Community Benefits	2024-2030 Cumulative Value	2024-2050 Cumulative Value
Avoided Lost Workdays	2,748	34,261
Avoided Respiratory Symptoms and Bronchitis	958	11,950
Avoided Hospital Admissions	10	118
Avoided Minor Restricted Activity Days	16,331	203,553

Review of Authority to Implement

The State of Michigan has existing legislative and regulatory authority to implement this measure without additional action. In addition to the statutes in Section 4.4 and other relevant laws, the "Clean and Renewable Energy and Energy Waste Reduction Act" – as amended most recently in 2023 – provides authority to implement this measure along with PA 3 of 1939 – as amended most recently in 2023 – which provides the authority for the Michigan Public Service Commission to regulate investor-owned utilities in the state.

Intersection with Other Funding Availability

In addition to the broader coordination of funding opportunities across Michigan as noted in Section 4.5, Michigan was granted awards from three separate programs related to grid resilience and reliability fitting within Priority Reduction Measure #2. Recipients for these programs include the state, municipalities, and utilities and total over $100 million dollars. For example:

1. GRIP: Program Upgrading our Electric Grid and Ensuring Reliability and Resiliency / Grid Innovation Program (awarded to Consumers and DTE)
2. Powering Affordable Clean Energy (PACE) (awarded to municipalities)
3. Preventing Outages and Enhancing the Resilience of Electric Grid Grants (awarded to EGLE)

The State also pursued the Solar and Wind Grid Services and Reliability Demonstration opportunity but was not granted an award.

Workforce Planning Analysis

There are currently about 3,900 grid and storage jobs in Michigan. By driving renewable energy and energy storage integration into the electric grid, Michigan will create electrician, manufacturing, engineering, general and operations management, and construction jobs. This

reduction measure is estimated to increase energy storage jobs to a peak of approximately 11,400 in 2031[37]. Supporting coal plant workers with retraining programs and relocation assistance will be crucial to ensure a smooth transition to a clean energy future and avoid exacerbating existing economic disparities. Currently the Michigan Department of Treasury runs the Energy Transition Impact Project (ETIP), which helps communities impacted by the closure of energy facilities by developing strategies to assist in expanding job opportunities, remediating sites, and mitigating related economic and socio-economic dislocations. In 2023, Senate Bill 519 established the Office of Worker and Community Economic Transition within LEO to assist workers, communities, and employers during the transition to clean energy.

5.2 COMMERCIAL AND RESIDENTIAL BUILDINGS REDUCTION MEASURES

Michigan's built environment was the third highest-emitting sector in 2019. The 2024 GHG Inventory shows emissions from commercial and residential buildings contributed to 33.3 MMTCO$_2$E to carbon dioxide emissions from fossil fuel combustion. Emissions related to the built environment are primarily due to use of heating fuels such as natural gas, propane, and oil. The best ways to decarbonize commercial and residential buildings is to electrify homes and implement energy efficient appliances and components. A major precursor to this, however, is ensuring the proper repair and weatherization of buildings and residences are incorporated to get the most out of energy-efficient equipment. Several other benefits result from having a strong and sustainable building stock including reduced energy bills, increased climate resilience, and increased health and well-being.

Reduction Measure #3 - Drive building electrification and fuel-switching in existing buildings including an emphasis on LIDACs and electrifying households that currently rely on delivered fuels such as propane and home heating oil.

Reduction Measure Description and Quantification

The MHCP aims to reduce emissions related to heating Michigan homes and businesses by 17% by 2030. According to research from Rewiring America, at least 39% of Michigan households—or 1.5 million households—could save a total of $710 million a year on energy bills if they were using modern heat pump space heaters and heat pump water heaters instead of their current appliances, which use electric resistance, fuel oil, or propane. That's an average savings per household of $460 each year. Half of the households with immediate savings potential are considered low- and moderate-income. The switch to electric heating and other appliances may also yield health benefits, as described in the LIDAC section of this reduction measure. Therefore, delivered fuels such as propane and home heating oil are two target areas to reduce emissions within this reduction measure. While the State of Michigan has several existing initiatives related to decarbonizing homes and buildings including the WAP, Sacred

---

[37] Energy Policy Simulator

Spaces Clean Energy Grants, Energy Waste Reduction (EWR) Programs, and more, these programs need additional assistance to reduce emissions in the built environment sector. Regarding the implementation schedule and milestones for this measure, EGLE does not anticipate any major obstacles. A major milestone to achieve this measure includes reducing emissions related to heating homes and buildings by 17% by 2030. This goal equates to reducing heating emissions in buildings by 2-3% each year between 2024 and 2030.

Example entities that may participate in implementing this reduction measure (but are not necessarily eligible to apply directly for CPRG implementation grants) include but are not limited to investor-owned utilities, public utilities, electric cooperatives, Michigan residents, businesses, municipalities, tribes, and others. Metrics that may be used to track this reduction measure include the change in emissions from the residential sector related to fossil fuel combustion, the amount of electrified components sold (e.g., heat pumps) over time, the number of applications received by existing building electrification programs – especially those that focus on LIDACs, and other metrics as identified.

**Table 21: Estimated GHG emission reductions
as a result of priority reduction measure #3**

Estimated Emissions Reductions	Time Scale
1.047 MMTCO$_2$e	Annual near-term average
6.280 MMTCO$_2$e	Between 2024 – 2030
25.808 MMTCO$_2$e	Between 2024 – 2050

Quantification of this reduction measure was calculated using EPS where four different policy levers were used to estimate the emissions reductions across commercial and residential buildings. The first policy lever includes retrofitting 37% of all existing commercial buildings and 25% of all existing residential buildings in Michigan between 2024 and 2030 for more efficient heating, cooling, and envelope components. The second policy lever is building component electrification which assumes a linear implementation between 2024 and 2050 where 25% of heating, appliance, and other building components that would normally be non-electric, be sold as electric. Two other policy levers were modeled, though they had no effect on the emissions quantification piece of the model. They included a rebate for efficient products and research and development in the near-term for fuel-use reduction.

Validation of this reduction measure is yet to be completed due to lack of quality data to both complete a second calculation and compare it accurately to the EPS model. Note, there is overlap in emissions reduction totals between reduction measure #3 and reduction measure #4.

LIDAC Qualitative and Quantitative Benefits Analysis

Driving building electrification and fuel-switching in existing buildings, particularly focusing on households reliant on delivered fuels like propane and home heating oil should positively impact low income and disadvantaged communities in Michigan. By transitioning from delivered fuels to clean electricity, households experience significant reductions in indoor and outdoor air pollution, The projected decrease in NOx, CO and VOCs results in fewer respiratory illnesses, asthma attacks, and cardiovascular problems. The improved health outcomes translate to fewer missed workdays, and other measures for a better quality of life for residents.

Table 22: Change in co-pollutants as a result of priority measure #3 in thousand metric tons of emissions

| Pollutant	Change in Cumulative Emissions (2024-2030)	Change in Cumulative Emissions (2024-2050)
SOx	-0.512	6.606
NOx	-1.230	-12.628
PM2.5	-1.352	-1.493
VOC	-2.287	-6.007
CO	-56.851	-179.159

Figure 31: Avoided deaths categorized by race between 2024 and 2050 as a result of priority reduction measure #3

White 276, Black 83, Asian 20, Other 14
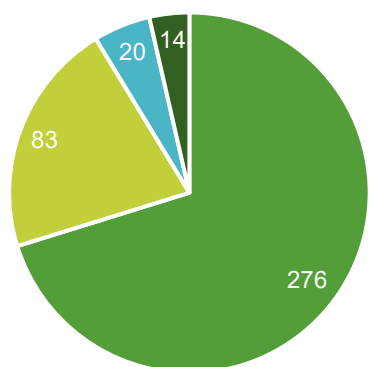
■White ■Black ■Asian ■Other

Figure 32: Avoided deaths categorized by race between 2024 and 2050 as a result of priority reduction measure #3

White 3105, Black 972, Asian 277, Other 207
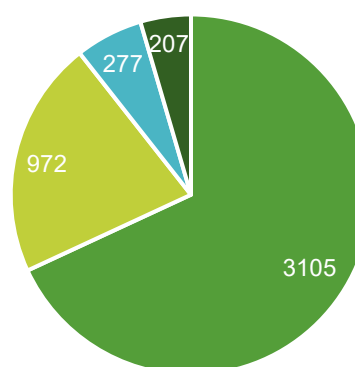
■White ■Black ■Asian ■Other

**Table 23: Additional estimated community benefits in the
near- and long-term throughout Michigan as a result of priority reduction measure #3**

Community Benefits	2024-2030 Cumulative Value	2024-2050 Cumulative Value
Avoided Lost Workdays	25,488	295,273
Avoided Respiratory Symptoms and Bronchitis	8,976	104,047
Avoided Hospital Admissions	80	928
Avoided Minor Restricted Activity Days	151,083	1,750,287

Review of Authority to Implement

The State of Michigan has existing legislative and regulatory authority to implement this measure without additional action. In addition to the statutes in Section 4.4 and other relevant laws, the "Clean and Renewable Energy and Energy Waste Reduction Act" – as amended most recently in 2023 – provides authority to implement this measure along with PA 3 of 1939 – as amended most recently in 2023 – which provides the authority for the Michigan Public Service Commission to regulate investor-owned utilities in the state.

Intersection with Other Funding Availability

In addition to the broader coordination of funding opportunities across Michigan as noted in Section 4.5, the State of Michigan has received funding for two different grant programs related to commercial and residential decarbonization including the Energy Efficiency Revolving Loan Fund Capitalization Grant Program (awarded $12.7 million) and Building Codes Implementation for Efficiency and Resiliency ($9.6 million) with partners. Additionally, two Michigan companies have received $22 million to scale up electric heat pump manufacturing from the U.S. DOE. There are currently two other opportunities pending an award decision:

1. Energy Auditor Training (EAT) Program (Section 40503)
2. Technical Assistance for the Adoption of Building Energy Codes

The State plans to apply for the Assistance for Latest and Zero Building Energy Code Adoption (Round 1) (Section 50131) program. The State applied for the Building Energy Codes: Resilient and Efficient Codes Implementation (RECI) program but was not granted funding.

Workforce Planning Analysis

Michigan's largest clean energy job sector is energy efficiency with over 75,000 jobs across Energy STAR and Efficient Lighting, HVAC, High Efficiency HVAC, Advanced Materials, and more sectors[38]. This reduction measure, related to driving building electrification and fuel-switching in existing commercial and residential buildings, will create jobs for electricians,

---

[38] Clean Jobs Midwest

engineers, technicians, customer service representatives, and more in the state. The estimated increase in jobs for this measure is set to peak in 2030 at around 103,000 newly created jobs.

Reduction Measure #4 - Reduce household fossil energy use through home repairs, electrical upgrades for building and vehicle electrification, weatherization, and other energy waste reduction investments with an emphasis on ensuring equitable access.

Reduction Measure Description and Quantification

This priority reduction measure solely focuses on residential building decarbonization given the higher proportion of GHG emissions from residential buildings and their reliance on fossil-fuel burning fuels compared to commercial buildings. The EPA shares, "Michigan is among the top five states in residential sector petroleum use and ranks first in residential sector consumption of propane"[39]. Decarbonizing Michigan buildings will require baseline investments in repairing Michigan's homes; stronger requirements, incentives, and financing options for energy efficiency and waste reduction; and evaluation and adoption of innovative home heating alternatives, including electrification. Regarding the implementation schedule and milestones for this measure, EGLE does not anticipate any major obstacles. A major milestone to achieve this measure includes reducing emissions related to heating homes and buildings by 17% by 2030. This goal equates to reducing heating emissions in buildings by 2-3% each year between 2024 and 2030.

Example entities that may participate in implementing this reduction measure (but are not necessarily eligible to apply directly for CPRG implementation grants) include but are not limited to investor-owned utilities, public utilities, electric cooperatives, Michigan residents, third party installation and maintenance contractors, and others. Metrics that may be used to track this reduction measure include home repair and electrification components sold over a period of time, the number of applications received by existing electrification programs, electricity usage and demand over time, and other metrics as identified.

**Table 24: Estimated GHG emission reductions
as a result of priority reduction measure #4**

Estimated Emissions Reductions	Time Scale
1.260 MMTCO$_2$e	Annual near-term average
7.562 MMTCO$_2$e	Between 2024 – 2030
24.463 MMTCO$_2$e	Between 2024 – 2050

---

[39] EIA

Quantifying this reduction measure was limited to residential properties in Michigan (i.e., excludes commercial buildings) but includes both rural and urban properties. Much like reduction measure #3, the emissions reductions were calculated using EPS with very similar policy levers. The first policy lever used was retrofitting 25% of all existing residential buildings in Michigan between 2024 and 2030 for more efficient heating, cooling, and envelope components. The second policy lever was building component electrification that assumes a linear implementation between 2024 and 2050 where 100% of heating, appliance, and other building components that would normally be non-electric, be sold as electric. The last policy lever modeled was a rebate for efficient projects which had no effect on the emissions change given it enables implementation of GHG reduction strategies but does not directly result in lowering emissions.

