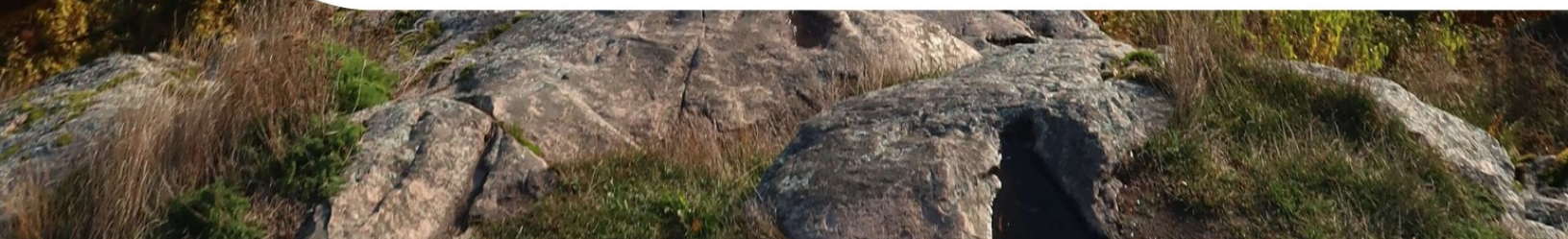
Marquette County Climate Action Plan

By 2050, Marquette County will lead by example in achieving carbon-neutral operations and building resilient infrastructure capable of withstanding the impacts of climate change.

Our community will foster a thriving, diverse economy that prioritizes the health of our land, water, and air, ensuring a vibrant and equitable quality of life for all residents and visitors.



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Thank You

Thank you to everyone who has provided insight and feedback throughout this process including but not limited to Dialogue Dinners attendees, community survey participants, employee Lunch and Learn attendees, Employee survey participants, the Climate Action Plan Subcommittee, the Marquette County Planning Commission, Marquette County Climate Adaptation Task Force, Marquette County staff, and many others.

Usability of the Plan

This plan is a living document and best read digitally. The blue text links out to further resources or to different areas within this document.

Land Acknowledgement

Marquette County lies on the ancestral land of the Anishinaabe Three Fires Confederacy of the Ojibway, Odawa, and Potawatomi. Indigenous peoples have lived in Marquette County dating back to 8,500-7,000 BCE. The land of Marquette County was ceded to the United States as a result of the Treaty of Washington in 1836 and the Treaty of La Pointe in 1842. A land acknowledgement is recognition of the historical injustices committed against Indigenous peoples by the federal government. By recognizing this history, we can begin working towards a common future of vibrancy and vitality. More information can be found at the NMU Center for Native American Studies, Great Lakes Indian Fish & Wildlife Commission, and Keweenaw Bay Indian Community websites.

Ceded Territories and Member Tribes. Great Lakes Indian Fish and Wildlife Commission

Executive Summary

Human greenhouse gas emissions are changing the planet and they are changing Marquette County. The County Board of Commissioners publicly acknowledged this in March 2023, by passing a resolution titled, "Supporting Measures to Respond to a Changing Climate." The average annual temperature in the City of Marquette has increased 2.1°F from 1951-2024 with the whole County facing similar warming. The year 2024 was the warmest year on record for the Weather Forecast Office in Negaunee Township and was 5.3°F warmer than the 20th century average temperature in the County. Lake Superior summer average water temperature is estimated to have increased 6.3°F in the last 100 years, and Lake Superior ice coverage has declined 79% since 1973.

These are not just abstract environmental concerns. Recent years have seen the cancellation of significant economic and cultural events in the region including the UP200, Midnight Run, Jack Pine 30, and the Noquemanon Ski Marathon. Other impacts include reduced opportunities for skiing and snowmobiling, algal blooms for the first time ever in Lake Superior, E. coli beach closures, increasing vector borne diseases from ticks and mosquitos, longer allergy seasons, and increasing threats to the state's $11.2 billion hunting and fishing industries.

In spite of all these changes, Marquette County is considered a climate haven, meaning it's going to be better off than most of the US. As a result of this climate haven status, Marquette County is projected to receive an increasing number of climate migrants through the 21st century. These new residents will tend to be wealthier than average, potentially exacerbating key community concerns such as rising housing costs, shoreline development, and declining small town charm.

The impacts of climate change will not be evenly distributed but will fall heaviest on vulnerable residents. Health risks, such as wildfire smoke, vector diseases, and heat will be worse for older adults, younger children, and those with pre-existing conditions. Extreme event risks are commonly addressed by moving to less vulnerable areas and adapting your home for climate change, both costly solutions. Climate change is projected to increase the cost of living, for example by increasing food prices and driving up home insurance premiums. Price increases to necessary goods and services will fall hardest on economically vulnerable populations.

This Climate Action Plan outlines goals and strategies for the Marquette County community and for Marquette County operations.

Community goals include:

1. Protecting water resources and shorelines
2. Protecting the health of residents in the face of a changing climate
3. Preparing for extreme events
4. Reducing energy emissions and costs
5. Reducing vehicle emissions
6. Increasing solid waste recycling rates

The Marquette County operations goal is to reach net zero emissions by 2050 and is supported in this plan by sub-goals that include:

1. Tracking County emissions
2. Reducing County electricity emissions
3. Reducing County building emissions and energy costs
4. Beginning to electrify the County vehicle fleet
5. Meeting the state's recycling goals

Addressing these problems is a tall task. But, this plan is just the most recent chapter in the lengthy book of Marquette County community climate action.

Introduction

Welcome to the Marquette County Climate Action Plan. The purpose of this plan is to serve as a strategic roadmap to reduce greenhouse gas emissions and adapt to climate change in Marquette County. Marquette County established a goal of eliminating greenhouse gas emissions from County operations by 2050 with the March 2023 County Board resolution titled, "Supporting Measures to Respond to a Changing Climate." This plan is aligned with an objective (reduce the County's carbon footprint) and measures (pass a climate resolution, and develop benchmark measurements to monitor reduction of the County's carbon footprint) from the Safe and Healthy Community Strategic Priority in the Marquette County Strategic Plan 2023-2028. The County's goal is in alignment with the State of Michigan's MI Healthy Climate Plan mission of making Michigan carbon-neutral by 2050.

Following introduction and background information, the Marquette County Climate Action Plan has two sections. Part One focuses on the broader Marquette County community and continues the work of the previous 2013 Climate Adaptation Plan and the 2019 Marquette Area Climate and Health Adaptation Guidebooks. Part Two focuses specifically on Marquette County facilities and operations, and highlights priorities from baseline reports completed by Johnson Controls Inc. in 2024 and a 10-year facility assessment completed by Northern Design Works in early 2025.

Background

Marquette County has transparently worked on climate action for over a decade. The Marquette County Master Plan, an overarching public policy document that serves as a common vision of the County, includes background information and goals on the climate and environment in Marquette County. This process and the resulting document are statutorily required and completed pursuant to the Michigan Planning Enabling Act. The important role of climate and the environment in such a general plan highlights the interest and value that the people of the County place on this topic. In fact, the first goal listed in the Master Plan reads "A community resilient to climate change through mitigation, adaptation and coordinated public policy."

The County 2020 Hazard Mitigation Plan is a more specific climate-related planning process. Many hazards, such as extreme weather, flooding, wildfires, and infrastructure impacts, are worsened by climate change making this process overlap with climate adaptation

for Marquette County. The County Hazard Mitigation Plan is required for the County or local units of government to receive Federal Emergency Management Agency (FEMA) funding for specific projects. The County will be updating its Hazard Mitigation Plan later this year.

Finally, the principal climate action by the County was the passing of the "Resolution Supporting Measures to Respond to a Changing Climate." This resolution set the charge to create this Climate Action Plan, committed the County to an effort to eliminate greenhouse gas emissions by 2050, updated the ranking criteria for Capital Improvement Projects with a resiliency focus, and, for the first time, quantified greenhouse gas emissions from County operations.

The wider Marquette area has a rich history of climate action that has laid the groundwork for this plan. In 2013, the County was a founding member of the Marquette County Adaptation Task Force (CATF), which has spearheaded local climate collaboration for over a decade. CATF's mission is to help prepare local leaders and Marquette County stakeholders to develop mitigation and adaptation strategies that will make the Upper Peninsula more resilient and effective when dealing with the consequences of climate change and extreme weather events. The group has brought together Northern Michigan University, Marquette County, multiple local municipalities, The Community Foundation of Marquette County, Superior Watershed Partnership, and many other local organizations. Throughout 2024, CATF hosted the 2049 Learning Circle Series that brought the community together to envision the next 25 years in Marquette County in terms of food systems; trash & recycling; healthcare, housing, transportation & public services; economic development & diversification; energy & power; and water & land use, all with climate adaptation and justice and equity in the forefront.

There have been previous climate plans produced for the Marquette area. In 2012-2013, the Superior Watershed Partnership (SWP) worked with the Model Forest Policy Program to produce a Climate Adaptation Plan for Marquette County, Michigan. This plan provided background information and proposed detailed actions for identified issue areas of land use, water resources, forest health, public health, food security, and tourism.

In 2018-2019, the Marquette Area Climate and Health Adaptation Guidebook series was published. The guidebooks were created by the Michigan Climate and Health Adaptation Program of the Michigan Department of Health and Human Services, Michigan State University (MSU) Extension, and the Marquette County Health Department, with CATF serving as the project steering committee. The guidebooks followed the Center for Disease Control's Building Resilience Against Climate Effects framework. The themes focused on in these reports were vector awareness, air quality, emergency response/extreme events, and water related issues. The three volumes developed in this series are: (1) Stakeholder Engagement and Visual Design Imaging, (2) Policy and Metric Recommendations, and (3) Prioritizing and Implementing Recommendations.

Both of these reports, as indicated by their name, were climate adaptation plans. Climate adaptation is an action taken to prepare for or adjust for climate change. Climate mitigation is an action to reduce climate change, usually an effort to reduce greenhouse gas emissions. This Climate Action Plan encompasses both mitigation and adaptation actions, making it a step beyond the scope of previous climate plans for the area.

Within the County, the City of Marquette has done extensive climate work. In 2013, the City partnered with SWP on a grant that resulted in the creation by MSU Extension of the report, "Adapting to Climate Change and Variability Marquette, Michigan." In 2019, the City adopted a Land Development Code, which was funded by the Michigan Association of Planning's Coastal Resilience Initiative. In September 2024, the City revised its Community Master Plan which included a Climate Action Plan framework, and a Resiliency Assessment.

To support the effort of developing this Climate Action Plan, the County has brought on members of the MI Healthy Climate Corps. The duration of this report has overlapped with the service of two MI Healthy Climate Corps members hosted by the County Planning Department. These members have served as the organizers of community events, drafters of this plan, and worked to connect the County with State of Michigan resources, under oversight of the Senior Planner.

Marquette County participated in the 2022, 2023, and 2024 Sustainability Benchmarking Challenge organized by Michigan Green Communities, which is a statewide network of local and state officials collaborating on sustainability and climate change solutions. Marquette County was certified as Silver for 2023 and achieved gold certification in 2024.

Government Climate Action

This section will outline climate action and legislation at the state, federal, and international levels. It is meant to provide background information.

International Climate Action

The Intergovernmental Panel on Climate Change (IPCC) is a leader in the science of climate change and publishes comprehensive Assessment Reports summarizing current knowledge on climate change. The reports began in 1990 with the sixth finished in 2023. International climate action began with the United Nations Framework Convention on Climate Change in 1992, which created yearly meetings and a framework for international climate negotiations. The most extensive agreement to date from these negotiations is the Paris Agreement from 2015, which includes a goal of limiting global surface temperature rise to below 2º C, and requires each country to independently set and report progress on emissions targets.

In January 2025, the United States submitted a withdrawal notification from the Paris Agreement.

Federal Government Climate Action

Inflation Reduction Act (IRA)

The IRA, passed in 2022, appropriated more than $142 billion to fund climate change mitigation and adaptation in the form of federal loans, loan guarantees, grants, awards, and direct spending by agencies. In addition, the IRA created and expanded tax credits for projects such as renewable energy, electric vehicles (EVs), EV chargers, and energy efficiency. These tax credits were not capped and have projected totals of $780 billion to $1.2 trillion over 10 years. Michigan has been a national leader in implementing projects with IRA funds and has been the #1 state in bringing in new projects, totaling $27.84 billion and +26,000 new jobs.

The tax credits can be either investment tax credits (covering specific % of a project) or production tax credits (paying per unit of energy produced). The base credits start at 30% of cost for the investment credit and $0.0275/kWh for the production credit. Additionally, there are bonus credits available for being an energy community (all of Marquette County is an energy community), being a low-income community, meeting domestic content minimums, or a qualified low-income residential building. There is also a clean vehicle credit providing up to $4,000 for a used EV, or up to $7,500 for a new EV.

The IRA also introduced a new way to monetize tax credits called direct pay, which allows non-taxable entities to be directly paid the amount of their tax credits. This mechanism is aimed at state, local, and tribal governments that are usually not able to utilize tax incentives.

IRA Credits under the Trump Administration

President Trump has expressed a desire to cut IRA spending, raising questions about whether or for how long these funds will continue, and the risk associated with designing a project dependent on them. Based on analysis from December 2024, rescinding the IRA tax credits would require an act of Congress and not an executive action. Second, when changes are made to the tax code, they typically do not take effect until the following year, which would mean there would be no changes until at least 2026. For this reason, projects implemented in 2025 will likely receive funding.

One of President Trump's first week Executive Orders titled, "Unleashing American Energy," stated that "All agencies shall immediately pause the disbursement of funds appropriated through the Inflation Reduction Act of 2022." It is believed that this refers to the $142 billion appropriated in the form of federal loans, loan guarantees, grants, awards, and other direct spending, and not tax credits. For now, it is probably best to observe how the executive order is operationalized and what progress Congress makes on passing legislation regarding the tax credits.

Infrastructure and Jobs Act (IIJA)

Another major piece of climate legislation was the Infrastructure and Jobs Act (IIJA), also known as the Bipartisan Infrastructure Act. The IIJA invested $550 billion into new spending and $650 billion into existing programs with many opportunities to direct that funding into adaptation and resilience of infrastructure, including addressing extreme weather, flooding, storms, droughts, heat waves, and wildfires. Some areas of focus include rebuilding roads and bridges, investing in public transit, upgrading ports and airports, investing in passenger rail, national network of EV chargers, and updating power infrastructure.

State of Michigan Climate Action

MI Healthy Climate Plan

The MI Healthy Climate Plan, created by an Executive Directive of Governor Gretchen Whitmer in September 2020, is the State of Michigan's plan to reduce greenhouse gas emissions and to eventually reach economy-wide carbon neutrality by 2050. The plan was released in April 2022. The shorter term sub-goals in the state plan include:

- Reduce GHG emissions 28% below 2005 levels by 2025 and 52% by 2030
- Ensure that at least 40% of state funding for climate and water infrastructure initiatives benefit Michigan's disadvantaged communities
- Generate 60% of the state's electricity from renewable resources and phase out remaining coal-fired power plants by 2030
- Build infrastructure to support 2 million EVs by 2030
- Reduce emissions related to heating Michigan homes and businesses by 17% by 2030
- Triple Michigan's recycling rate to 45% and cut food waste in half by 2030
- Protect, conserve, and restore 30% of Michigan's land and water by 2030

UP Energy Task Force

The UP Energy Task Force was established in 2019 by Governor Whitmer with the goal of assessing the UP's overall energy needs and how they are currently being met. The Task Force was also charged with outlining alternative solutions for meeting the UP's unique energy needs, and identifying and evaluating potential changes that could occur to UP energy. The outcome was 16 key recommendations.

Part 1 focused on propane supply. About 18% of UP homes use propane for heat (12.8% in Marquette County) with UP commercial storage equal to about 6% of annual use. Report recommendations can be summarized as improving storage capacity, improving supply infrastructure, identifying warning signs for supply issues, improving assistance programs, and exploring fuel price gouging legislation.

Part 2 focused on energy supply. Report recommendations included coordinating electricity planning at the regional level, expanding energy waste reduction, supporting renewable energy development, expanding EV charging infrastructure, examining cost drivers and cost allocation for UP utilities, researching rate setting, providing technical assistance resources from EGLE, and leaning into economic development opportunities linked with energy.

2023 Energy Legislation

In November 2023, the State of Michigan passed a series of Public Acts working to deliver the clean energy goals outlined in the MI Healthy Climate Plan. Collectively, these Acts are referred to as the 2023 Energy Legislation and are outlined in more detail below.

Public Act 229

Public Act 229 increases the Energy Waste Reduction (EWR) standard for electric and natural gas providers. For electric providers, the annual waste reduction increased from 1% to 1.5% with a further goal of 2%. For natural gas providers, the standard increased from 0.75% to 0.85%. These standards indicate the annual energy savings required as a percent of their total retail sales from the previous year. Also, "fuel switching," or the changing of a customer's home heating source to a lower emitting fuel (including electrification), is now allowed in EWR programs.

Public Act 231

Public Act 231 updates the requirements for utility Integrated Resource Plans (IRP), which outlines how the utility will meet the energy and capacity resource needs of its customers. The new issues that the IRP must address include affordability, cost effectiveness, labor standards, and the promotion of environmental quality and public health. Public Act 231 also opens a proceeding to examine expanding how the public engages with the Michigan Public Service Commission's decision-making process and to investigate if there are ways to improve the process through which the Michigan Public Service Commission considers rate case applications, which is the way that utilities set their rates.

Public Act 233

Public Act 233 is a renewable energy siting law that allows the state to approve utility scale renewable energy developments over local objections. The act does not involve eminent domain, as developers can only develop projects with accepting landowners. In addition, the law sets uniform state standards for renewable energy projects. These standards include requirements such as solar setbacks, fencing, solar panel height, noise limits, and wind tower shadow limits. If a project meets these state standards, but is rejected by local governments, the developers may appeal to the Michigan Public Service Commission. This mechanism applies to solar projects of at least 50 megawatts (or about 350 acres) and wind farms of at least 100 megawatts (or about 35 turbines). To go through the state permitting process, the developer must pay municipalities $75,000 to be used to cover the cost of the regulatory preceding and $2,000/MW of nameplate capacity to be used for police, fire, public safety, and other infrastructure projects. If a local government proceeds with local siting, then there is a Renewables Ready Communities Award available for up to $5,000/MW. A UP example of locally siting a renewable energy project and receiving a Renewable Ready Communities Award is the Groveland Mine Solar project in Dickinson County. This project was awarded $500,000 to be distributed to Felch, Norway, and Sagola Townships.

Public Act 235

Public Act 235 establishes a Renewable Energy Standard of 50% by 2030 and 60% by 2035. Renewable energy is defined as wind, solar, existing hydro, existing biomass (which do not use tire derived fuel), and methane digesters with specific feedstocks. Renewable Energy Plans that forecast how utilities will meet this standard are required to be filed by February 27, 2025.

Public Act 235 also establishes a Clean Energy Standard of 80% by 2035 and 100% by 2040. Clean energy is defined as a system that does not emit greenhouse gas and, in addition to renewable energy, includes nuclear and >90% carbon capture natural gas generation. Utilities must file proposed Clean Energy Plans by Jan 1, 2028.

Additionally, there is a statewide energy storage target of 2,500 MW with annual storage plans beginning to be filed in 2024. There were updates to the Distributed Generation and Interconnection programs required for utilities. The Distributed Generation program cap was increased from 1% to 10% of a utility's peak load with at least 50% of the cap reserved for systems with under 20 kW and the other 50% for systems between 20 kW and 550 kW.

House Bill 4007, introduced in January 2025, seeks to amend Public Act 235 and allow the natural gas units installed in the UP to replace and retire coal-fired generation to meet the definition of clean energy until the end of their useful life in 2050. This bill would greatly change the measures needed by Marquette Board of Light and Power and the Upper Michigan Energy Resources Corporation to meet the clean energy standard. The bill was unanimously supported by the Marquette City Commission.