Validation of this reduction measure is yet to be completed due to lack of quality data to both complete a second calculation and compare it accurately to the EPS model. Note, there is overlap in emissions reduction totals between reduction measure #3 and reduction measure #4.

LIDAC Qualitative and Quantitative Benefits Analysis

Low income and disadvantaged communities benefit from targeted home repairs, electrical upgrades, weatherization, and other energy waste reduction investments. There is a projected reduction in emissions particularly in NOx, CO, and VOCs that will result in cleaner air and fewer respiratory illnesses like asthma and bronchitis, reduced hospital admissions, and overall improved health outcomes for LIDAC residents. An additional benefit that can be expected from weatherization and home repair investments is increased comfort by reducing summer heat stress and ensuring warmth in the winter, particularly helpful for vulnerable population segments like the elderly and young children. Energy efficient homes also translates to lower energy costs, alleviating a portion of the financial burden on low-income households and contributing to longer term economic stability. Efforts should be made to preserve existing affordable housing and tenant protections to ensure that home upgrades and electrification do not have adverse impacts on LIDAC households.

Table 25: Change in co-pollutants as a result of priority measure #4 in thousand metric tons of emissions

| Pollutant	Change in Cumulative Emissions (2024-2030)	Change in Cumulative Emissions (2024-2050)
SOx	-1.000	6.569
NOx	-3.427	-11.837
PM2.5	-1.689	0.245
VOC	-3.628	-4.161
CO	-66.543	-168.706

Figure 33: Avoided deaths categorized by race between 2024 and 2030 as a result of priority reduction measure #4

- White
- Black
- Asian
- Other
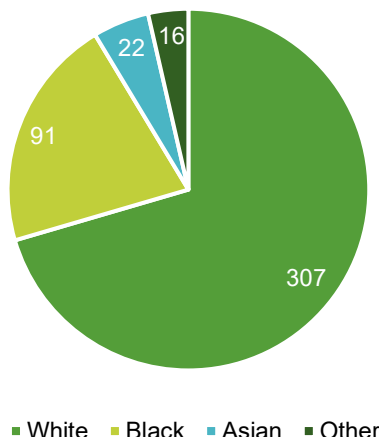
Figure 34: Avoided deaths categorized by race between 2024 and 2050 as a result of priority reduction measure #4

- White
- Black
- Asian
- Other
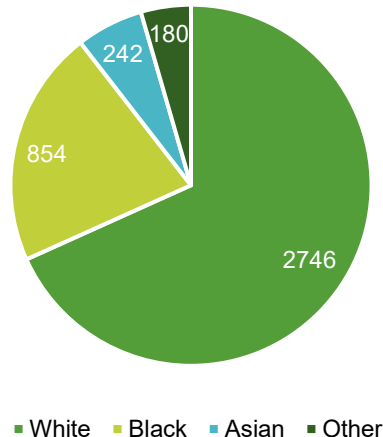
Table 26: Additional estimated community benefits in the near- and long-term throughout Michigan as a result of priority reduction measure #4

Community Benefits	2024-2030 Cumulative Value	2024-2050 Cumulative Value
Avoided Lost Workdays	28,213	260,324
Avoided Respiratory Symptoms and Bronchitis	9,943	91,741
Avoided Hospital Admissions	89	819
Avoided Minor Restricted Activity Days	167,234	1,543,121

Review of Authority to Implement

The State of Michigan has existing legislative and regulatory authority to implement this measure without additional action. In addition to the statutes in Section 4.4 and other relevant laws, the "Clean and Renewable Energy and Energy Waste Reduction Act" -- as amended most recently in 2023 – provides authority to implement this measure along with PA 3 of 1939 – as amended most recently in 2023 – which provides the authority for the Michigan Public Service Commission to regulate investor-owned utilities in the state.

Intersection with Other Funding Availability

In addition to the broader coordination of funding opportunities across Michigan as noted in Section 4.5, the State of Michigan received $211 million in 2023 to carry out the Consumer Home Energy Rebate Program. Additionally, in 2023, the Michigan Department of Health and Human Services (MDHHS) received $183 million for the WAP, providing the opportunity for program expansion that will allow people living in multifamily units access to funds (in addition to others). EWR programs have also been a focus of electric and natural gas utilities in recent years. In 2022, utilities spent a combined $517 million on EWR programs that will lower emissions and save ratepayers money.

The State is awaiting an award decision on the Training for Residential Energy Contractors (TREC) (50123) program to expand the clean energy workforce.

Workforce Planning Analysis

Across the state of Michigan, there are currently over 100,000 jobs available across the clean energy sectors associated with this measure including energy efficiency, solar energy, and electric vehicles. Michigan is expected to see additional job creation in these areas across the value chain[40]. Examples include, solar panel and EV installers and technicians, electricians, green building retrofitter, engineers, and more. It is estimated that this reduction measure will result in an increase in jobs related to residential building decarbonization by approximately 21,000 by 2030[41].

Reduction Measure #5 - Decarbonize government and nonprofit facilities and infrastructure, with an emphasis on LIDACs, by reducing energy waste, investing in decarbonization solutions, and reducing emissions from fossil fuel combustion.

**Table 27: Estimated GHG emission reductions
as a result of priority reduction measure #5**

Estimated Emissions Reductions	Time Scale
0.050 MMTCO$_2$e	Annual near-term average
0.251 MMTCO$_2$e	Between 2024 – 2030
0.502 MMTCO$_2$e	Between 2024 – 2050

Reduction Measure Description and Quantification

Decarbonizing government-owned and nonprofit facilities and infrastructure is an opportunity to pave the way for other commercial and residential buildings to reduce their carbon footprint. Supporting deployment of renewable energy and storage systems for local government buildings can reduce energy costs and provide resilience in case of an electric grid outage. This measure has several potential benefits to Michiganders such as:

- Sharing of best practices to business-owners and residents looking to decarbonize in the future

- Technology maturity for newer, expensive equipment (e.g., heat pumps) that result in potential cost savings for others who implement later on in maturity

- Potential reallocation of or reduced costs to constituents who indirectly fund operational costs of these facilities

---

[40] Clean Jobs Midwest
[41] Energy Policy Simulator

Specific implementation schedule and milestones will be determined by those implementing this measure. Implementing entities may track milestones by achieving a 2-3% reduction in emissions each year for buildings undergoing decarbonization initiatives as part of this reduction measure.

Example entities that may participate in implementing this reduction measure (but are not necessarily eligible to apply directly for CPRG implementation grants) include but are not limited to state government, local municipalities, tribes, nonprofits, investor-owned utilities, public utilities, electric cooperatives, and others. Metrics that may be used to track this reduction measure include natural gas consumption and electricity use of government and nonprofit facilities over time, applications received by eligible electrification programs, the number of electrification components sold over time, and other metrics as identified.

Quantifying this reduction measure took a manual approach to collect data about energy use and operations from municipalities and apply it to cities and counties across Michigan. Using an average ratio of energy consumption among municipal buildings per capita, this factor was applied to the population throughout Michigan to model the estimated emissions. This approach was taken given the lack of actual building and energy data from Michigan government buildings. The calculations were made under the following assumptions:

1. Assumes a 20% improvement in building energy efficiency by 2030
2. Assumes a 40% improvement in building energy efficiency by 2050
3. Streetlight infrastructure was excluded
4. Nonprofit facilities were excluded

The National Renewable Energy Laboratory's (NREL's) ComStock Analysis Tool[42] was used to validate this reduction measure and shows a similarity in the order of magnitude of expected emission reductions. Differences in the data sets used and underlying assumptions prevent a direct comparison from being possible. Improvements to this quantification are possible with actual data from government-owned buildings in Michigan including but not limited to energy profile, building components such as square footage, and other data.

LIDAC Qualitative and Quantitative Benefits Analysis

Quantification of the LIDAC benefits was not possible for this reduction measure. It will likely result in similar benefits as reduction measures three and four such as improved air quality and a healthier environment for people using those facilities, though the quantity would alter based on the scale differences of each measure. Long-term energy savings from efficiency upgrades to public and nonprofit facilities will free-up resources for other community investments and potentially lead to lower costs for public services that benefit LIDAC residents.

---

[42] nrel.gov/buildings/comstock.html

Review of Authority to Implement

The State of Michigan has existing legislative and regulatory authority to implement this measure without additional action. In addition to the statutes in Section 4.4 and other relevant laws, the "Clean and Renewable Energy and Energy Waste Reduction Act" -- as amended most recently in 2023 – provides authority to implement this measure along with PA 3 of 1939 – as amended most recently in 2023 -- which provides the authority for the Michigan Public Service Commission to regulate investor-owned utilities in the state.

Intersection with Other Funding Availability

In addition to the broader coordination of funding opportunities across Michigan as noted in Section 4.5, the State of Michigan received $2.7 million in funding from the Energy Efficiency and Conservation Block Grant Program - State Formula program that directly aligns with this reduction measure to decarbonize government-owned buildings. In overlap with Priority Reduction Measure #3, the state plans to apply for the Assistance for Latest and Zero Building Energy Code Adoption (Round 1) (Section 50131) program. The EPA "Greenhouse Gas Reduction Fund" and the Federal Emergency Management Agency "Building Resilient Infrastructure and Communities" are two additional funding sources but are not believed to be duplicative due to different program foci.

Workforce Planning Analysis

The current jobs available and profiles to be created as a result of this reduction measure is similar to reduction measures #3 and #4. There is data lacking in the estimated increase of jobs in this reduction measure, however, it is estimated to be lower than the similar reduction measures in the built environment due to the smaller footprint of government-owned buildings in the state compared to the entirety of the residential and commercial sectors. There is likely overlap in the amount of jobs accounted for in the aforementioned reduction measures and with this one.

5.3 TRANSPORTATION REDUCTION MEASURES

The transportation sector is the second highest emitting sector behind the energy sector in Michigan as of 2019 with a total of 51.4 MMTCO$_2$E. Transportation emissions are primarily due to the combustion of petroleum products such as gasoline and diesel in light-duty vehicles and freight trucks. In November 2023, the Michigan Department of Transportation (MDOT) released a statewide Carbon Reduction Strategy (CRS) report to explore initiatives to reduce statewide transportation sector carbon emissions that reflect the carbon reduction needs and preferences in the state. Several initiatives are underway to decarbonize different subsectors of the transportation sector, both funded by the CRS and separately. A zero-emission ferry conversion, development of EV battery manufacturing facilities, and multi-state EV charger deployment are examples of some ongoing projects.

Reduction Measure #6 - Electrify state government, municipal, tribal, and other public fleets, prioritizing equitable access for Michigan's LIDACs.

Reduction Measure Description and Quantification

As a step towards decarbonizing the transportation sector, Governor Whitmer recently called for a transition of the state government fleet to zero emission vehicles under Executive Directive No. 2023-5. The Governor called for the conversion of the state fleet to reach zero emissions by 2033 for light-duty vehicles and by 2040 for medium- and heavy-duty vehicles. This reduction measure aims to launch this Executive Directive to action while lowering emissions, growing demand for EV production, and reducing net costs. Including municipal, tribal, other public fleets, in addition to the electrification of school buses, in this measure is an opportunity for other large fleets to make the transition. It builds off existing plans to decarbonize fleets such as the BIL's Clean School Bus Program that will help transition school buses to zero emission vehicles. Thanks to the new Executive Directive, Michigan does not anticipate any major obstacles in the implementation schedule or milestones associated with this measure. The state government fleet currently has approximately 14,000 vehicles. In order to reach a zero-emission fleet by 2033, transiting approximately 1,500 vehicles per year to zero-emission vehicles could serve as interim milestones to achieve this reduction measure.

Example entities that may participate in implementing this reduction measure (but are not necessarily eligible to apply directly for CPRG implementation grants) include but are not limited to state government, local municipalities, tribes, public schools, public universities, and others. Metrics that may be used to track this reduction measure include the number of electrified vehicles owned or leased by state government and other applicable entities, the number of EV chargers installed on government- and publicly-owned property, the number of entities engaging in bulk-buy programs, and other metrics as identified.