2024 Upper Peninsula Energy Report

The 2024 Upper Peninsula Energy Report was commissioned as a part of Public Act 235. The goal of the report was to examine the unique conditions impacting electric generation, transmission, and electricity demand in the UP as it works to achieve the renewable and clean energy standards of Public Act 235. The report was to focus on the unique circumstances of the current natural gas Reciprocating Internal Combustion Engine (RICE) units operated by the Upper Michigan Energy Resources Corporation (UMERC), which were built to allow the retirement of the Presque Isle Power Plant and also the RICE units operated by Marquette Board of Light and Power (MBLP) to retire the Shiras Power Plant. Following these retirements, CO2 emissions from the UP electricity sector have fallen by 71% from 2013 to 2022. The progress on electricity emissions reduction in the UP has far outpaced the Lower Peninsula, as the UP has fully retired its coal power plants and possesses several hydroelectric facilities.

Later this year, the regional transmission organization covering the UP, the Midcontinent Independent System Operator (MISO), will be releasing a study examining electricity transmission and reliability in the UP under the new renewable energy portfolio standards in Public Act 235. The UP transmission is primarily connected with the larger grid through Wisconsin and is typically grouped with eastern Wisconsin for planning purposes.

The recommendations from the report include further investigation of more Energy Waste Reductions than required under Public Act 229. The Legislature or the Michigan Public Service Commission should provide more clarity on the definition of clean energy, specifically addressing tire-derived fuels, renewable natural gas, and direct air capture technologies. The

Legislature should consider the concept of “functional equivalence” or, in recognition that the goal is economy-wide carbon reduction, accelerated reductions in sectors other than power generation could be considered as a power generation reduction for the purpose of meeting the standards from Public Act 235. The Legislature should consider expanding joint clean energy planning to include all electric providers serving under 1,000,000 customers, which would allow for UP-wide solutions.

Materials Management Legislation

In December of 2022, the State of Michigan amended Part 115, Solid Waste Management, of the Natural Resources and Environmental Protection Act, and called for new Materials Management Plans (MMPs) to replace the current Solid Waste Management Plans. MMPs will have more focus on recycling and composting compared to the Solid Waste plans, and work toward achieving the state’s goal of a 45% municipal solid waste recycling rate, with an interim step of a 30% municipal solid waste recycling rate by 2029. These plans are required to be completed and approved by June 27, 2027. The current recycling rate for Marquette County is about 11%. In 2024 Marquette County accepted the role as the County Approval Agency, designated CUPPAD as their Designated Planning agency, and appointed six members to the Materials Management Planning Committee, which will be advising the plan development.

Tribes as Climate Leaders

In addition to climate action at the state and federal level, there have been regional efforts to mitigate and adapt to climate change by tribal nations. The Keweenaw Bay Indian Community has focused on planning for climate change in their Strategic Plan and has hired staff in their Natural Resources Department to develop a climate change action plan. They have also passed a resolution for green purchasing and formed a Committee for Alternative and Renewable Energy (CARE) to investigate local renewable energy. The Sault Ste. Marie Tribe of Chippewa Indians was one of 16 cities or other communities named by President Obama at the 2014 White House Tribal Nations Conference as a Climate Action Champion. The Great Lakes Indian Fish and Wildlife Commission (GLIFWC) performed a Climate Change Vulnerability Assessment examining the risks to plants and animals that are essential to tribal peoples’ way of life and is using this information to prioritize next steps. Other work by the GLIFWC includes a study of walleye populations in a changing climate, a study of the impact of climate change on plant phenology (timing of life cycles), a study of lake trout in a warming Lake Superior, establishing a seed bank, and a dietary study of Lake Superior fish.

Regional Climate Trends

Climate change refers to long-term shifts in both temperature and weather patterns. The main cause of this global climate change is human activities that release greenhouse gases or gases that trap heat in the Earth's atmosphere. Globally, the surface temperature from 2011-2020 was 1.1°C (1.98°F) above the surface temperature from 1850-1900. This section will outline some of these changes that are occurring at the local level and describe the potential impacts driven by climate change.

Top 10 Warmest Years at WFO Marquette in Negaunee Township

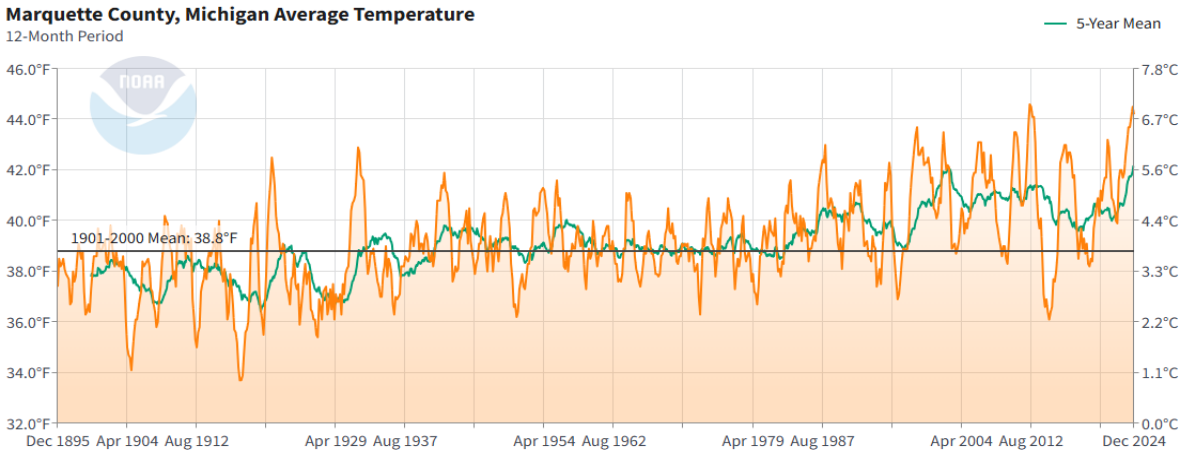
Period of record: 1959–present

Rank	Year	Mean Avg Temperature
1	2024	44.1
2	2012	43.8
3	1998	43.4
4	2010	43.1
5	2021	43.0
6	1987	42.9
7	2023	42.8
8	2006	42.4
-	2001	42.4
10	2016	42.1

Top 10 Warmest Years at WFO Marquette in Negaunee Township, 1959-2024. National Weather Service

Temperature

The average temperature in Marquette County has been increasing over the previous decades. The general trend has been an increase of about 0.4°F/decade since the 1970s. The warming has been concentrated in the winter and has primarily been driven by an increase in minimum temperatures. Across Marquette County there can be large variations in temperature, with lakeshore areas staying 3-4°F warmer compared with locations a few miles inland during the winter and experiencing cooler temperatures during the summer. The warming trend has culminated with 2024 being the warmest year on record for the Marquette Weather Forecast Office in Negaunee Township, with an average temperature of 44.1°F (6.7°C). This warmest year ever was driven by temperatures decreasing less overnight, with 23 daily record warm low temperatures in 2024.



Marquette County, Michigan Average Temperature, 12-month period, 1895-2024. National Centers for Environmental Information, a part of National Oceanic and Atmospheric Administration (NOAA)

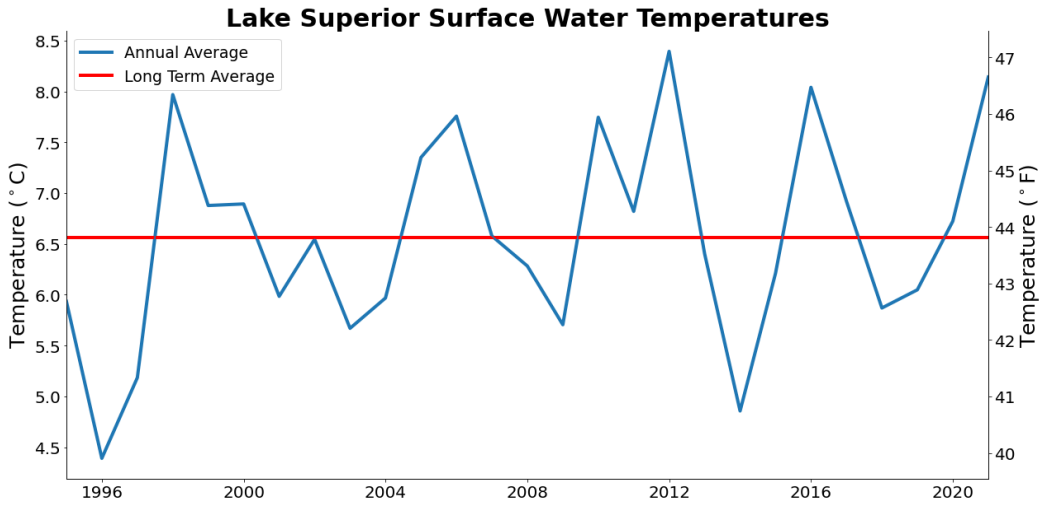
CHANGES IN AVERAGE TEMPERATURE, 1951-2024.

	°F
Annual average temperature	2.1
Winter average temperature	3.2
Spring average temperature	0.4
Summer average temperature	1.0
Fall average temperature	2.7

Changes in average temperature for the City of Marquette. Great Lakes Integrated Sciences and Assessments (GLISA), a collaboration between the University of Michigan and Michigan State University supported by NOAA.

Lake Superior Water Temperature

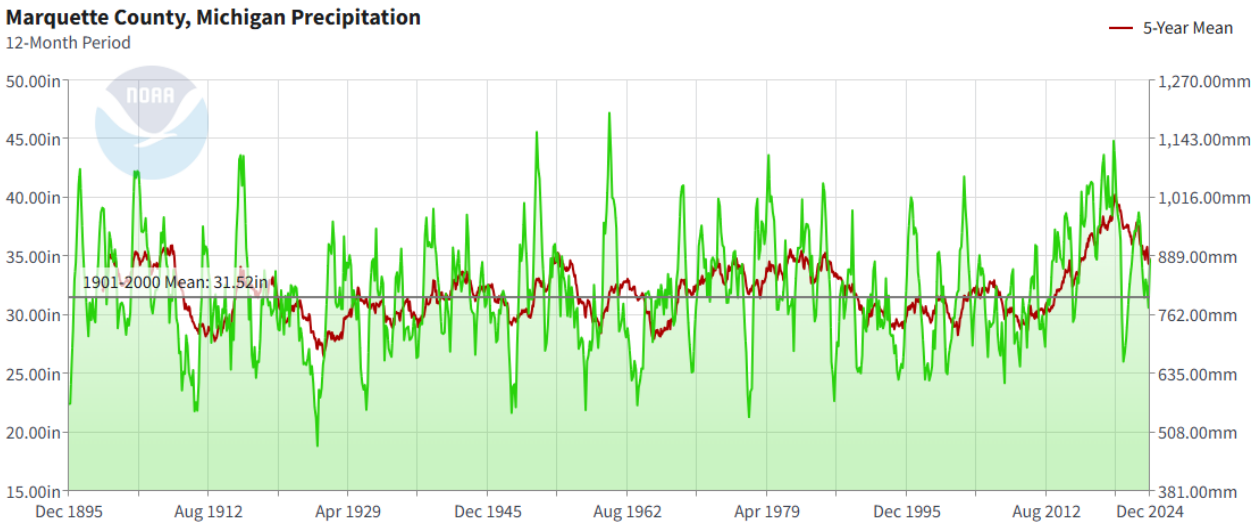
Publically available Lake Superior temperature data only goes back to 1995 and is displayed in the figure below. An analysis using water temperatures taken downstream from Lake Superior as a proxy found that summer water temperatures had increased by 6.3°F (3.5°C) from 1906 to 2006. Another study found that summer water temperatures had increased by 4.5°F (2.5°C) from 1982 to 2012. And a 2015 study found that Lake Superior was warming up 3 times faster than the global average.



Lake Superior Water Temperatures, 1996-2022. GLISA

Precipitation

There has been a slight increase in precipitation in Marquette County but no change for the City of Marquette. When the Marquette County Master Plan was completed in 2021, GLISA had found a slight decrease in precipitation in Marquette County.



Marquette County, Michigan Precipitation, 12-month period, 1895-2024. National Centers for Environmental Information

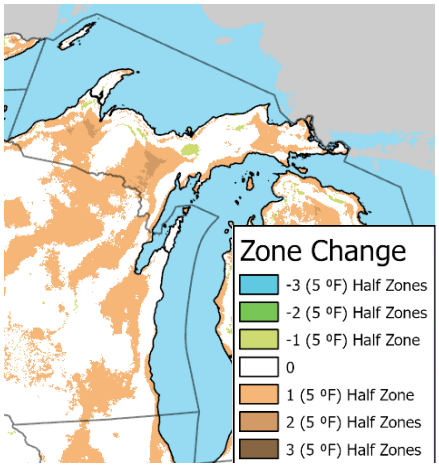
CHANGES IN AVERAGE PRECIPITATION, 1951-2024.

	in.	%
Annual total precipitation	0.0	0.00
Winter total precipitation	0.1	1.30
Spring total precipitation	-0.3	-4.10
Summer total precipitation	-0.4	-4.20
Fall total precipitation	0.5	5.00

Changes in average precipitation for the City of Marquette. 1951-2024. GLISA

USDA Plant Hardiness Map Changes

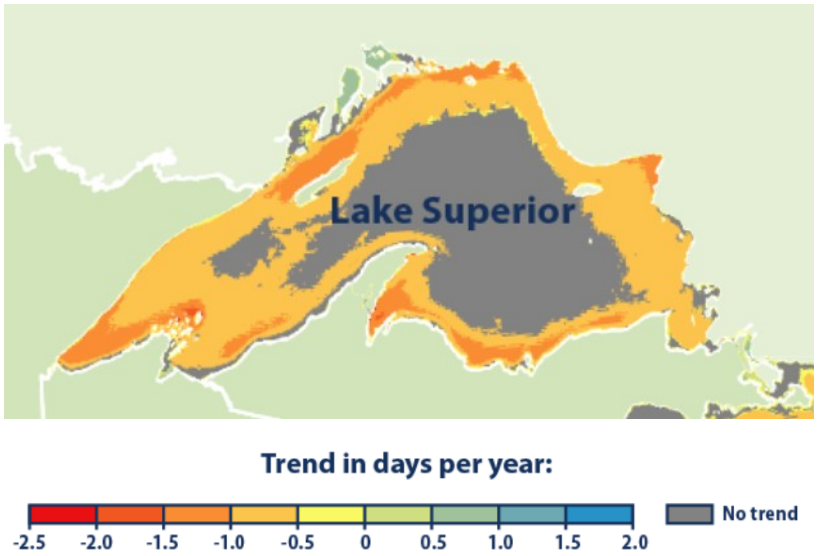
The US Department of Agriculture Plant Hardiness Map is a resource used by gardeners to determine the locations that perennial plants will thrive. The map is determined by the average annual extreme minimum winter temperature with increments of 10-degree zones and 5-degree half zones. The most recent maps are from 2012 and 2023. The map below shows the change in zones between those maps. The light brown color means the area is one half zone warmer. The medium brown color means the area is two half zones (1 full zone) warmer. The light green means the zone is one half zone colder. A significant area in Marquette County has moved into a warmer zone in the newer map.



USDA Plant Hardiness Zone Change: 2012 to 2023. US Department of Agriculture

Lake Superior Ice Cover

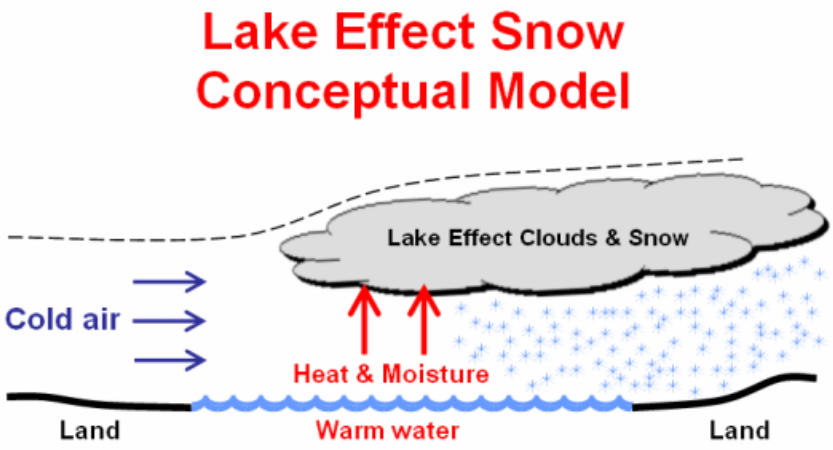
One of the ways that climate change is impacting Lake Superior during the winter is changing the amount of ice. It is challenging to get a long term trend for maximum ice coverage due to the extreme year-to-year variation. But, Lake Superior is the only Great Lake with a statistically significant decline in maximum ice coverage since 1973. The duration of ice cover days, defined as a day with at least 5% ice cover, has also decreased. This duration decrease has been concentrated near the shore.



Change in Ice Cover Duration Lake Superior 1973-2019. EPA

Can Climate Change Cause More Snowfall?

Lake effect snow is formed as cold air moves across warmer, lake water. Water evaporates into the lower atmosphere and, because it is warmer, rises to form clouds. The clouds cool and deposit the water as snow on nearby land. Ice coverage on the lakes can limit the amount of water that evaporates and falls as lake effect snow, but warming temperatures in the region are decreasing ice cover and can potentially provide more uncovered lake water leading to more lake effect snow.



Lake Effect Snow Conceptual Model. National Weather Service

The Economic Case for Climate Action

The question of "Why take action on climate change?" is often answered with the health or environmental benefits, but climate change initiatives can bring economic benefits as well. A report from the US Chamber of Commerce found that every $1 invested in resilience and disaster preparedness saved $13 in economic costs, damages, and cleanup. While Marquette County is not particularly prone to some of the largest natural disasters faced in the US, it is rated by climate risk firm First Street, as facing a moderate risk from both flooding and wildfire. Additionally, there have been recent storms that caused significant damage, in particular the October 2017 storm and lakeshore flooding event that cost the City of Marquette $110,000 to clean up. Another way that climate change can directly impact local governments' budgets is municipal bond ratings, which are beginning to incorporate climate change risk and preparedness, meaning that worse prepared municipalities can face increases in interest rates.

With winter seeing the greatest impact due to climate change, there have been knock-on effects to the winter tourism economy. The previous two years have seen the UP 200 sled dog race cancelled due to a lack of snow. Losing events like this is a significant economic loss as the UP200, Midnight Run, and Jack Pine 30 sled dog races generate $2 million in economic activity in Marquette County each winter. In addition, warmer winters harm the skiing industry through a shortened season and increased cost of making snow, which together have cost the US ski industry $5 billion over the last 2 decades. And just last winter, a coalition of 43 businesses in the western UP stated they had lost $3.1 million due to the warm temperatures in December 2023.

There have also been impacts of climate change on summer tourism. E coli bacteria, from sewer water, can cause beach shutdowns. These bacteria concentrations can increase due to runoff from large precipitation events and thrive more in warmer weather. Beach closure due to E. coli has been an issue in the County with Tourist Park beach closing last summer and Marquette South Beach in 2022.

One cost-effective strategy for fighting climate change is energy efficiency, or the practice of getting more energy services for less energy and therefore less emissions and money. Nationally, 10-20% of American energy spending is wasted on air leaks, drafts, and outdated heating and cooling systems. Paying to fix these inefficiencies can save more money than it costs to repair. At the utility level, the Michigan Public Service Commission found that every $1 spent on energy waste reduction saved customers almost $3. These savings can be especially important for people who are energy burdened, with potential electricity savings for low-income Michigan residents of 25-29%.