**Table 28: Estimated GHG emission reductions
as a result of priority reduction measure #6**

Estimated Emissions Reductions	Time Scale
0.285 MMTCO$_2$e	Annual near-term average
1.519 MMTCO$_2$e	Between 2024 – 2030
7.571 MMTCO$_2$e	Between 2024 – 2050

Fleet electrification was quantified using EPA's AVERT tool. Major assumptions include:

1. Electrification of the State fleet is calculated using Michigan State Fleet Plans from DTMB

2. Municipal fleets and school buses are accounted for in the emission reduction calculation, tribal fleets or other major public fleets are not accounted for in this emission reduction

3. Focus is on emission reductions for light-duty vehicles and school buses across the State by 2030, medium and heavy duty vehicles are not quantified given lack of access to federal tools

4. Electric vehicles are added to displace new internal combustion engine (ICE) vehicles on the road

5. The manufacturing of EV batteries and recycling are not considered

Validation of these emissions reduction will be performed using comparable state data for fleet electrification.

Note: This reduction measure quantifies municipal fleets using representative fleet data for different population sizes across the State of Michigan. When applying for specific projects, ensure the appropriate emissions are calculated to result in reductions due to completion of the specific project.

LIDAC Qualitative and Quantitative Benefits Analysis

Transitioning from gasoline-powered vehicles to electric vehicles significantly reduces emissions of harmful pollutants like NOx and VOCs producing cleaner air for communities historically plagued by traffic-related pollution. This shift holds the potential to reduce respiratory illnesses like asthma and bronchitis and to improve overall health outcomes. In addition, the quieter operation of electric vehicles compared to gasoline-powered counterparts has a dual impact — minimizing noise pollution in neighborhoods and creating more peaceful environments for residents particularly those living near transit routes. This transition not only offers a quieter, less polluted urban landscape but also has the potential to transform public spaces, creating pedestrian-friendly areas that encourage outdoor activities, ultimately revitalizing community life. To ensure equity in the transition of the State fleet, the DTMB EV Plan should prioritize focus of fleet transition for fleet vehicles within Justice40 communities, high-density areas, and historically disadvantaged communities with higher pollution rates. In addition, to ensure that fleets are transitioned properly, siting electric vehicle supply equipment (EVSE) on state-controlled property in LIDACs will be a focus.[43]

---

[43] Executive Directive 2023-5

**Table 29: Change in co-pollutants as a result of
priority measure #6 in thousand metric tons of emissions**

Pollutant*	Change in Cumulative Emissions (2024-2030)	Change in Cumulative Emissions (2024-2050)
SOx	0.064	0.332
NOx	-1.221	-6.076
PM2.5	0.009	0.043
VOC	-0.364	-1.966
CO	N/A	N/A

Calculated via AVERT tool, does not include all co-pollutants from EPS

**Table 30: Additional estimated community benefits in the
near- and long-term throughout Michigan as a result of priority reduction measure #6**

Community Benefits	2024-2030 Cumulative Value*	2024-2050 Cumulative Value*
Avoided Lost Workdays	9,615	79,137
Avoided Respiratory Symptoms and Bronchitis	3,412	28,077
Avoided Hospital Admissions	31	149,984
Avoided Minor Restricted Activity Days	57,011	469,252

Values are calculated in EPA's COBRA tool using the annual emissions for final implementation year of fleet transition (from AVERT). Additional analysis for year over year benefits given the implementation schedule is needed to show data change overtime.

Review of Authority to Implement

In addition to the statutes in Section 4.4 and other relevant laws, the State of Michigan has existing legislative and regulatory authority to implement this measure without additional action.

Intersection with Other Funding Availability

In addition to the broader coordination of funding opportunities across Michigan as noted in Section 4.5, 55 school districts within the State of Michigan have received funds through the Clean School Bus Program to electrify their school bus fleets. Additionally, the State has applied for the 2023 Clean School Bus Rebate Program and is currently awaiting award decisions.

Other complementary funding sources include:

- Volkswagen settlement grants
- Federal and state-funded EV purchase rebates
- Federal Transit Administration's Low or No Emission and Grants for Buses and Bus Facilities Competitive Programs
- Diesel Emissions Reduction Act

- FEMA Congestion Mitigation and Air Quality Improvement Program
- Inflation Reduction Act Clean Ports
- Federal Highway Administration Charging and Fueling Infrastructure Discretionary Grant
- Inflation Reduction Act Alternative Fuel Vehicle Refueling Property Credit Direct Pay

Workforce Planning Analysis

Michigan currently has over 32,000 jobs in clean transportation. By electrifying government and other public fleets, this measure will create jobs as technicians, electricians, engineers, EV workers, infrastructure service jobs, transportation service jobs, and construction jobs.[44]

Reduction Measure #7 - Support just access to public transit and non-motorized transportation options by improving infrastructure, and by increasing routes, frequency, and reliability of available options.

Reduction Measure Description and Quantification

Michigan's current public transit system is comprised of 78 public transit agencies that transported 30 million passengers across the state in 2022[45]. Increasing the accessibility of public transit for both motorized and non-motorized modes was a very popular topic among the MHCP community engagement sessions held towards the end of 2023. In order to accomplish the expansion of Michigan's public transit network, upgrades and improvement to existing infrastructure is necessary. By improving and upgrading infrastructure, Michigan can increase routes, frequency, and reliability among public transit services for the Michigan public, who have experienced longer commute times in recent years[46]. Incentivizing the use of public transit can help displace individual passenger cars on the road and ultimately reduce emissions, commute time, and traffic on the roads.

Regarding the implementation schedule and milestones for this measure, EGLE does not anticipate any major obstacles. While an increase in public transit ridership and use of non-motorized transportation solutions will reduce emissions by displacing use of ICE vehicles, increased access to public transit will increase emissions from transit buses. Thus, this measure incorporates electrification of transit buses across the state to ensure a transition to clean infrastructure by 15% each year, as prioritized in the MHCP.

Example entities that may participate in implementing this reduction measure include but are not limited to state government, local municipalities, tribes, transit authorities, and others. Metrics that may be used to track this reduction measure include the number of registered vehicles within an area, ridership of public transit, the amount of money spent on developing infrastructure, sales data of vehicle batteries and public transit vehicles, and other metrics as identified.

---

[44] Clean Jobs Midwest
[45] Michigan Transit
[46] U.S. Department of Transportation

**Table 31: Estimated GHG emission reductions
as a result of priority reduction measure #7**

Estimated Emissions Reductions	Time Scale
1.162 MMTCO$_2$e	Annual near-term average
7.000 MMTCO$_2$e	Between 2024 – 2030
12.018 MMTCO$_2$e	Between 2024 – 2050

Quantification of increased access to public transit uses RMI's Energy Policy Simulator tool. Additional analysis of bus electrification uses AVERT tool. Major assumptions include:

1. Increased access of public transit is quantified using "mode shifting" policies which analyze emission reductions for passenger cars and SUVs who choose non-motorized and public transit options

2. MDOT's Michigan Ridership Reports were used to understand the total number of transit buses in the State of Michigan[47]

Validation of this measure used comparisons to similar frameworks such as the Carbon Reduction Strategy report by MDOT to replicate quantification given increased access to public transit.

Note: this reduction measure was quantified within the larger "mode shifting" which may include additional non-motorized factors in the emission reduction calculation. When applying for specific projects, ensure the appropriate emissions are calculated to result in reductions due to completion of the specific project.

LIDAC Qualitative and Quantitative Benefits Analysis

Michiganders who take public transportation spend an extra 67.7% of their time commuting and non-White households are 5.6 times more likely to commute via public transportation[48]. Improving infrastructure to enable more robust public transit and expanded non-motorized transportation options offers a cascade of benefits to low income and disadvantaged communities such as health, economic opportunity, and overall well-being. The projected reductions in harmful pollutants like NOx and CO translate to significant improvements in air quality, directly impacting residents' health particularly for people living near busy roads where there is expected to be major reductions in cases of respiratory symptoms and bronchitis. Improved transportation access fosters economic empowerment and social mobility. Expanded public transit networks, especially those in underserved areas, connect residents to job opportunities, educational institutions, healthcare facilities, and other essential services they may have previously lacked access to.

---

[47] Michigan Department of Transportation
[48] transportation.gov/briefing-room/bipartisan-infrastructure-law-will-deliver-michigan

Table 32: Change in co-pollutants as a result of priority measure #7 in thousand metric tons of emissions

Pollutant*	Change in Cumulative Emissions (2024-2030)	Change in Cumulative Emissions (2024-2050)
SOx	-1.031	7.368
NOx	-12.408	-27.762
PM2.5	1.366	5.492
VOC	-4.512	-1.474
CO	-96.832	-186.676

* Includes EPS and COBRA pollutants to account for increased access and electrification of transit

Figure 35: Avoided deaths categorized by race between 2024 and 2030 as a result of priority reduction measure #7
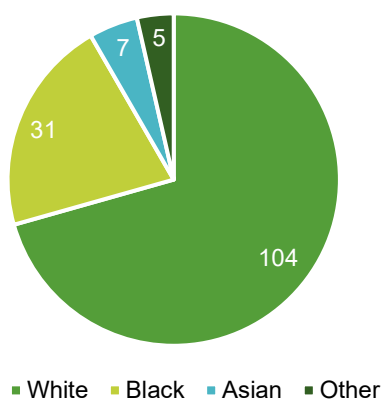
Figure 36: Avoided deaths categorized by race between 2024 and 2050 as a result of priority reduction measure #7
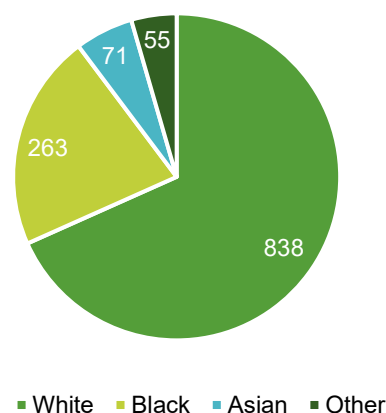
NOTE: Avoided deaths may be conservative estimate based on lack of data in one of the tools used in quantification

Table 33: Additional estimated community benefits in the near- and long-term throughout Michigan as a result of priority reduction measure #7

Community Benefits	2024-2030 Cumulative Value*	2024-2050 Cumulative Value*
Avoided Lost Workdays	9,458	78,457
Avoided Respiratory Symptoms and Bronchitis	3,357	27,841
Avoided Hospital Admissions	30	250
Avoided Minor Restricted Activity Days	56,079	465,212

* Values include both EPS (for updating infrastructure) and COBRA (for electrifying transit) benefits. COBRA outputs assume the benefits of the final implementation year, therefore, the benefits all buses have been transitioned for each year. Additional analysis is needed to understand the overtime benefits given a 15% MHCP implementation schedule.

Review of Authority to Implement

In addition to the statutes in Section 4.4 and other relevant laws, the State of Michigan has existing legislative and regulatory authority to implement this measure without additional action and plans to orient implementation around existing areas of authority. Local governments and regional authorities also have significant authority to implement.

Intersection with Other Funding Availability

In addition to the broader coordination of funding opportunities across Michigan as noted in Section 4.5, Michigan has been awarded funds from three different federal grant programs to expand public transit:

1. Strengthening Mobility and Revolutionizing Transportation (SMART) Grant (awarded approximately $7 million to State and municipal entities (see FY 2022 awards below))
    a. Michigan Department of Transportation ($3.1 million)
    b. City of Detroit ($2 million)
    c. Oakland County
2. Rebuilding American Infrastructure with Sustainability and Equity (RAISE) (multiple awards received by the State and statewide entities over the course of the awards (see FY 2023 awards below))
    a. Michigan Department of Labor and Economic Opportunity ($8.5 million)
    b. City of Pontiac ($16.3 million)
    c. City of Jackson ($6.8 million)
3. Reconnecting Communities Pilot Program (awarded approximately $34 million to the State and City of Kalamazoo)

Workforce Planning Analysis

Currently, the State of Michigan has over 32,000 clean transportation jobs and the advanced transportation sector grew 21% from 2021 to 2022. By continuing to improve infrastructure and support access to public transit, Michigan will create jobs in transportation services, construction, and engineering, as well as for electricians, technicians, and EV workers[49]. Job growth for this measure is expected to increase to approximately 37,000 by 2030 with this reduction measure[50].

---

[49] Clean Jobs Midwest
[50] Energy Policy Simulator

Reduction Measure #8 - Encourage adoption of electric vehicles by increasing deployment of electric vehicle charging infrastructure, prioritizing equitable access for Michigan's LIDACs.