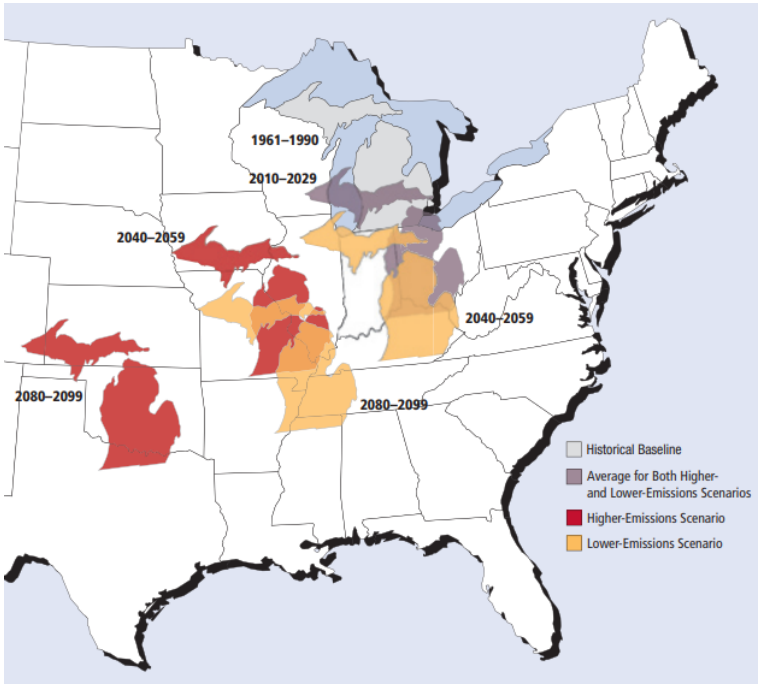
Impacts and Future Projections

As the climate continues to change, these trends will contribute to many other direct impacts on people. Some impacts that will continue to get worse include:

- Increased risk of wildfire
- Increase in the number and severity of extreme weather and flooding
- Longer seasonal allergy season
- Increase in extreme weather events
- Increases in ticks and the prevalence of Lyme Disease

- Decrease in snow depth
- Increase in harmful algal blooms in Lake Superior
- Increase in damage from forest pests and diseases
- Shifting ranges for native animals and trees

Projections have been made that attempt to determine the trend of climate change impacts into the future. City of Marquette temperatures are projected to increase by 3.5-6° F through the mid-century. The total precipitation is projected to increase overall but the magnitude is uncertain. Summer precipitation is expected to remain stable or decline.



State of Michigan Summer Heat Index Projections Under Different Emissions Scenarios. Union of Concerned Scientists

Climate Migrants

Nationally, as these impacts continue to get worse they will cause people to move away from the most affected areas. A recent paper estimates that between 2000-2020 approximately 3.2 million Americans moved to escape flooding. A primary destination of the people moving due to impacts will be climate havens, or areas that are projected to be less impacted by climate change. Most of these climate havens are located in the Upper Midwest and Northeast. Since 2022, Marquette has been drawing people from Phoenix, Chicago, Detroit, and Grand Rapids areas. This migration would exacerbate struggles with affordable housing as Marquette County has already seen a 47% increase in home sale prices since 2020. Construction costs have increased and are now twice the state average, making building new homes very expensive. From 2020 to 2023, the State of Michigan had a population decline of 0.4% while Marquette County had a population increase of 1.5%.

Community Engagement

Community Survey

An important part of developing a Climate Action Plan is getting public feedback on how climate change impacts their lives and their vision for the community. To gather feedback, the County has been running an online survey that asked a few basic questions about vehicles, recycling, and other sustainable habits. The survey then asked for general feedback. The survey received 451 responses and here are some of the results. Of respondents:

- 83% drive personal vehicles to commute
- 2% vehicles are electric
- 11% vehicles are hybrids
- 84% frequently recycle
- 53% compost
- 74% utilize LED light bulbs at home
- 78% have an energy efficient appliance
- 45% were familiar with the Marquette County Climate Resolution

Word cloud of the general comments received. Climate Community Survey.

Dialogue Dinners

The County also organized Dialogue Dinners to provide a space to directly discuss the plan and climate change impacts with the community. An event was held in each of the Planning Regions of Marquette County, as identified in the Master Plan (Blueberry Farms, Borealis Beach, Iron Core, and Moose Hills). The event began with a short presentation on the Climate Action Plan and local climate trends. Next, each table was given a set of questions to discuss: 1) With justice, equity, and climate in mind, what is your ideal vision for our country over the next 10 to 25 years? 2) In terms of climate change impacts, what community needs should be considered as we work toward an ideal vision for the future? and 3) What can we do today to ensure we meet our ideal vision for the future? Participants were also given a selection of potential topics of focus for the Climate Action Plan, and asked to highlight the ones most important to them. The total attendance across the four Dialogue Dinners was 110 people.

Borealis Beach Dialogue Dinner Attendees.

Top Five Most Important Topics for the Climate Action Plan are:

1. Housing Options
2. Ecological Health
3. Communication/Education
4. Transportation
5. Water Quality/Water Management

A couple of themes emerged from the wide-ranging discussions at the Dialogue Dinners. The community places a strong emphasis on environmental stewardship, and the continued protection and growth of green spaces. Natural areas draw and keep people in Marquette County and should be a focus of climate action planning. The community recognizes the importance of local energy and food systems, which enhance the local area's ability to provide for itself, and reduce reliance on fossil fuels. There is also a need for more accessible housing to accommodate residents. This redevelopment and new development should be balanced with consideration of our forests and shorelines.

Meetings with Community Stakeholders

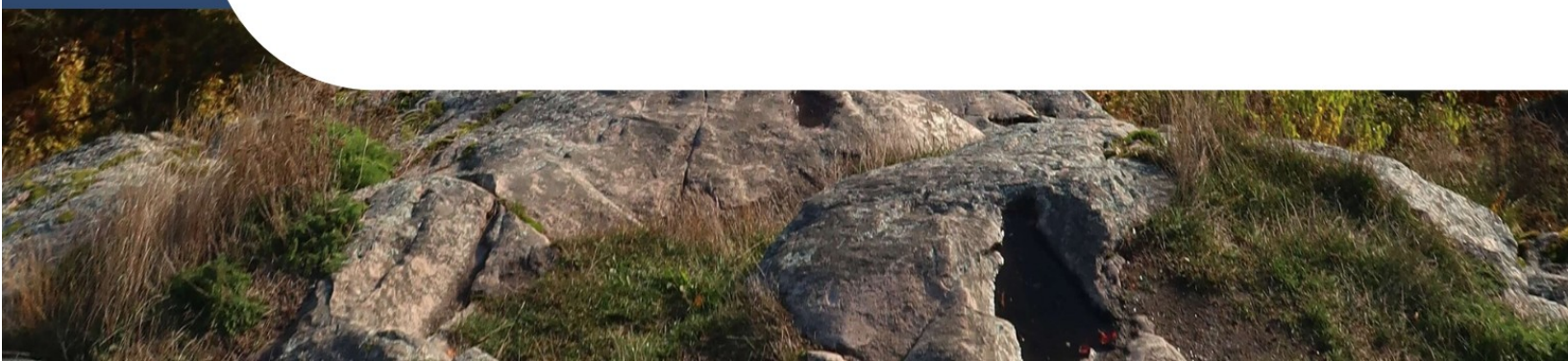
During the Climate Action Plan process, the County has held meetings with community stakeholders to gather feedback on Marquette County environmental programs generally and on the Climate Action Plan. The full list of stakeholder meetings can be found in the Appendix.

2049 Discussions

The 2049 Learning Circle discussions facilitated by CATF have provided valuable feedback for the Climate Action Planning process. The Learning Circles provided an opportunity to bring together community members, share resources, and connect organizations. The areas of discussion included: Food Systems; Trash & Recycling; Healthcare, Housing, Transportation & Public Services; Economic Development & Diversification; Energy & Power; and Water & Land Use. Summaries of the Marquette 2049 Learning Circles can be found here. The takeaways from these discussions will be used to inform internal and public presentations, and guide future projects by CATF.

Marquette County Climate Action Plan

Part 1: Marquette County Community



Part 1: Marquette County Community

Part 1 of Climate Action Plan goals and strategies will cover the Marquette County community and focuses on interactions between Marquette County and community organizations, community members, and community municipalities. This section continues some of the adaptation strategies from the previous adaptation plans for Marquette County as well as from the County Master Plan. This CAP also outlines mitigation goals and strategies for the Marquette County community.

Goal and Strategy Format

The section will be guided by overarching goals with multiple strategies supporting them. The section begins with the adaptation goals and strategies and then moves to mitigation goals and strategies. Each strategy will have a short description, a timeline, responsible parties, and resources needed. Short-term means within the next year, medium-term means in the next 2-5 years, and long-term means 5+ years. Further, some are ongoing strategies. Responsible parties list the groups that would be required for the successful implementation of that strategy. CATF serves as a supporting entity for many of these strategies, but, because of its mission, is not itself a responsible stakeholder. Resources needed will detail whether the strategy needs staff time, funding, or both. Strategies requiring funding will be given a rating of $, $$, or $$$ indicating roughly how much funding is needed. $ means an allocation within current budgeting. $$ means a minor grant or financing. $$$ means a large grant or major financing.

Table Summary of Marquette County Community Strategies follows on pages 22-25.

Strategy	**Timeline** Short - Within year Medium - 2-5 years Long - 5+ years	**Responsible Parties**	**Resources Needed** $ - allocation within budget $$ - minor grant or financing $$$ - major grant or financing
1. Coordinate actions to protect water resources and shorelines (Adaptation)			
1.1 Participate in the GLISA Floodwise Communities Program to complete a stormwater vulnerability assessment	Medium-term	Local Units of Government, Marquette County Planning Division, MSU Extension	Staff Time
1.2 Revive Marquette County Water Coalition	Medium-term	Local Units of Government, Marquette County Health Department, Marquette County Planning Division, Marquette County Emergency Management	Staff Time, Funding ($)
1.3 Plan for water utility siting at new housing developments	Ongoing	Marquette County Health Department, Marquette County Planning Division, Local Units of Government, Marquette County Planning Commission, Marquette County Land Bank	Staff Time
1.4 Support actions to protect shoreline infrastructure and advise communities on zoning updates	Ongoing	Superior Watershed Partnership, Marquette County Planning Division, Marquette County Planning Commission, Marquette County Emergency Management, Local Units of Government	Staff Time, Funding ($$$)
2. Work to protect the health of Marquette County residents in the face of a changing climate (Adaptation)			
2.1 Bring together the parties of the 2018-2019 Marquette Area Climate and Health Adaptation Guidebook to check-in on implementation status of	Short-term	Marquette County Planning Division, CATF, MSU Extension, Local Units of Government, Michigan Department of Health and Human Services, Superior Watershed Partnership	Staff Time

the goals and strategies outlined in the plan			
2.2 Vector disease education and awareness	Short-term	Marquette County Health Department, Local Units of Government, Travel Marquette/Respect Marquette, Trail Organizations, Public Schools	Staff Time, Funding ($)
2.3 Install air quality sensors and establish an air quality dashboard webpage for Marquette County	Medium-term	Local Units of Government, Marquette County Health Department, EGLE, Marquette County IT Department	Funding ($), Staff Time
3. Enhance the resiliency of the people, infrastructure, and land of Marquette County to extreme events (Adaptation)			
3.1 Establish an Emergency Response Workforce with Superior Watershed Partnership	Short-term	Marquette County Emergency Management, Superior Watershed Partnership	Funding ($$)
3.2 Update the Community Wildfire Protection Plan	Short-term	Marquette County Planning Division, Marquette County Emergency Management, Local Units of Government, MI DNR	Funding ($$), Staff Time
3.3 Update the Hazard Mitigation Plan	Short-term	Marquette County Emergency Management, Marquette County Planning Division, Local Units of Government	Funding ($$), Staff Time
3.4 Continue to implement fire reduction strategies for County Forest land identified in the 2023 Forest Management Plan	Medium-term	Marquette County Forestry Commission, Marquette County Planning Division, Marquette County Emergency Management, MI DNR	Staff Time, Funding ($$)
3.5 Install renewable energy and	Long-term	Marquette County Emergency Management,	Funding ($$$)

storage at the Marquette County Emergency Operations Center		Marquette County Sheriff's Office (Special Operations)	
4. Reduce Marquette County energy emissions and costs (Mitigation)			
4.1 Municipal education and ordinance review for Public Act 233	Short-term	CATF, MSU Extension, UP Energy Coalition, Utility Companies, Lake Superior Community Partnership	Staff Time
4.2 Use state, county, and non-profit home repair, home rebate, and energy efficiency programs to reduce Marquette County resident home energy costs and GHG emissions	Ongoing	Marquette County Planning Division, Superior Watershed Partnership, Habitat for Humanity, Community Action Alger-Marquette, Marquette County Land Bank, Housing Now, Marquette County Housing Coalition	Funding ($$), Staff Time
4.3 Outreach and communication with local utilities to promote the responsible development of renewable energy in Marquette County	Ongoing	CATF, MSU Extension, Marquette County utilities	Staff Time
5. Improve EV charging infrastructure and reduce vehicle miles per person (Mitigation)			
5.1 Spread awareness of current public EV chargers and track future EV charging needs	Ongoing	Marquette County Planning Division, Travel Marquette, CATF, EGLE, Superior Watershed Partnership	Staff Time
5.2 Install EV chargers at public facilities	Ongoing	Marquette County Planning Division, Local Units of Government, Marquette Sawyer Regional Airport, Travel Marquette, Lake Superior Community Partnership, MDOT, EGLE, Invest UP	Funding ($$$)

5.3 Improve the ease of use for public transport, and invest in service route and operation time expansion	Ongoing	Marq Tran, MDOT, NMU, Lake Superior Community Partnership	Funding ($$$)
5.4 Continue to invest in walkability/bikeability improvements, update zoning codes to encourage walkability, and work to preserve walkability in winter	Long-term	Marquette County Planning Commission, Trail Organizations, Marquette County Road Commission, Local Units of Government, MDOT	Funding ($$$)
6. Reach the State of Michigan's municipal solid waste recycling rate goals in Marquette County (Mitigation)			
6.1 Utilize Recycle 906 to reach the solid waste recycling goals of the State of Michigan and the multi-county Materials Management Plan in development	Ongoing	Solid Waste Management Authority, Recycle906, Materials Management Planning Committee, CUPPAD, Local Units of Government	Staff Time
6.2 Expand the use of composting in Marquette County	Medium-term	Marquette County Planning Division, Partridge Creek Compost, Solid Waste Management Authority, Lake Superior Community Partnership, NMU, Public Schools	Staff Time, Funding ($$)
6.3 Work with higher education and economic development organizations to grow local businesses that create valuable products from recycled materials	Long-term	Marquette County Planning Division, NMU, Solid Waste Management Authority, Invest UP, Lake Superior Community Partnership, Public Schools	Staff Time, Funding ($$)

1. Coordinate actions to protect water resources and shorelines (Adaptation)

Strategy 1.1: Participate in the GLISA Floodwise Communities Program to complete a stormwater vulnerability assessment

Description: GLISA is running a Floodwise Communities Program to provide technical assistance to complete a stormwater vulnerability assessment using its Floodwise Communities tools. This assessment process identifies factors that may stress the stormwater system and surrounding community due to climate change. The County should then pursue projects to address the weaknesses identified in this assessment.
Timeline: Medium-term
Responsible Parties: Local Units of Government, Marquette County Planning Division, MSU Extension
Resources Needed: Staff Time

Strategy 1.2: Revive Marquette County Water Coalition

Description: In 2020 a Regional Water Coalition was formed for Marquette County as a part of the Master Plan update process. The group was focused on developing a baseline assessment of the current state of water resources in Marquette County and coordinating future water policies. Due to COVID-19, the group did not complete their work. The County should revive the Regional Water Coalition and execute the goals outlined in 2020.
Timeline: Medium-term
Responsible Parties: Local Units of Government, Marquette County Health Department, Marquette County Planning Division, Marquette County Emergency Management
Resources Needed: Staff Time

Strategy 1.3: Plan for water utility siting at new housing developments

Description: The current shortage of affordable housing in Marquette County is driving the creation of new housing developments. The County should perform baseline assessments of water resources and utilities, and turn this information into a publicly available interactive map to guide smart development.
Timeline: Ongoing
Responsible Parties: Marquette County Health Department, Marquette County Planning Division, Local Units of Government, Marquette County Planning Commission, Marquette County Land Bank
Resources Needed: Staff Time

Strategy 1.4: Support actions to protect shoreline infrastructure and advise communities on zoning updates

Description: There are 87 miles of Lake Superior shoreline in Marquette County, of which 27% is publicly owned. Lakeshore development and protection is an important issue to the Marquette County community. A recent undertaking was the Lakeshore

Boulevard project by Superior Watershed Partnership and the City of Marquette. The County should continue to partner with local stakeholders to protect the Lake Superior shoreline and engage with local municipalities on lakeshore zoning updates.
Timeline: Ongoing
Responsible Parties: Superior Watershed Partnership, Marquette County Planning Division, Marquette County Planning Commission, Marquette County Emergency Management, Local Units of Government
Resources Needed: Staff time, Funding (?)

2. Work to protect the health of Marquette County residents in the face of a changing climate (Adaptation)

Strategy 2.1: Bring together the parties of the 2018-2019 Marquette Area Climate and Health Adaptation Guidebook to check-in on implementation status of the goals and strategies outlined in the plan

Description: The ultimate goal for a plan is the implementation of its strategies and recommendations. The Marquette Area Climate and Health Adaptation Guidebook Volume 3: Prioritizing and Implementing Recommendations was finalized in September 2019 and since that time there has been significant action on climate adaptation in Marquette County. However, due to this timing, and the public health crisis of COVID-19 that began the next year, there has been limited coordination on implementation. Bringing together the participants from the planning process of 2018-2019 would be useful to highlight the implementation of the plan that has been carried out. Marquette County Planning should perform outreach and coordinate this gathering.
Timeline: Short-term
Responsible Parties: Marquette County Planning Division, CATF, MSU Extension, Local Units of Government, Michigan Department of Health and Human Services, Superior Watershed Partnership
Resources Needed: Staff Time

Strategy 2.2: Vector disease education and awareness

Description: The Marquette County Health Department should continue to track the threat of vector borne diseases in Marquette County, mainly mosquito illness such as Eastern Equine Encephalitis (EEE) and West Nile Virus, and tick illnesses such as Lyme disease. The Health Department should perform media outreach at the beginning of mosquito and tick season with education resources describing health risks and current trends in the area.
Timeline: Short-term
Responsible Parties: Marquette County Health Department, Local Units of Government, Travel Marquette/Respect Marquette, Trail Organizations
Resources Needed: Staff Time, Funding ($)

Strategy 2.3: Install air quality sensors and establish an air quality dashboard webpage for Marquette County

Description: One of the main data resources for local air quality data is Air Now, a partnership between the EPA, NOAA, the National Park Service, CDC, and tribal, state, and local air quality agencies. Their Air Quality Index map uses a mix of permanent air monitors and smaller air sensors. Currently in Marquette County, there is a permanent monitoring station in Negaunee Township and air sensors in the City of Marquette, Big Bay, Harvey, Palmer, and on County Road 550. This distribution of air monitoring data leaves large gaps, and which limits information available for the Marquette County Health Department. Marquette County or Local Units of Government should install air quality sensors to provide complete coverage of the County and use this information to create an air quality dashboard on the website. The site should include resources to help the public understand the Air Quality Index and what its scores mean for community health.
Timeline: Medium-term
Responsible Parties: Local Units of Government, Marquette County Health Department, EGLE, Marquette County IT Department
Resources Needed: Funding ($), Staff Time

3. Enhance the resiliency of the people, infrastructure, and land of Marquette County to extreme events (Adaptation)

Strategy 3.1: Establish an Emergency Response Workforce with Superior Watershed Partnership