Reduction Measure Description and Quantification

Michigan currently has over 50,000 battery electric and hybrid vehicles registered in the state supported by just over 3,000 public charging ports. According to the MI Future Mobility Plan, another 100,000 chargers will need to be installed and supported to reach the MHCP goal of bringing 2 million electric vehicles on Michigan roads by 2030. While Michigan has several ongoing initiatives related to deploying charging infrastructure, such as the Charge Up Michigan Program, the rate at which chargers need to be deployed to reach MHCP 2030 goals is too high for existing programs as they stand today to accomplish. Increasing the access and security to those making the switch to electric vehicles is a vital way to reach successful deployment. In addition, addressing the charging infrastructure gaps along key commercial corridors can help support a region-wide transition to electric medium- and heavy-duty vehicles in Michigan and across the mid-west.

**Table 34: Estimated GHG emission reductions
as a result of priority reduction measure #8**

Estimated Emissions Reductions	Time Scale
0.509 MMTCO$_2$e	Annual near-term average
3.052 MMTCO$_2$e	Between 2024 – 2030
13.489 MMTCO$_2$e	Between 2024 – 2050

Regarding the implementation schedule and milestones for this measure, EGLE does not anticipate any major obstacles. Interim milestones to achieving this measure could include deploying approximately 300,000 BEVs (inclusive of light-duty, medium-duty, and heavy-duty vehicles) per year between 2024 and 2030. Alternatively, deploying approximately 16,000 EV chargers per year between 2024-2030 within the state to help support the transition to electric vehicles could be used as milestones depending on the specific projects created out of this priority reduction measure.

Example entities that may participate in implementing this reduction measure (but are not necessarily eligible to apply directly for CPRG implementation grants) include but are not limited to state government, local municipalities, tribes, electric vehicle charging infrastructure installers/contractors, Michigan residents, transportation agencies, and others. Metrics that may be used to track this reduction measure include the number of available public electric vehicle chargers, the number of electric vehicles registered in Michigan, gasoline and diesel sales data, air quality, and other metrics as identified.

Quantifying the emissions impact on deploying electric vehicle charging infrastructure was estimated using AVERT and was based on the following assumptions:

1. EV charging deployment will result in Michigan reaching their goal of bringing 2 million electric vehicles on Michigan roads by 2030 and all registered vehicles in MI as of 2022 transition to zero-emission vehicles by 2050

2. All remaining EVs deployed are assumed to be all-electric and light-duty vehicles to serve as a conservative estimate compared to a range of light-duty, medium-duty, and heavy-duty vehicles being deployed

3. There was no change in the existing electric power generation fuel mix in the state (i.e., initiatives related to clean energy deployment are not considered and the existing fuel mix is assumed to remain constant)

4. Omits emissions related to battery energy efficiency improvements and greenhouse gases outside of carbon dioxide

Validation of this reduction measure quantification was completed with manual calculation of displacing ~300,000 internal combustion engines (ICEs) per year with new battery electric vehicles (BEVs) and estimating the approximate GHGs emitted per typical ICE per year.

LIDAC Qualitative and Quantitative Benefits Analysis

Quantification of the avoided deaths by race was not possible for this reduction measure. It will likely result in similar benefits as reduction measures six and seven such as the significant reduction of harmful pollutants like NOx and SOx, leading to cleaner air and fewer respiratory illnesses, though the quantity would alter based on the scale differences between each measure.

Table 35: Change in co-pollutants as a result of priority measure #8 in thousand metric tons of emissions

Pollutant	Change in Cumulative Emissions (2024-2030)	Change in Cumulative Emissions (2024-2050)
SOx	-0.001	-0.004
NOx	-0.016	-0.070
PM2.5	-0.001	-0.006
VOC	-0.038	-0.164
CO	**N/A**	**N/A**

Table 36: Avoided estimated community benefits in the near-term and long-term as a result of priority reduction measure #8

Community Benefits	2024-2030 Cumulative Value	2024-2050 Cumulative Value
Avoided Lost Workdays	7	39
Avoided Respiratory Symptoms and Bronchitis	2	13
Avoided Hospital Admissions	0	0
Avoided Minor Restricted Activity Days	39	235

Review of Authority to Implement

The State of Michigan has existing legislative and regulatory authority to implement this measure without additional action. In addition to the statues in Section 4.4 and other relevant laws, the "Clean and Renewable Energy and Energy Waste Reduction Act" – as amended most recently in 2023 – provides authority to implement this measure along with PA 3 of 1939 – as amended most recently in 2023 – which provides the authority for the Michigan Public Service Commission to regulate investor-owned utilities in the state to support the deployment of EV charging infrastructure.

Intersection with Other Funding Availability

In addition to the broader coordination of funding opportunities across Michigan as noted in Section 4.5, the State of Michigan has received $110 million as part of the National Electric Vehicle Infrastructure (NEVI) Formula Program to deploy charging infrastructure across the state. The State is awaiting award decisions for the Electric Vehicle Charger Reliability and Accessibility Accelerator Program through the IIJA. There is an existing state program EGLE manages to advance strategic deployment of EV infrastructure along Lake Michigan.

Other complementary funding sources include:
- Volkswagen settlement grants
- Federal and state-funded EV purchase rebates
- EPA's Clean School Bus program
- Federal Transportation Administration's Low or No Emission and Grants for Buses and Bus Facilities Competitive Programs
- Diesel Emissions Reduction Act
- FEMA Congestion Mitigation and Air Quality Improvement Program
- Inflation Reduction Act Clean Ports
- Federal Highway Administration Charging and Fueling Infrastructure Discretionary Grant
- Inflation Reduction Act Alternative Fuel Vehicle Refueling Property Credit Direct Pay

Workforce Planning Analysis

Governor Whitmer has helped Michigan build on leadership in mobility. She worked to win big projects and create thousands of good-paying jobs, such as a historic $7B investment from GM, creating and retaining 5,000 jobs; a $1.7B investment from electric vehicle battery manufacturer LG Energy Solution, creating 1,200 jobs; and a $2B investment from Ford that will create more than 3,200 jobs. Michigan currently has approximately 32,000 jobs in the clean transportation space[51], with the largest hub in Detroit. As the state continues to increase deployment of electric vehicle charging infrastructure, the following jobs will be created: electricians, technicians, engineers, transportation services jobs, and grid specialists. Projected job creation was unable to be estimated for this reduction measure. In 2023, Senate Bill 519 established the Office of Worker and Community Economic Transition within LEO to assist workers, communities, and employers during the transition to clean energy, including internal combustion engine vehicle workers and workers in the supply chain for internal combustion engine vehicles. This Office can provide further support and analysis to understand and mitigate workforce impacts.[52]

5.4 INDUSTRY REDUCTION MEASURES

Michigan's industry sector accounted for 15% of overall GHG emissions in 2019. Emissions from industrial processes amounted to 11.1 MMTCO$_2$E and energy related emissions from industrial processes was an additional 15.6 MMTCO$_2$E. The state's industrial sector is remarkably diverse, and makes critical products like iron, steel, cement, chemicals, and food using specific manufacturing processes that can cause on-site GHG emissions, often require a lot of power, and involve GHG emissions in their supply chains.

Reduction Measure #9 - Encourage industrial innovation to advance energy efficiency, fuel-switching, and deployment of cleaner manufacturing technologies prioritizing facilities in LIDACs that may receive significant benefits from reduced industrial sector emissions.

Reduction Measure Description and Quantification

Industrial decarbonization is a key area of focus for Michigan as one of the national leaders in manufacturing jobs and output[53]. Energy efficiency is a vital tool that can help Michigan's industrial sector reduce GHG emissions while keeping energy costs reasonable. Additionally, many industrial facilities have a high potential for process electrification, while other high-heat processes require fuel-switching to cleaner fuels (such as green hydrogen), and certain processes require deploying cleaner manufacturing technologies, including but not limited to carbon capture, utilization, and storage. The top ten highest GHG emitting industrial facilities

---

[51] Clean Jobs Midwest
[52] legislature.mi.gov/documents/2023-2024/billanalysis/Senate/htm/2023-SFA-0519-G.htm
[53] Business Facilities' 19th Annual Rankings Report: State Rankings

outside of power plants produced over 8 MMTCO$_2$E in 2022, representing a major opportunity to reduce emissions from top emitting facilities as they pave the way for others to follow.

Regarding the implementation schedule and milestones for this measure, EGLE does not anticipate any major obstacles. In partnership with existing institutions, such as the Michigan State University Industrial Assessment Center, this measure would initially support site assessments and predevelopment costs for many of Michigan's industrial facilities. Decarbonization projects at facilities of varying sizes would be undertaken thereafter, prioritizing the projects that result in the greatest emission reductions.

**Table 37: Estimated GHG emission reductions
as a result of priority reduction measure #9**

Estimated Emissions Reductions	Time Scale
0.597 MMTCO$_2$e	Annual near-term average
5.887 MMTCO$_2$e	Between 2024 – 2030
15.529 MMTCO$_2$e	Between 2024 – 2050

Example entities that may participate in implementing this reduction measure (but are not necessarily eligible to apply directly for CPRG implementation grants) include but are not limited to manufacturers, industrial plants, and others. Metrics that may be used to track this reduction measure include the change in natural gas and electricity usage of industrial facilities over time, emissions of various greenhouse gases via existing reporting programs, localized air pollution, and other metrics as identified.

Industrial decarbonization strategies such as fuel-switching, energy efficiency improvements, and investments in clean manufacturing technology were quantified using RMI's EPS tool. The following assumptions served as the base of the quantification:

1. Focus on industrial decarbonization outside of power plants to avoid double counting with other electricity specific reduction measures

2. The 10 highest emitting industrial users were distinguished using Greenhouse Gas Reporting Program (GHGRP) data and include minerals, metals, refineries, petroleum and natural gas systems, pulp and paper, and non-fluorinated chemicals industries[54]

Validation of this reduction measure quantification will be completed with manual calculation using comparative data for other similar sized industrial sites.

---

[54] EPA GHG Reporting

Note: The quantification included policies related to industrial energy efficiency, fuel-switching, and clean manufacturing for the top 10 industries (besides power plants). When applying for specific projects, ensure appropriate emissions are quantified.

LIDAC Qualitative and Quantitative Benefits Analysis

Cleaner manufacturing technologies and fuel-switching lead to significant reductions in emissions of harmful pollutants like NOx, SOx, and CO in traditionally overburdened communities located near industrial facilities. Transitioning to cleaner industrial processes will also generate demand for new skills and expertise that can create new workforce opportunities in areas like conducting energy audits and implementing the energy saving strategies they identify.

Table 38: Change in co-pollutants as a result of priority measure #9 in thousand metric tons of emissions

Pollutant	Change in Cumulative Emissions (2024-2030)	Change in Cumulative Emissions (2024-2050)
SOx	-1.433	5.805
NOx	-2.272	-4.160
PM2.5	1.305	5.199
VOC	-0.698	0.753
CO	-48.531	-149.659

Figure 37: Avoided deaths categorized by race between 2024 and 2030 as a result of priority reduction measure #9

2.44
1.90
10.37
37.36

■ White ■ Black ■ Asian ■ Other
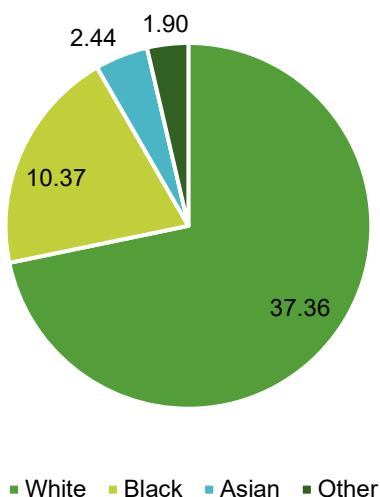
Figure 38: Avoided deaths categorized by race between 2024 and 2050 as a result of priority reduction measure #9

28.92
35.58
126.00
433.42

■ White ■ Black ■ Asian ■ Other

State of Michigan
Priority Climate Action Plan

Table 39: Avoided estimated community benefits in the near-term and long-term as a result of priority reduction measure #9

Community Benefits	2024-2030 Cumulative Value	2024-2050 Cumulative Value
Avoided Lost Workdays	3,335	39,897
Avoided Respiratory Symptoms and Bronchitis	1,180	14,107
Avoided Hospital Admissions	11	129
Avoided Minor Restricted Activity Days	19,767	236,484

Review of Authority to Implement

In addition to the statutes in Section 4.4 and other relevant laws, the State of Michigan has existing legislative and regulatory authority to implement this incentive-based measure without additional action.

Intersection with Other Funding Availability

In addition to the broader coordination of funding opportunities across Michigan as noted in Section 4.5, the State of Michigan has received funding through the Regional Clean Hydrogen Hubs Program as part of the Midwest Hydrogen Hub to expand the production, processing, delivery, storage, and end-use of hydrogen which is applicable to the fuel-switching component of this priority reduction measure.

In addition, this measure intends to fill gaps in funding left after implementation of the federal 48C Clean Manufacturing Tax Credit. That program is currently funded at a $4 billion level, applications were due in December 2023, and winners of 48C credits are not yet known. The 48C program is expected to leave an abundance of unfunded projects to spur innovation and reduce emissions. This coalition grant program will build on the 48C grants and focus on projects that do not get 48C funding.

Workforce Planning Analysis

In Michigan, there are approximately 75,000 energy efficient jobs and almost 700 clean fuels jobs[55]. As the state strives to advance energy efficiency and fuel-switching in heavy industry, it will create jobs across the value chain in manufacturing, innovation consulting, business development, construction, engineering, and more. Job creation from this reduction measure can expect about 4,347 new jobs in the year 2050.

---

[55] Clean Jobs Midwest

Reduction Measure #10 - Reduce methane emissions from various sources, including but not limited to food waste, organics diversion, and wastewater treatment facilities with a focus on methane reduction strategies that will bring significant benefits for LIDACs.

Reduction Measure Description and Quantification

Methane emissions, while a relatively small portion of Michigan's GHG emissions, have a significantly higher warming potential compared to CO_2, stressing the importance of mitigating their release into the atmosphere. The inventory sectors that emit the highest amounts of CH_4 include Natural Gas and Oil Systems, Agriculture, and Waste. This reduction measure may focus on methane reductions from any emitting inventory sector with significant methane emissions, but for the purposes of quantification, prioritizes food waste, organics diversion, and wastewater.

Regarding the implementation schedule and milestones for this measure, EGLE does not anticipate any major obstacles. Michigan has a goal to reduce food waste by 50% from 2005 levels by 2030. Currently in development is a Michigan Food System Waste Reduction Road Map to inform decision makers of policies and programs related to reducing food waste.

**Table 40: Estimated GHG emission reductions
as a result of priority reduction measure #10**

Estimated Emissions Reductions	Time Scale
0.858 MMTCO$_2$e	Annual near-term average
5.147 MMTCO$_2$e	Between 2024 – 2030
13.827 MMTCO$_2$e	Between 2024 – 2050

Example entities that may participate in implementing this reduction measure (but are not necessarily eligible to apply directly for CPRG implementation grants) include but are not limited to landfill owners, wastewater treatment facilities, compost companies, tribes, municipalities, universities, and others. Metrics that may be used to track this reduction measure include the change in reported methane emissions from industrial sites, the amount of methane vented and flared, the amount of food waste diverted from landfills, and other metrics as identified.

Quantification of this reduction measure was calculated using RMI's EPS tool and the EPA's recent report "Quantifying Methane Emissions from Landfilled Food Waste"[56]. The baseline assumptions include:

1. All food waste is calculated via municipal solid waste emissions from the EPA's SIT data and EPA's finding that 58% of fugitive methane emissions in municipal solid waste landfills are from food waste

---

[56] epa.gov/land-research/quantifying-methane-emissions-landfilled-food-waste

State of Michigan
Priority Climate Action Plan

2. Wastewater baseline data are taken from the SIT

3. A 50% reduction in wastewater is also assumed (based on 2005 levels) in addition to reduction by 50% for food waste

Validation of this reduction measure was completed through addressing additional EPS policies and how they relate to emission goals, based on the SIT. Note, the SIT does not include state-specific data but uses EPA estimates and national proportions to calculate both waste and wastewater data.

LIDAC Qualitative and Quantitative Benefits Analysis

Reducing methane emissions from diverse sources – including food waste, organic waste diversion, and wastewater treatment facilities – has the potential to improve the lives of Michigan's LIDAC residents. Reducing methane emissions, even at a seemingly small scale within communities, leads to reduced pollutants, especially CO, and improves air quality and enhances overall health and well-being. Landfills and wastewater treatment facilities are often the source of unpleasant odors from the release of compounds that accompany methane such as hydrogen sulfide. Diverting organic waste to anaerobic digestion facilities minimizes the release of odorous compounds. Reducing these emissions creates a more pleasant environment in surrounding communities, which are often historically disadvantaged. In addition, implementing solutions like anaerobic digestion for food waste conversion requires infrastructure upgrades and operational staff, generating green jobs in local communities.

Table 41: Change in co-pollutants as a result of priority measure #9 in thousand metric tons of emissions

Pollutant	Change in Cumulative Emissions (2024-2030)	Change in Cumulative Emissions (2024-2050)
SOx	-0.891	7.429
NOx	-0.783	0.576
PM2.5	1.687	6.341
VOC	-0.178	2.269
CO	-45.358	-142.737

Figure 39: Avoided deaths categorized by race between 2024 and 2030 as a result of priority reduction measure #10
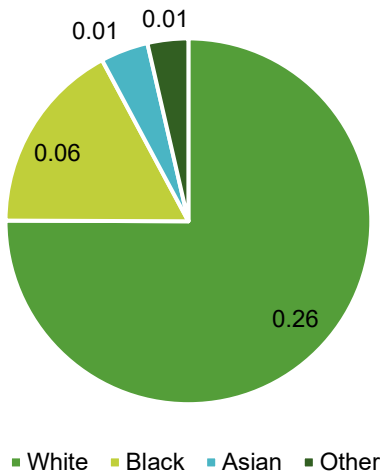
Figure 40: Avoided deaths categorized by race between 2024 and 2050 as a result of priority reduction measure #10
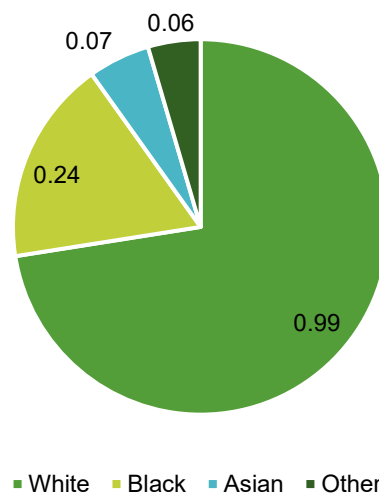
Table 42: Avoided estimated community benefits in the near-term and long-term as a result of priority reduction measure #9

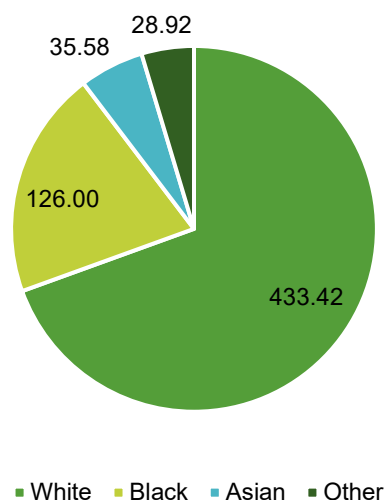| Community Benefits	2024-2030 Cumulative Value	2024-2050 Cumulative Value
Avoided Lost Workdays	22	87
Avoided Respiratory Symptoms and Bronchitis	8	30
Avoided Hospital Admissions	0	0
Avoided Minor Restricted Activity Days	128	516

Review of Authority to Implement

In addition to the statutes in Section 4.4 and other relevant laws, the State of Michigan has existing legislative and regulatory authority to implement this measure without additional action.

Intersection with Other Funding Availability

In addition to the broader coordination of funding opportunities across Michigan as noted in Section 4.5, EGLE was awarded $5 million as part of the Methane Emissions Reduction Program funded through the IRA that helps monitor air pollution, enhance climate resilience, and decrease adverse health effects in LIDACs.

Workforce Planning Analysis

This reduction measure relating to methane emissions reduction will have an effect on jobs in farming, food processing and manufacturing, grocery retail, food service, and more. This is the only reduction measure to estimate a decrease in net jobs by as low as 4,300 fewer jobs by 2050[57]. However, the aforementioned Community and Worker Economic Transition Office in LEO is meant to support workers from industries impacted by the clean energy transition and could provide analysis, planning, and support to mitigate adverse workforce impacts.

6. CONCLUSION AND NEXT STEPS

EGLE continues to oversee all components required to implement the strategies laid out in the MHCP. This requires complex management to obtain funds, incentivize progress, operate and promote programs, and much more. The potential outcome to establish Michigan as a clean energy leader in economic development, jobs, and overall well-being for citizens makes further progress an imperative.

As we look forward to making groundbreaking advancements in the areas discussed herein, EGLE will work to make the following additions or improvements both as part of the CPRG Program and upon MHCP implementation holistically.

- Incorporate natural and working lands sectors into relevant components of the CCAP.

- Increase meaningful engagement across the state by better incorporating equity and accessibility into future community engagements.

- Ensure tribes are included in outreach for PCAP and CCAP related programs and projects that are located near tribal lands. Outreach will include, but not be limited to:
    - Continuing to meet and collaborate with tribes and tribal consortiums on implementing PCAPs and CCAPs.
    - Continuing to include EGLE's MHCP and CPRG updates at quarterly MTEG meetings.
    - Ensuring tribes are notified of funding opportunities that could assist in implementing PCAP and CCAP strategies.

- Improve upon the data in the GHG inventory by:
    - Sorting data into an Economic Sector GHG inventory approach,
    - Engaging communities for Michigan specific data collection (e.g., utilities) (to replace default state-specific data sources) for the following SIT modules: agriculture, wastewater, municipal solid waste, electricity consumption, and,
    - Developing a dynamic, open-source data visualization dashboard, updated regularly.

---

[57] Energy Policy Simulator

- Perform a deeper analysis related to LIDAC and statewide community benefits, using local partnerships and experts to create a more robust assessment of the effects air pollution, energy burden, jobs, and climate resilience have on communities and incorporate learnings into decision-making.

- Continue to expand the funding opportunities assessment to holistically understand the streams of funding flowing to what industry sectors for what projects and programs.

- Further examine the existing and required workforce planning activities across the state beginning with overarching estimates in each industry sector, existing programs and planning activities, specific opportunities for LIDAC workers, and additional programs required to ensure a sufficient workforce is equipped to realize MHCP goals and a just transition.

- Perform a scenario analysis across reduction measures to estimate the complex nature of how initiatives interact with one another. Institute conservative, moderate, and aggressive estimates to deepen understanding of a range of possibilities along the timeline to 2050.

This Priority Climate Action Plan embodies Michigan's urgent response to the escalating challenges of climate change, echoing the urgent call to action outlined in the MI Healthy Climate Plan. As climate-related impacts increasingly affect Michiganders, failure to act decisively will exacerbate existing disparities and environmental injustices. However, by embracing the PCAP's strategic measures, including immediate actions to achieve a 52% reduction in greenhouse gas emissions by 2030 and laying the groundwork for full decarbonization by 2050, Michigan can seize a transformative opportunity. Oversight and implementation of the PCAP by the Office of Climate and Energy within EGLE, supported by advisory bodies and transparent reporting mechanisms, will ensure accountability and progress toward our shared goals. Through resolute leadership, inclusive participation, and collaboration among all parties involved, we can build a more equitable, healthy, prosperous, and sustainable future for all Michiganders.

APPENDIX A: GHG INVENTORY DETAILED TABLES

Appendix Table 1:
Summary of GHG Emissions for Michigan by Inventory Sector (MMTCO$_2$E)

Inventory Sector (MMTCO$_2$E)	2005	2019	% of Gross Emissions (2019)	% Change (2005 to 2019)
Energy	190.42	161.94	87.21%	-15%
CO$_2$ from Fossil Fuel Combustion	186.89	154.24	83.06%	-17%
Stationary Combustion	0.85	0.81	0.43%	-6%
Mobile Combustion	1.36	0.61	0.33%	-56%
Coal Mining	0.00	0.00	0.00%	-
Natural Gas and Oil Systems	1.31	6.29	3.39%	381%
Industrial Processes	11.36	11.08	5.97%	-2%
Agriculture	6.55	8.05	4.33%	23%
Waste	9.77	4.62	2.49%	-53%
Municipal Solid Waste	8.78	3.62	1.95%	-59%
Wastewater	0.99	1.01	0.54%	1%
Gross Emissions	218.10	185.69	-	-15%
Sinks (LULUCF)	-19.63	-18.96	10.21%	-3%
Net Emissions	**198.47**	**166.73**	-	**-16%**

State of Michigan
Priority Climate Action Plan

Appendix Table 2:
Total GHG Emissions for Michigan by Greenhouse Gas in 2005 and 2019

Emissions (MMTCO$_2$E)	2005	2019	% of Gross Emissions (2019)	% Change (2005 to 2019)
Gross CO$_2$	194.61	160.99	88.86%	-17%
CO$_2$ from Fossil Fuel Combustion	186.89	154.24	85.14%	-17%
Industrial Processes	7.07	6.18	3.41%	-13%
Waste	0.61	0.54	0.30%	-12%
Agriculture	0.04	0.03	0.01%	-28%
Sinks (LULUCF)	-19.73	-19.05	-11%	-3%
*Net CO$_2$***	*174.89*	*141.93*	*78%*	*-19%*
CH$_4$	13.07	13.59	7.50%	4%
Stationary Combustion	0.42	0.50	0.28%	19%
Mobile Combustion	0.13	0.09	0.05%	-33%
Coal Mining	0.00	0.00	0.00%	-
Natural Gas and Oil Systems	1.31	6.29	3.47%	381%
Agriculture	2.34	2.91	1.61%	24%
Waste	8.15	3.07	1.69%	-62%
Wastewater	0.72	0.74	0.41%	3%
N$_2$O	2.46	1.69	0.93%	-31%
Stationary Combustion	0.43	0.30	0.17%	-30%
Mobile Combustion	1.24	0.52	0.29%	-58%
Industrial Processes	0.00	0.00	0.00%	-
Agriculture	0.42	0.49	0.27%	18%
Waste	0.01	0.01	0.00%	-27%
Wastewater	0.27	0.27	0.15%	-2%
F-Gases	4.29	4.90	2.70%	14%
Industrial Processes	4.29	4.90	2.70%	14%
Gross Emissions	**214.44**	**181.16**	-	**-16%**
Net Emissions (Sources and Sinks)	**194.71**	**162.11**	-	**-17%**

* Carbon dioxide sinks in the environment are categorized under land-use, land-use change and forestry thus, are subtracted from Gross CO$_2$ emissions. Net CO$_2$ = gross CO$_2$ emissions - sinks. NOTE: Dashes signify that the value is not counted. Coal mining production in the State of Michigan stopped by 1952, therefore, no emissions are accounted for.