Description: Marquette County and Superior Watershed Partnership should together establish an agreement to utilize the Great Lakes Climate Corps crews to respond to local weather emergencies. This emergency program should also perform damage assessments following an extreme event to streamline insurance and emergency funding reimbursements.
Timeline: Short-term
Responsible Parties: Marquette County Emergency Management, Superior Watershed Partnership
Resources Needed: Funding ($)

Strategy 3.2: Update the Community Wildfire Protection Plan

Description: Community Wildfire Protection Plans were created in the Healthy Forests Restoration Act of 2003. The current Community Wildfire Protection Plan was developed in 2014. The County should update this plan and take this opportunity to perform a deeper dive and analysis of Marquette County wildfire risk and strategies to limit risk.
Timeline: Medium-term
Responsible Parties: Marquette County Planning Division, Marquette County Emergency Management, Local Units of Government, MI DNR
Resources Needed: Funding ($$), Staff Time

Strategy 3.3: Update Hazard Mitigation Plan

Description: The current Marquette County Hazard Mitigation Plan was completed in 2020 and is due to be updated this year. The completion of a hazard mitigation plan allows municipalities to become eligible for FEMA mitigation program funding. The 2020 plan had participation from all 22 municipalities located in Marquette County. Each municipality provided a list of actions they could take to reduce risk in their community. The plan serves as a guide to hazard planning for each municipality and for the County as a whole.
Timeline: Medium-term
Responsible Parties: Marquette County Emergency Management, Marquette County Planning Division, Local Units of Government
Resources Needed: Funding ($$), Staff Time

Strategy 3.4: Continue to implement fire reduction strategies for County Forest land identified in the 2023 Forest Management Plan

Description: The Forest Management Plan lays out an approach to limiting fire in the County Forest. The County should continue these fire actions items including maintaining fire breaks, providing fire safety info with camping reservations, post-harvest slash management, and tree species diversification.
Timeline: Medium-term
Responsible Parties: Marquette County Forestry Commission, Marquette County Planning Division, Marquette County Emergency Management, MI DNR
Resources Needed: Staff Time, Funding ($$)

Strategy 3.5: Install renewable energy and storage at the Marquette County Emergency Center

Description: Connecting renewable energy and storage to the Marquette County Emergency Center would enhance the resilience of the Center, and improve its ability to perform essential functions during times of reduced services. The County should explore options for renewable energy generation and on-site energy storage for its Negaunee Emergency Center.
Timeline: Long-term
Responsible Parties: Marquette County Emergency Management, Marquette County Sheriff's Office (Special Operations)
Resources Needed: Funding ($$$)

4. Reduce Marquette County energy emissions and costs (Mitigation)

Strategy 4.1: Municipal education and ordinance review for Public Act 233

Description: Public Act 233 allows local governments to retain authority over renewable energy development if they: 1) have a local renewable energy siting ordinance, and 2) this ordinance aligns with state standards. Currently, very few of the state's existing

renewable energy ordinances comply with the new law. Municipalities in Marquette County with no renewable ordinances should decide whether they would like to develop a renewable ordinance, in order to retain local control of renewable energy development. The County Planning Commission, in its role of reviewing changes to zoning ordinances, should ensure that renewable energy ordinances are in line with state standards.
Timeline: Short-term
Responsible Parties: CATF, MSU Extension, UP Energy Coalition, Utility Companies, Lake Superior Community Partnership, Marquette County Planning Commission
Resources Needed: Staff Time

Strategy 4.2: Use state, county, and non-profit home repair, home rebate, and energy efficiency programs to reduce Marquette County resident home energy costs and GHG emissions

Description: The State of Michigan, Marquette County, and local non-profits administer home energy efficiency and repair programs (full list in appendix). Marquette County should work to inform residents about these programs and continue to operate its own program.
Timeline: Ongoing
Responsible Parties: Marquette County Planning Division, Superior Watershed Partnership, Habitat for Humanity, Community Action Alger-Marquette, Marquette County Land Bank, Housing Now, Marquette County Housing Coalition
Resources Needed: Funding ($$), Staff Time

Strategy 4.3: Outreach and communication with local utilities to promote the responsible development of renewable energy in Marquette County

Description: Local utilities are currently in the stage of planning to meet the state Renewable and Clean Energy Standards that were part of the 2023 Energy Legislation. The County Board has previously sent letters of support to renewable energy projects in the County. The County should reach out to utilities to support their development of renewable energy and work to engage with local communities so they are prepared for future developments.
Timeline: Ongoing
Responsible Parties: CATF, MSU Extension, Marquette County utilities
Resources Needed: Staff Time

5. Improve EV charging infrastructure and reduce vehicle miles per person (Mitigation)

Strategy 5.1: Spread awareness of current public EV chargers and track future EV charging needs

Description: In Marquette County there are 10 EV charging locations with 25 charging ports that have at least level 2 charging. Of those chargers, there are two locations and

9 ports with DC fast charging. The chargers are located in Marquette with 2 locations in Negaunee. The Johnson Controls EV assessment estimates that in 2025 there will be 188 battery EVs and 90 plug-in hybrid EVs in Marquette County. The required charging to meet this number of EVs would be 28 level 2 charging ports and 10 DC ports in the County- mainly at population centers. The number of EVs and their charging needs are projected to grow moving into the future (EVs are 7-10% of the US light-duty market in 2023 and are projected to reach 48-61% of the light duty market by 2030). Marquette County should track EV charging needs of both local and tourist vehicles, and coordinate funding if there are deficiencies in public EV charging.
Timeline: Ongoing
Responsible Parties: Marquette County Planning Division, Travel Marquette, CATF, EGLE, Superior Watershed Partnership
Resources Needed: Staff Time

Strategy 5.2: Install EV chargers at publicly owned facilities

Description: In rural areas, a main use of public EV chargers is for tourists. Marquette County and local units of government administer popular tourist areas in the County. To improve accessibility to visitors, local units of government should look for funding to install EV chargers at its recreation and tourist facilities.
Timeline: Ongoing
Responsible Parties: Marquette County Planning Division, Local Units of Government, Marquette Sawyer Regional Airport, Travel Marquette, Lake Superior Community Partnership, MDOT, EGLE, Invest UP
Resources Needed: Funding ($$$)

Strategy 5.3: Improve the ease of use for public transport, and invest in service route and operation time expansions

Description: Public transportation is an important service in the Marquette County community and a strategy to reduce transportation emissions. The County should work with Marq Tran and the community to identify and implement improvements that will increase the convenience and use of public transport.
Timeline: Ongoing
Responsible Parties: Marq Tran, MDOT, NMU, Lake Superior Community Partnership
Resources Needed: Funding ($$)

Strategy 5.4: Continue to invest in walkability/bikeability improvements, update zoning codes to encourage walkability, and work to preserve walkability in winter

Description: The Marquette County Master Plan includes walkability as a key complement to affordable housing and as a part of larger Smart Growth principles for the County. Additionally, increasing the use of alternative methods of transportation, such as walking and biking, reduces community emissions. But, walking and biking is challenging in Marquette County due to the distances between key destinations and the winter weather. The County should continue to coordinate and invest in walking and biking

improvements in Marquette County with an increased focus on improving winter options and adapting to e-bikes.
Timeline: Long-term
Responsible Parties: Marquette County Planning Commission, Trail Organizations, Marquette County Road Commission, Local Units of Government, MDOT
Resources Needed: Funding ($$)

6. Reach the State of Michigan's municipal solid waste recycling rate goals in Marquette County (Mitigation)

Strategy 6.1: Utilize Recycle 906 to reach the solid waste recycling goals of the State of Michigan and the multi-county Materials Management Plan in development

Description: Marquette County will be a part of a multi-county MMP with Alger, Delta, Dickinson, Menominee, and Schoolcraft counties, with the agreement being managed by the Central Upper Peninsula Planning and Development Regional Commission (CUPPAD). A key part of the new MMPs will be helping the state reach its municipal solid waste recycling rate goals of 30% by 2029 and, ultimately, 45%, compared with the current recycling rate in the UP of less than 2%. Recycle 906 is a new Materials Recovery Facility in Marquette County designed with the capacity and goal of accepting recyclable material from across the Upper Peninsula. Marquette County should, through the multi-county MMP process, leverage this cutting edge facility to keep the benefits of recycling local, reduce materials management costs for UP residents, and push the central UP to meet state goals.
Timeline: Ongoing
Responsible Parties: Solid Waste Management Authority, Recycle906, Materials Management Planning Committee, CUPPAD, Local Units of Government
Resources Needed: Staff Time

Strategy 6.2: Expand the use of composting in Marquette County

Description: Organic waste makes up roughly 35% of Michigan landfill waste, meaning the diversion of organics to compost could play a large part in achieving state solid waste recycling goals. Additionally, composting organics reduces GHG emissions as food waste sent to landfills tends to break down and form more methane, a GHG that causes 28 times more warming than CO2. The County should partner with Partridge Creek Compost, other compost providers, and the Solid Waste Management Authority to increase the availability of composting in Marquette County.
Timeline: Medium-term
Responsible Parties: Marquette County Planning Division, Partridge Creek Compost, Solid Waste Management Authority, Lake Superior Community Partnership, NMU, Public Schools
Resources Needed: Staff Time, Funding ($$)

Strategy 6.3: Work with higher education and economic development organizations to grow local businesses that create valuable products from recycled materials

Description: The County should coordinate with local universities and economic development organizations to nurture new technologies that invent new uses for waste products and develop local businesses around promising ideas.

Timeline: Long-term

Responsible Parties: Marquette County Planning Division, NMU, Solid Waste Management Authority, Invest UP, Lake Superior Community Partnership, Public Schools

Resources Needed: Staff Time, Funding ($$)

Marquette County Climate Action Plan

Part 2: Marquette County Operations

Part 2: Marquette County Operations

Part 2 will focus on Marquette County operations goals and strategies. These goals are guided by the Climate Resolution from March 2023 and aim to move the County to carbon neutrality by 2050. Marquette County operations are defined as the scope 1 and 2 emissions under direct influence of the County Board of Commissioners and County budget. The below goals do not apply to the Solid Waste Authority, the Airport, the Road Commission, the County Medical Care Facility or similar semi-autonomous entities. These goals and strategies build off 2024 Johnson Controls reports, including a GHG Inventory, a Fleet Review and Electrification Assessment, and an ASHRAE Level 2 Energy Audit as well as the 10-year Facility Assessment completed by Northern Design Works in early 2025.