State of Michigan
Priority Climate Action Plan

Appendix Table 3: Indirect CO2 from Electricity Consumption by End-Use Sector with Detailed Uses (MMTCO$_2$E)

End-Use Sector	2005	2019	% Change (2005 to 2019)
Residential	23.58	16.23	-31%
Space Heating	1.28	2.51	96%
Air-conditioning	3.59	1.80	-50%
Water Heating	1.88	1.93	3%
Refrigeration	3.16	1.29	-59%
Other Appliances and Lighting	13.67	8.69	-36%
Commercial	25.87	18.34	-29%
Space Heating	1.45	0.52	-64%
Cooling	2.10	2.06	-2%
Ventilation	3.69	3.02	-18%
Water Heating	0.37	0.07	-80%
Lighting	8.94	3.39	-62%
Cooking	0.33	0.52	55%
Refrigeration	3.17	2.73	-14%
Office Equipment	0.66	0.74	12%
Computers	1.47	1.69	15%
Other	3.70	3.61	-2%
Industrial	22.70	14.48	-36%
Indirect Uses-Boiler Fuel	0.22	0.22	3%
Conventional Boiler Use	0.21	0.22	7%
CHP and/or Cogeneration Process	0.01	0.00	-100%
Direct Uses-Total Process	17.87	11.57	-35%
Process Heating	3.08	1.63	-47%
Process Cooling and Refrigeration	1.56	1.19	-24%
Machine Drive	11.93	7.42	-38%
Electro-Chemical Processes	1.05	0.98	-6%
Other Process Use	0.25	0.35	39%
Direct Uses-Total Nonprocess	4.36	2.51	-42%
Facility HVAC	2.03	1.18	-42%
Facility Lighting	1.77	0.95	-46%
Other Facility Support	0.47	0.26	-45%
Onsite Transportation	0.06	0.09	48%
Other Nonprocess Use	0.03	0.03	-11%
Other	0.25	0.17	-32%
Transportation	0.003	0.003	-4%

State of Michigan
Priority Climate Action Plan

End-Use Sector	2005	2019	% Change (2005 to 2019)
Automated Guideway	0.003	0.002	-39%
Bus (charged batteries)	0	0	-
Cable Car	0	0	-
Commuter Rail	0	0	-
Heavy Rail	0	0	-
Inclined Plane	0	0	-
Light Rail	0	0	-
Trolleybus	0	0	-
Other	0	0.001	-
TOTAL	**72.16**	**49.05**	**-32%**
Residential	23.58	16.23	-31%
Commercial	25.87	18.34	-29%
Industrial	22.70	14.48	-36%
Transportation	0.003	0.003	-4%

Comparison of Michigan's 2024 Inventory using EPA's SIT and the EPA's annual Inventory of U.S. Greenhouse Gas Emissions and Sinks and the Inventory of U.S. Greenhouse Gas Emissions and Sinks by State

Appendix Table 4:
Difference between Michigan's 2024 Inventory and EPA's Annual Inventories*

Inventory Sector (MMTCO$_2$E)	2005 (SIT)	2005 (EPA Annual Inventories)	Difference between SIT and EPA Annual Inventories (2005)	2019 (SIT)	2019 (EPA Annual Inventories)	Difference between SIT and EPA Annual Inventories (2019)
Energy	190.418	196.408	-5.991	161.935	158.805	3.131
Industrial Processes	11.363	12.988	-1.626	11.080	14.055	-2.975
Agriculture	6.548	8.523	-1.975	8.047	10.769	-2.722
Waste	9.771	9.974	-0.203	4.624	7.005	-2.381
Gross Emissions	218.100	227.166	-9.067	185.687	190.549	-4.862
Sinks (LULUCF)	-19.633	-15.785	-3.848	-18.958	-15.263	-3.695
Net Emissions	198.467	212.109	-13.643	166.729	175.371	-8.642

*2024 Inventory uses EPA's SIT and EPA's Annual Inventories include the Inventory of U.S. Greenhouse Gas Emissions and Sinks and the Inventory of U.S. Greenhouse Gas Emissions and Sinks by State[1]

---

[1] EPA Greenhouse Gas Inventory Data Explorer

State of Michigan
Priority Climate Action Plan

APPENDIX B: SUMMARY TABLE OF PRIORITY REDUCTION MEASURES

The below table describes the associated emission reduction quantification and review of authority to implement for each priority reduction measure described in Section 5. Priority Reduction Measures by Key Sector.

ID	Key Sector	Priority Reduction Measure	Estimated Emissions Reductions		
			Annual near-term average	Between 2024 – 2030	Between 2024 – 2030
1	Electricity Generation	Drive clean energy deployment including improving siting for renewable energy and energy storage across Michigan, including on brownfields and former industrial sites and emphasizing equitable access for Michigan's LIDACs.	1.640	20.856	42.651
2	Electricity Generation	Invest in energy storage and necessary electric grid investments to enable earlier coal plant retirements and better integrate renewable energy into the electric grid.	2.794	16.762	23.593
3	Commercial and Residential Buildings	Drive building electrification and fuel-switching in existing buildings including an emphasis on LIDACs and electrifying households that currently rely on delivered fuels such as propane and home heating oil.	1.047	6.280	25.808
4	Commercial and Residential Buildings	Reduce household fossil energy use through home repairs, electrical upgrades for building and vehicle electrification, weatherization, and other energy waste reduction investments with an emphasis on ensuring equitable access.	1.260	7.562	24.463

State of Michigan
Priority Climate Action Plan

ID	Key Sector	Priority Reduction Measure	Estimated Emissions Reductions		
			Annual near-term average	Between 2024 – 2030	Between 2024 – 2030
5	Commercial and Residential Buildings	Decarbonize government and nonprofit facilities and infrastructure, with an emphasis on LIDACs, by reducing energy waste, investing in decarbonization solutions, and reducing emissions from fossil fuel combustion.	0.050	0.251	0.502
6	Transportation	Electrify state government, municipal, tribal, and other public fleets, prioritizing equitable access for Michigan's LIDACs.	0.285	1.519	7.571
7	Transportation	Support just access to public transit and non-motorized transportation options by improving infrastructure, and by increasing routes, frequency, and reliability of available options.	1.162	7.000	12.018
8	Transportation	Encourage adoption of electric vehicles by increasing deployment of electric vehicle charging infrastructure, prioritizing equitable access for Michigan's LIDACs.	0.509	3.052	12.646
9	Industry	Encourage industrial innovation to advance energy efficiency, fuel-switching, and deployment of cleaner manufacturing technologies prioritizing facilities in LIDACs that may receive significant benefits from reduced industrial sector emissions.	0.597	5.887	15.529
10	Industry	Reduce methane emissions from various sources, including but not limited to food waste, organics diversion, and wastewater treatment facilities with a focus on methane reduction strategies that will bring significant benefits for LIDACs.	0.858	5.147	13.827

APPENDIX C: CEJST CENSUS TRACTS

According to the EPA, low income and disadvantaged communities includes census tracts included in the Climate and Economic Justice Screening Tool (CEJST), census blocks above 90th national percentile in EJScreen Supplemental Indexes, or geographic areas within tribal lands (as included in EJScreen). Below are the **996 census tracts** which fall under one, or all, of these definitions as of 2010 Census.

County Name	Census tract 2010 ID	County Name	Census tract 2010 ID
Alcona County	26001970100	Berrien County	26021000300
Alcona County	26001970400	Berrien County	26021000400
Alcona County	26001970500	Berrien County	26021000500
Alcona County	26001970600	Berrien County	26021000600
Alger County	26003000100	Berrien County	26021002000
Allegan County	26005031000	Berrien County	26021002100
Allegan County	26005031200	Berrien County	26021002200
Alpena County	26007000100	Berrien County	26021002300
Alpena County	26007000400	Berrien County	26021002500
Alpena County	26007000500	Berrien County	26021020200
Alpena County	26007000700	Berrien County	26021020500
Alpena County	26007000800	Berrien County	26021020600
Antrim County	26009960200	Berrien County	26021020700
Antrim County	26009960700	Berrien County	26021020900
Arenac County	26011970100	Branch County	26023950200
Arenac County	26011970200	Branch County	26023950800
Arenac County	26011970300	Branch County	26023951200
Arenac County	26011970400	Branch County	26023951400
Arenac County	26011970500	Branch County	26023951600
Baraga County	26013000100	Calhoun County	26025000200
Baraga County	26013000200	Calhoun County	26025000300
Bay County	26017280300	Calhoun County	26025000500
Bay County	26017280400	Calhoun County	26025000600
Bay County	26017280600	Calhoun County	26025000700
Bay County	26017280700	Calhoun County	26025000800
Bay County	26017280900	Calhoun County	26025001000
Bay County	26017281300	Calhoun County	26025001100
Bay County	26017285202	Calhoun County	26025001300
Bay County	26017285800	Calhoun County	26025001400
Bay County	26017286500	Calhoun County	26025002100
Bay County	26017286600	Calhoun County	26025002600

State of Michigan
Priority Climate Action Plan

County Name	Census tract 2010 ID		County Name	Census tract 2010 ID
Calhoun County	26025002800		Delta County	26041970800
Calhoun County	26025003100		Delta County	26041971000
Calhoun County	26025003300		Dickinson County	26043950500
Calhoun County	26025003600		Eaton County	26045020202
Calhoun County	26025004000		Eaton County	26045020901
Calhoun County	26025004100		Emmet County	26047970100
Cass County	26027002000		Emmet County	26047970800
Cass County	26027002100		Genesee County	26049000100
Charlevoix County	26029000200		Genesee County	26049000200
Charlevoix County	26029001500		Genesee County	26049000300
Cheboygan County	26031960200		Genesee County	26049000400
Cheboygan County	26031960300		Genesee County	26049000500
Cheboygan County	26031960700		Genesee County	26049000600
Cheboygan County	26031960800		Genesee County	26049000700
Chippewa County	26033970200		Genesee County	26049000800
Chippewa County	26033970400		Genesee County	26049000900
Chippewa County	26033970500		Genesee County	26049001000
Chippewa County	26033970700		Genesee County	26049001100
Chippewa County	26033970900		Genesee County	26049001200
Chippewa County	26033980200		Genesee County	26049001300
Chippewa County	26033980300		Genesee County	26049001400
Clare County	26035000100		Genesee County	26049001500
Clare County	26035000200		Genesee County	26049001600
Clare County	26035000300		Genesee County	26049001700
Clare County	26035000400		Genesee County	26049001800
Clare County	26035000500		Genesee County	26049001900
Clare County	26035000600		Genesee County	26049002000
Clare County	26035000800		Genesee County	26049002200
Clare County	26035000900		Genesee County	26049002300
Clare County	26035001000		Genesee County	26049002400
Clare County	26035001300		Genesee County	26049002600
Clinton County	26037010203		Genesee County	26049002700
Clinton County	26037010702		Genesee County	26049002800
Clinton County	26037010901		Genesee County	26049002900
Crawford County	26039960300		Genesee County	26049003100
Crawford County	26039960400		Genesee County	26049003200
Crawford County	26039960500		Genesee County	26049003300
Delta County	26041970100		Genesee County	26049003400

State of Michigan
Priority Climate Action Plan

County Name	Census tract 2010 ID	County Name	Census tract 2010 ID
Genesee County	26049003500	Gladwin County	26051000100
Genesee County	26049003600	Gladwin County	26051000300
Genesee County	26049003700	Gladwin County	26051000400
Genesee County	26049003800	Gladwin County	26051000500
Genesee County	26049004000	Gladwin County	26051000600
Genesee County	26049010110	Gladwin County	26051000700
Genesee County	26049010113	Gladwin County	26051000800
Genesee County	26049010115	Gogebic County	26053950100
Genesee County	26049010304	Gogebic County	26053950200
Genesee County	26049010305	Gogebic County	26053950500
Genesee County	26049010501	Gogebic County	26053950600
Genesee County	26049010502	Gratiot County	26057000300
Genesee County	26049010504	Gratiot County	26057000400
Genesee County	26049010811	Gratiot County	26057000700
Genesee County	26049010812	Gratiot County	26057001000
Genesee County	26049010910	Hillsdale County	26059050200
Genesee County	26049010911	Hillsdale County	26059050400
Genesee County	26049010912	Hillsdale County	26059050600
Genesee County	26049011301	Hillsdale County	26059050700
Genesee County	26049011302	Hillsdale County	26059050800
Genesee County	26049011401	Hillsdale County	26059051100
Genesee County	26049011508	Hillsdale County	26059051200
Genesee County	26049011901	Houghton County	26061000100
Genesee County	26049012003	Houghton County	26061000200
Genesee County	26049012006	Houghton County	26061000300
Genesee County	26049012007	Houghton County	26061000400
Genesee County	26049012008	Houghton County	26061000700
Genesee County	26049012100	Huron County	26063950300
Genesee County	26049012201	Huron County	26063950600
Genesee County	26049012202	Huron County	26063951000
Genesee County	26049012310	Huron County	26063951200
Genesee County	26049012311	Ingham County	26065000100
Genesee County	26049012501	Ingham County	26065000600
Genesee County	26049012503	Ingham County	26065000700
Genesee County	26049012601	Ingham County	26065000800
Genesee County	26049012602	Ingham County	26065001200
Genesee County	26049013500	Ingham County	26065001703
Genesee County	26049013600	Ingham County	26065002000

State of Michigan
Priority Climate Action Plan

County Name	Census tract 2010 ID	County Name	Census tract 2010 ID
Ingham County	26065002101	Jackson County	26075000100
Ingham County	26065002600	Jackson County	26075000200
Ingham County	26065002800	Jackson County	26075000400
Ingham County	26065003200	Jackson County	26075000500
Ingham County	26065003301	Jackson County	26075000600
Ingham County	26065003500	Jackson County	26075000900
Ingham County	26065003602	Jackson County	26075001000
Ingham County	26065003700	Jackson County	26075001100
Ingham County	26065004302	Jackson County	26075001200
Ingham County	26065005100	Jackson County	26075001300
Ingham County	26065005201	Jackson County	26075005000
Ingham County	26065005304	Jackson County	26075005100
Ingham County	26065005402	Jackson County	26075005500
Ingham County	26065006500	Jackson County	26075005800
Ingham County	26065006600	Jackson County	26075005900
Ingham County	26065006700	Jackson County	26075006000
Ingham County	26065006800	Jackson County	26075006900
Ionia County	26067030200	Kalamazoo County	26077000100
Ionia County	26067030300	Kalamazoo County	26077000201
Ionia County	26067031700	Kalamazoo County	26077000202
Ionia County	26067032100	Kalamazoo County	26077000300
Iosco County	26069000100	Kalamazoo County	26077000600
Iosco County	26069000300	Kalamazoo County	26077000900
Iosco County	26069000400	Kalamazoo County	26077001000
Iosco County	26069000500	Kalamazoo County	26077001100
Iosco County	26069000600	Kalamazoo County	26077001504
Iosco County	26069000700	Kalamazoo County	26077001507
Iosco County	26069000800	Kalamazoo County	26077001702
Iosco County	26069000900	Kalamazoo County	26077001803
Iron County	26071000300	Kalamazoo County	26077002201
Iron County	26071000400	Kalamazoo County	26077002903
Iron County	26071000500	Kalamazoo County	26077005501
Isabella County	26073000100	Kalkaska County	26079950200
Isabella County	26073940100	Kalkaska County	26079950400
Isabella County	26073940200	Kalkaska County	26079950601
Isabella County	26073940400	Kalkaska County	26079950602
Isabella County	26073940500	Kent County	26081000800
Isabella County	26073940600	Kent County	26081000900

State of Michigan
Priority Climate Action Plan

County Name	Census tract 2010 ID	County Name	Census tract 2010 ID
Kent County	26081001000	Lake County	26085960100
Kent County	26081001101	Lake County	26085961100
Kent County	26081001300	Lake County	26085961200
Kent County	26081001500	Lake County	26085961300
Kent County	26081001600	Lapeer County	26087331000
Kent County	26081001900	Lapeer County	26087336500
Kent County	26081002000	Lapeer County	26087337500
Kent County	26081002200	Lapeer County	26087339500
Kent County	26081002600	Lenawee County	26091061301
Kent County	26081002800	Lenawee County	26091061302
Kent County	26081003000	Lenawee County	26091061400
Kent County	26081003100	Lenawee County	26091061600
Kent County	26081003200	Lenawee County	26091061800
Kent County	26081003500	Lenawee County	26091061900
Kent County	26081003600	Livingston County	26093722300
Kent County	26081003700	Livingston County	26093725100
Kent County	26081003800	Livingston County	26093742202
Kent County	26081003900	Mackinac County	26097950200
Kent County	26081004000	Mackinac County	26097950300
Kent County	26081004200	Mackinac County	26097950400
Kent County	26081004600	Mackinac County	26097950500
Kent County	26081010301	Macomb County	26099206700
Kent County	26081010402	Macomb County	26099222101
Kent County	26081011406	Macomb County	26099228100
Kent County	26081012606	Macomb County	26099230500
Kent County	26081012607	Macomb County	26099231400
Kent County	26081012701	Macomb County	26099231500
Kent County	26081012901	Macomb County	26099231600
Kent County	26081013300	Macomb County	26099231900
Kent County	26081013400	Macomb County	26099232300
Kent County	26081013500	Macomb County	26099232400
Kent County	26081013600	Macomb County	26099240000
Kent County	26081013802	Macomb County	26099241000
Kent County	26081014000	Macomb County	26099241200
Kent County	26081014100	Macomb County	26099241600
Kent County	26081014200	Macomb County	26099241700
Kent County	26081014300	Macomb County	26099245000
Kent County	26081014701	Macomb County	26099245100

State of Michigan
Priority Climate Action Plan

County Name	Census tract 2010 ID	County Name	Census tract 2010 ID
Macomb County	26099245200	Macomb County	26099268400
Macomb County	26099245400	Macomb County	26099982200
Macomb County	26099247100	Macomb County	26099982300
Macomb County	26099247601	Manistee County	26101000100
Macomb County	26099255300	Manistee County	26101000500
Macomb County	26099255800	Manistee County	26101000600
Macomb County	26099255900	Marquette County	26103000500
Macomb County	26099256100	Marquette County	26103001900
Macomb County	26099256500	Marquette County	26103002400
Macomb County	26099256600	Mason County	26105950100
Macomb County	26099256700	Mason County	26105950400
Macomb County	26099256800	Mason County	26105950500
Macomb County	26099258200	Mason County	26105950700
Macomb County	26099258400	Mecosta County	26107960100
Macomb County	26099258600	Mecosta County	26107960200
Macomb County	26099258700	Mecosta County	26107960400
Macomb County	26099258800	Mecosta County	26107960500
Macomb County	26099258900	Mecosta County	26107960800
Macomb County	26099260100	Mecosta County	26107960900
Macomb County	26099260600	Mecosta County	26107961000
Macomb County	26099260800	Menominee County	26109960100
Macomb County	26099262100	Menominee County	26109960200
Macomb County	26099262300	Menominee County	26109960300
Macomb County	26099262400	Menominee County	26109960700
Macomb County	26099262500	Midland County	26111290200
Macomb County	26099262800	Midland County	26111290600
Macomb County	26099262900	Midland County	26111291500
Macomb County	26099263200	Midland County	26111291700
Macomb County	26099263400	Missaukee County	26113960100
Macomb County	26099263500	Missaukee County	26113960200
Macomb County	26099263600	Missaukee County	26113960300
Macomb County	26099263700	Missaukee County	26113960400
Macomb County	26099263800	Monroe County	26115831200
Macomb County	26099263900	Monroe County	26115831400
Macomb County	26099264000	Monroe County	26115831800
Macomb County	26099264200	Monroe County	26115831900
Macomb County	26099268100	Monroe County	26115832100
Macomb County	26099268300	Monroe County	26115832200

State of Michigan
Priority Climate Action Plan

County Name	Census tract 2010 ID	County Name	Census tract 2010 ID
Montcalm County	26117970200	Oakland County	26125141100
Montcalm County	26117970300	Oakland County	26125141200
Montcalm County	26117970400	Oakland County	26125141300
Montcalm County	26117970800	Oakland County	26125141400
Montcalm County	26117970900	Oakland County	26125141500
Montcalm County	26117971000	Oakland County	26125141600
Montmorency County	26119910100	Oakland County	26125141700
Montmorency County	26119910200	Oakland County	26125142000
Montmorency County	26119910300	Oakland County	26125142100
Montmorency County	26119910400	Oakland County	26125142200
Montmorency County	26119910500	Oakland County	26125142300
Muskegon County	26121000300	Oakland County	26125142400
Muskegon County	26121000401	Oakland County	26125142600
Muskegon County	26121000402	Oakland County	26125142700
Muskegon County	26121000500	Oakland County	26125144701
Muskegon County	26121000601	Oakland County	26125160300
Muskegon County	26121000800	Oakland County	26125160400
Muskegon County	26121001200	Oakland County	26125161400
Muskegon County	26121001300	Oakland County	26125162400
Muskegon County	26121001402	Oakland County	26125171300
Muskegon County	26121001902	Oakland County	26125171500
Muskegon County	26121002000	Oakland County	26125171600
Muskegon County	26121002100	Oakland County	26125172400
Muskegon County	26121002601	Oakland County	26125172500
Muskegon County	26121003100	Oakland County	26125175100
Muskegon County	26121003200	Oakland County	26125175200
Muskegon County	26121003300	Oakland County	26125175300
Muskegon County	26121004200	Oakland County	26125181000
Muskegon County	26121004300	Oakland County	26125181300
Newaygo County	26123970100	Oakland County	26125181600
Newaygo County	26123970300	Oakland County	26125198100
Newaygo County	26123970500	Oceana County	26127010300
Newaygo County	26123970700	Oceana County	26127010400
Newaygo County	26123970800	Oceana County	26127010500
Newaygo County	26123970900	Oceana County	26127010600
Oakland County	26125135000	Ogemaw County	26129950100
Oakland County	26125140900	Ogemaw County	26129950300
Oakland County	26125141000	Ogemaw County	26129950400

County Name	Census tract 2010 ID	County Name	Census tract 2010 ID
Ogemaw County	26129950500	Saginaw County	26145001700
Ogemaw County	26129950600	Saginaw County	26145001800
Ogemaw County	26129950900	Saginaw County	26145001900
Ontonagon County	26131970100	Saginaw County	26145002000
Ontonagon County	26131970200	Saginaw County	26145002100
Osceola County	26133970100	Saginaw County	26145010401
Osceola County	26133970200	Saginaw County	26145010700
Osceola County	26133970300	Saginaw County	26145011000
Osceola County	26133970400	Saginaw County	26145011100
Osceola County	26133970500	Saginaw County	26145011500
Oscoda County	26135970201	Saginaw County	26145011600
Oscoda County	26135970300	Saginaw County	26145011800
Oscoda County	26135970400	Saginaw County	26145012500
Oscoda County	26135970500	Saginaw County	26145012600
Presque Isle County	26141950200	Sanilac County	26151970200
Presque Isle County	26141950300	Sanilac County	26151970300
Presque Isle County	26141950400	Sanilac County	26151970400
Roscommon County	26143970100	Sanilac County	26151970500
Roscommon County	26143970200	Sanilac County	26151970700
Roscommon County	26143970300	Sanilac County	26151970900
Roscommon County	26143970500	Sanilac County	26151971000
Roscommon County	26143971000	Sanilac County	26151971100
Roscommon County	26143971100	Sanilac County	26151971200
Roscommon County	26143971200	Schoolcraft County	26153000300
Saginaw County	26145000100	Shiawassee County	26155030500
Saginaw County	26145000200	Shiawassee County	26155030600
Saginaw County	26145000400	Shiawassee County	26155030700
Saginaw County	26145000600	Shiawassee County	26155030800
Saginaw County	26145000700	St. Clair County	26147620000
Saginaw County	26145000800	St. Clair County	26147621000
Saginaw County	26145000900	St. Clair County	26147622000
Saginaw County	26145001000	St. Clair County	26147623000
Saginaw County	26145001100	St. Clair County	26147624000
Saginaw County	26145001200	St. Clair County	26147625000
Saginaw County	26145001300	St. Clair County	26147626000
Saginaw County	26145001400	St. Clair County	26147628000
Saginaw County	26145001500	St. Clair County	26147629000
Saginaw County	26145001600	St. Clair County	26147634100

State of Michigan
Priority Climate Action Plan

County Name	Census tract 2010 ID	County Name	Census tract 2010 ID
St. Clair County	26147636000	Wayne County	26163500500
St. Clair County	26147657100	Wayne County	26163500600
St. Joseph County	26149040200	Wayne County	26163500700
St. Joseph County	26149040400	Wayne County	26163500800
St. Joseph County	26149040500	Wayne County	26163500900
St. Joseph County	26149040600	Wayne County	26163501000
St. Joseph County	26149040700	Wayne County	26163501100
St. Joseph County	26149040800	Wayne County	26163501200
St. Joseph County	26149041000	Wayne County	26163501300
St. Joseph County	26149041200	Wayne County	26163501400
Tuscola County	26157000600	Wayne County	26163501500
Tuscola County	26157000700	Wayne County	26163501600
Tuscola County	26157000900	Wayne County	26163501700
Tuscola County	26157001000	Wayne County	26163501900
Tuscola County	26157001100	Wayne County	26163502000
Van Buren County	26159010200	Wayne County	26163503100
Van Buren County	26159010400	Wayne County	26163503200
Van Buren County	26159010500	Wayne County	26163503300
Van Buren County	26159010600	Wayne County	26163503400
Van Buren County	26159011300	Wayne County	26163503500
Van Buren County	26159011400	Wayne County	26163503600
Van Buren County	26159012000	Wayne County	26163503900
Washtenaw County	26161400200	Wayne County	26163504000
Washtenaw County	26161404200	Wayne County	26163504100
Washtenaw County	26161407400	Wayne County	26163504200
Washtenaw County	26161410100	Wayne County	26163504300
Washtenaw County	26161410600	Wayne County	26163504400
Washtenaw County	26161410700	Wayne County	26163504700
Washtenaw County	26161410800	Wayne County	26163504800
Washtenaw County	26161411900	Wayne County	26163504900
Washtenaw County	26161412000	Wayne County	26163505000
Washtenaw County	26161412100	Wayne County	26163505100
Washtenaw County	26161412300	Wayne County	26163505200
Washtenaw County	26161422900	Wayne County	26163505400
Wayne County	26163500100	Wayne County	26163505500
Wayne County	26163500200	Wayne County	26163506100
Wayne County	26163500300	Wayne County	26163506200
Wayne County	26163500400	Wayne County	26163506300

State of Michigan
Priority Climate Action Plan

County Name	Census tract 2010 ID	County Name	Census tract 2010 ID
Wayne County	26163506400	Wayne County	26163514500
Wayne County	26163506500	Wayne County	26163515200
Wayne County	26163506600	Wayne County	26163515300
Wayne County	26163506700	Wayne County	26163515600
Wayne County	26163506800	Wayne County	26163515900
Wayne County	26163506900	Wayne County	26163516000
Wayne County	26163507000	Wayne County	26163516100
Wayne County	26163507100	Wayne County	26163516200
Wayne County	26163507200	Wayne County	26163516300
Wayne County	26163507300	Wayne County	26163516400
Wayne County	26163507400	Wayne County	26163516600
Wayne County	26163507500	Wayne County	26163516700
Wayne County	26163507800	Wayne County	26163516800
Wayne County	26163507900	Wayne County	26163516900
Wayne County	26163508000	Wayne County	26163517300
Wayne County	26163508100	Wayne County	26163517500
Wayne County	26163510400	Wayne County	26163518400
Wayne County	26163510500	Wayne County	26163518500
Wayne County	26163510600	Wayne County	26163518600
Wayne County	26163510700	Wayne County	26163518800
Wayne County	26163511000	Wayne County	26163518900
Wayne County	26163511200	Wayne County	26163520400
Wayne County	26163511300	Wayne County	26163521100
Wayne County	26163511400	Wayne County	26163521300
Wayne County	26163511900	Wayne County	26163521400
Wayne County	26163512100	Wayne County	26163521500
Wayne County	26163512200	Wayne County	26163521800
Wayne County	26163512300	Wayne County	26163521900
Wayne County	26163512400	Wayne County	26163522000
Wayne County	26163512600	Wayne County	26163522100
Wayne County	26163512900	Wayne County	26163522200
Wayne County	26163513200	Wayne County	26163522300
Wayne County	26163513600	Wayne County	26163522400
Wayne County	26163513700	Wayne County	26163522500
Wayne County	26163513900	Wayne County	26163523100
Wayne County	26163514100	Wayne County	26163523200
Wayne County	26163514200	Wayne County	26163523300
Wayne County	26163514300	Wayne County	26163523400

State of Michigan
Priority Climate Action Plan

County Name	Census tract 2010 ID	County Name	Census tract 2010 ID
Wayne County	26163523800	Wayne County	26163532200
Wayne County	26163524000	Wayne County	26163532400
Wayne County	26163524100	Wayne County	26163532600
Wayne County	26163524200	Wayne County	26163532700
Wayne County	26163524300	Wayne County	26163533000
Wayne County	26163524500	Wayne County	26163533100
Wayne County	26163524700	Wayne County	26163533200
Wayne County	26163524800	Wayne County	26163533300
Wayne County	26163524900	Wayne County	26163533400
Wayne County	26163525000	Wayne County	26163533500
Wayne County	26163525400	Wayne County	26163533600
Wayne County	26163525500	Wayne County	26163533700
Wayne County	26163525600	Wayne County	26163533900
Wayne County	26163525700	Wayne County	26163534100
Wayne County	26163525800	Wayne County	26163534200
Wayne County	26163526000	Wayne County	26163534300
Wayne County	26163526100	Wayne County	26163534400
Wayne County	26163526200	Wayne County	26163534500
Wayne County	26163526300	Wayne County	26163534600
Wayne County	26163526400	Wayne County	26163534700
Wayne County	26163526500	Wayne County	26163535000
Wayne County	26163527200	Wayne County	26163535100
Wayne County	26163527300	Wayne County	26163535200
Wayne County	26163530100	Wayne County	26163535300
Wayne County	26163530200	Wayne County	26163535400
Wayne County	26163530300	Wayne County	26163535500
Wayne County	26163530400	Wayne County	26163535600
Wayne County	26163530500	Wayne County	26163535700
Wayne County	26163530800	Wayne County	26163536100
Wayne County	26163530900	Wayne County	26163536200
Wayne County	26163531100	Wayne County	26163536300
Wayne County	26163531300	Wayne County	26163536400
Wayne County	26163531400	Wayne County	26163536500
Wayne County	26163531500	Wayne County	26163536600
Wayne County	26163531600	Wayne County	26163536700
Wayne County	26163531700	Wayne County	26163536800
Wayne County	26163531800	Wayne County	26163536900
Wayne County	26163531900	Wayne County	26163537000

State of Michigan
Priority Climate Action Plan

County Name	Census tract 2010 ID	County Name	Census tract 2010 ID
Wayne County	26163537100	Wayne County	26163542300
Wayne County	26163537200	Wayne County	26163542400
Wayne County	26163537300	Wayne County	26163542500
Wayne County	26163537500	Wayne County	26163542600
Wayne County	26163537600	Wayne County	26163542700
Wayne County	26163537700	Wayne County	26163542800
Wayne County	26163537800	Wayne County	26163543200
Wayne County	26163538300	Wayne County	26163543400
Wayne County	26163538500	Wayne County	26163543500
Wayne County	26163538600	Wayne County	26163543600
Wayne County	26163538700	Wayne County	26163543700
Wayne County	26163538900	Wayne County	26163543800
Wayne County	26163539000	Wayne County	26163543900
Wayne County	26163539100	Wayne County	26163544000
Wayne County	26163539200	Wayne County	26163544100
Wayne County	26163539400	Wayne County	26163544200
Wayne County	26163539500	Wayne County	26163544300
Wayne County	26163539600	Wayne County	26163545100
Wayne County	26163539700	Wayne County	26163545200
Wayne County	26163540100	Wayne County	26163545300
Wayne County	26163540200	Wayne County	26163545400
Wayne County	26163540300	Wayne County	26163545500
Wayne County	26163540400	Wayne County	26163545600
Wayne County	26163540500	Wayne County	26163545700
Wayne County	26163540600	Wayne County	26163545800
Wayne County	26163540700	Wayne County	26163545900
Wayne County	26163540800	Wayne County	26163546000
Wayne County	26163540900	Wayne County	26163546100
Wayne County	26163541000	Wayne County	26163546200
Wayne County	26163541100	Wayne County	26163546300
Wayne County	26163541200	Wayne County	26163546400
Wayne County	26163541300	Wayne County	26163546500
Wayne County	26163541400	Wayne County	26163546600
Wayne County	26163541500	Wayne County	26163546700
Wayne County	26163541700	Wayne County	26163546800
Wayne County	26163541800	Wayne County	26163546900
Wayne County	26163542100	Wayne County	26163551400
Wayne County	26163542200	Wayne County	26163551600

State of Michigan
Priority Climate Action Plan

County Name	Census tract 2010 ID	County Name	Census tract 2010 ID
Wayne County	26163552000	Wayne County	26163570800
Wayne County	26163552100	Wayne County	26163570900
Wayne County	26163552200	Wayne County	26163571000
Wayne County	26163552300	Wayne County	26163571600
Wayne County	26163552400	Wayne County	26163571800
Wayne County	26163552800	Wayne County	26163572000
Wayne County	26163553000	Wayne County	26163572100
Wayne County	26163553100	Wayne County	26163572500
Wayne County	26163553200	Wayne County	26163572600
Wayne County	26163553300	Wayne County	26163572800
Wayne County	26163553400	Wayne County	26163573300
Wayne County	26163553600	Wayne County	26163573400
Wayne County	26163553800	Wayne County	26163573500
Wayne County	26163554100	Wayne County	26163573600
Wayne County	26163554200	Wayne County	26163573701
Wayne County	26163554500	Wayne County	26163573702
Wayne County	26163555100	Wayne County	26163573800
Wayne County	26163555300	Wayne County	26163573900
Wayne County	26163555400	Wayne County	26163574000
Wayne County	26163564900	Wayne County	26163574100
Wayne County	26163565300	Wayne County	26163574300
Wayne County	26163566400	Wayne County	26163577000
Wayne County	26163566500	Wayne County	26163577100
Wayne County	26163566700	Wayne County	26163577200
Wayne County	26163566900	Wayne County	26163577300
Wayne County	26163567000	Wayne County	26163577400
Wayne County	26163567100	Wayne County	26163577500
Wayne County	26163568000	Wayne County	26163577600
Wayne County	26163568300	Wayne County	26163577900
Wayne County	26163568500	Wayne County	26163578000
Wayne County	26163568800	Wayne County	26163578500
Wayne County	26163568900	Wayne County	26163578600
Wayne County	26163569200	Wayne County	26163579100
Wayne County	26163570100	Wayne County	26163579200
Wayne County	26163570200	Wayne County	26163579300
Wayne County	26163570400	Wayne County	26163579500
Wayne County	26163570500	Wayne County	26163579600
Wayne County	26163570600	Wayne County	26163579700

State of Michigan
Priority Climate Action Plan

County Name	Census tract 2010 ID
Wayne County	26163579800
Wayne County	26163580700
Wayne County	26163582000
Wayne County	26163583100
Wayne County	26163583200
Wayne County	26163583900
Wayne County	26163584300
Wayne County	26163584400
Wayne County	26163584500
Wayne County	26163584600
Wayne County	26163584800

County Name	Census tract 2010 ID
Wayne County	26163585500
Wayne County	26163585900
Wayne County	26163586200
Wayne County	26163588100
Wayne County	26163591501
Wexford County	26165380100
Wexford County	26165380200
Wexford County	26165380300
Wexford County	26165380600
Wexford County	26165380700
Wexford County	26165380800