Goal and Strategy Format

The section will be guided by overarching goals with multiple strategies supporting them. Each strategy will have a short description, a timeline, responsible parties, and resources needed. For the timeline, short-term means within the next year, medium-term means in the next 2-4 years, and long-term means 5+ years. Responsible parties list the groups that would be required for the successful implementation of that strategy. Resources needed will detail whether the strategy needs staff time, funding, or both. Strategies requiring funding will be given a rating of $, $$, or $$$ indicating roughly how much funding is needed. $ means an allocation within current budgeting. $$ means a minor grant or financing. $$$ means a large grant or major financing.

Johnson Controls Report Summaries

The Johnson Controls reports were commissioned as a part of the Marquette County Climate Resolution from March 2023. The reports are to provide a baseline for County operations and identify projects that the County can implement to reduce greenhouse gas emissions.

Marquette County Greenhouse Gas Inventory 2022 and 2023

Purpose

The goal of the Greenhouse Gas (GHG) Inventory was to determine the total baseline GHG emissions from County operations for 2022 and 2023. The buildings covered in this inventory include the County Courthouse, the Annex, the County Jail, the Negaunee Service Center (Marquette County Health Department), and the Ishpeming Service Center.

Summary

County emissions in 2022 were 1981.33 metric tons of CO2e and in 2023 were 1931.73 metric tons of CO2e. This was a decline of 2.5%. Both Scope 1 and 2 emissions decreased from 2022 to 2023.

Marquette County Greenhouse Gas Audit
Summary of 2022 and 2023, Scope 1 and 2

	2022		2023	
GHG Footprint	MTCO2e	Percentage	MTCO2e	Percentage
Scope 1	1095.77	55.3	1060.39	54.9
Scope 2	885.56	44.7	871.34	45.1
Totals	1981.33		1931.73	

Background

Scope 1 Emissions: Direct emissions from operations that occur on site. Examples: combustion for heating, refrigerant leaking, fertilizer use, and fleet emissions.
Scope 2 Emissions: Emissions produced in the generation of purchased electricity, steam, heating, and cooling.
Scope 3 Emissions: Emissions from activities and assets not owned by the organization, but necessary for the organization's operations. Examples: employees commuting, waste, business travel, product emissions.
CO2e unit: Different greenhouse gases trap different amounts of heat, reflected in the global warming potential of a GHG. CO2e is the standardized unit of warming.

The GHG emissions were calculated by summing the County's Scope 1 and Scope 2 emissions. Scope 1 sources included fleet emissions and on-site energy from natural gas. Scope 2 sources included emissions from electricity generation. Scope 3 emissions were excluded from this report. Electricity emissions were determined using a location based method which assigns an emissions factor based on the EPA Emissions & Generation Resource Integrated Database (eGrid) sub region. Marquette County is in the Midwest Reliability Organization East (MRO East) sub region, which is the third most carbon intensive sub region at 1,488.7 lbs CO2e/MWh, compared to the US average of 827.5 lbs CO2e/MWh.

Data

	2022		2023	
Scope 1 Stationary Energy: By Building	**Therms**	**MTCO2e**	**Therms**	**MTCO2e**
Emission factor: 0.0053 MTCO2e/therm				
Negaunee Service Center	10,217.76	54.15	9,592.90	50.84
Courthouse	15,843.52	83.97	14,369.39	76.16
Annex & Jail	74,990.60	397.45	70,450.78	373.39
Ishpeming Service Center	3,845.44	20.38	3,317.487	17.58
Totals	104,897.3	556.0	97,730.6	518.0

Scope 1 Natural Gas Emissions. Johnson Controls Inc 2024 Report.

	2022		2023	
Scope 1 Fleet: by Department	**Gallons**	**MTCO2e**	**Gallons**	**MTCO2e**
Emission factor: 0.008887 MTCO2e/gallon gasoline				
Equalization	530.4	4.71	939.3	8.35
Sheriff	26,104.6	231.99	30,584.0	271.8
Facilities	757.5	6.73	798.2	7.1
Soil Erosion	413.6	3.68	1,140.1	10.1
Codes	3,902.6	34.68	3,292.8	29.3
Perkins Park	668.8	5.94	830.9	7.4
Planning	32.7	0.29	51.4	0.5
MCDCC			67.4	0.6
Airport	24,676.6	219.30	19,225.8	170.9
Health Department	1,510.4	13.42	1,593.9	14.2
MCMCF	2,144.7	19.06	2,511.3	22.3
Totals	60,741.8	539.8	61,035.2	542.4

Scope 1 Fleet Emissions. Johnson Controls Inc 2024 Report.

	2022		2023	
Scope 2: Stationary Energy: By Building	**KWH**	**MTCO2e**	**KWH**	**MTCO2e**
Conversion factor: eGRID	MROE	MRO East	1,488.7	
Negaunee Service Center	199,800	134.92	189,240	127.79
Negaunee Service Center Garage	33	0.02	19	0.01
Courthouse/Annex	339,960	229.56	310,640	209.76
Jail	734,880	496.23	761,920	514.49
Ishpeming Service Center	36,764	24.83	28567	19.29
Totals	1,311,437	885.6	1,290,386	871.3

Scope 2 Electricity Emissions. *Johnson Controls Inc 2024 Report.*

Marquette County ASHRAE Level 2 Energy Audit

Purpose

The goal of the ASHRAE Level 2 Energy Audit is to identify potential facility improvement measures (FIMs) resulting in energy savings, carbon reduction, and needed operational improvements. The report also assesses the overall energy performance of each building. Finally, Johnson Controls provides a list of FIM recommendations and potential project phasing. The five County buildings covered in this report are the Courthouse, Annex, Jail, Ishpeming Service Center, and Negaunee Service Center.

Energy Star

Energy Star is a system of benchmarking building energy use by comparing with similar building types in similar locations. The Energy Star Score tells the percent of buildings your building consumes less energy than. A main factor in Energy Star Scoring is Energy Use Intensity (EUI). EUI can be measured at the site level or the source level. Site level is the energy used on site per building square foot and source level is the energy generated at a power plant per building square foot. The County Courthouse's excellent score is primarily due to the lack of air conditioning. Some building types do not have enough examples to provide Energy Star scores and this is the case for the Jail.

Energy Star Scores by Building

Building	Energy Star Score	Annual Electricity Use (kBTU)	Annual Natural Gas Use (kBTU)	Site EUI (kBTU/ft^2)	Source EUI (kBTU/ft^2)	Annual Emissions (metric tons CO2e/year)
Courthouse	93	310,837	1,378,184	42 (median 99.5)	57.6 (median 136.6)	135
Annex	50	725,202	6,953,950	122.6 (median 123.6)	149 (median 150.2)	513
Jail	N/A	2,371,788	3,269,794	122.2 (median 87.6)	218.2 (median 156.4)	643
Ishpeming Service Center	62	133,731	307,098	79.9 (median 94.2)	121.6 (median 143.5)	39
Negaunee Service Center	57	738,193	799,706	64.3 (median 70.9)	121.5 (median 134)	188

Recommendations

The full list of recommendations has detailed descriptions in the report. The summarized list of recommendations is as follows

- Enhanced automated building controls (MetaSys Courthouse complex and OBEM all buildings)
- Combined heat and power generation for the Courthouse Complex
- Air conditioning for the Courthouse
- Variable Speed Drive air handling units (all buildings)
- Variable Air Volume mixing box units (Courthouse complex and Ishpeming)
- Variable Speed Drive hot and chilled water pumps (Courthouse complex and Negaunee)
- Adiabatic humidification (Jail and Negaunee)
- Testing, adjusting, and balancing procedures (all buildings)

Marquette County Fleet Review and Electrification Assessment

Purpose

The goal of the fleet review/electrification assessment is to assess the current state of the County's vehicle fleet and determine the most cost effective projects to begin fleet electrification.

Fleet Review Summary

The County has a total of 87 vehicles with an average age of 14 years. The current dispersed fleet purchasing model means that some departments have much newer vehicles than others. Departments with older vehicles are subject to higher maintenance costs and more vehicle down time. Some challenges raised by departments include: the capital budget process requiring the purchase of the lowest bid of the first cost of the vehicle, and the need for more vehicles data, such as vehicle use, mileage, idling time, and maintenance records.

	2022			2023		
Transportation: Fleet by Department	Gallons	Number of vehicles	Gallons/vehicle/ year	Gallons	Number of vehicles	Gallons/vehicle/y ear
Equalization	530.4	2	265.2	939.3	2	469.7
Sheriff	26104.6	26	1004.0	30584	26	1176.3
Facilities	757.5	2	378.7	798.2	2	399.1
Soil Erosion	413.6	2	206.8	1140.1	2	570.1
Codes	3902.6	8	487.8	3292.8	8	411.6
Perkins Park	668.8	3	222.9	830.9	3	277.0
Planning	32.7	1	32.7	51.4	1	51.4
Jail/MCCDC		3	0.0	6743.3	3	2247.8
Airport	24676.6	21	1175.1	19225.8	21	915.5
Health Department	1510.4	6	251.7	1593.9	6	265.7
MCMCF	2144.7	6	357.5	2511.3	6	418.6
	60741.8	87.00		67711.03	87.00	

EV Background

Globally, there has been a large increase in EV sales with a 35% increase in EV sales from 2022 to 2023. Globally, of all cars sold in 2023, 18% were EVs. In the US, 1 in 10 new cars sold was electric.

In 2019, transportation accounted for almost 28% of State of Michigan emissions. According to the Johnson Control GHG inventory for Marquette County, fleet emissions were about 28% of County emissions. The State of Michigan needs to phase out fossil-fuel-powered passenger vehicles by 2035 for state net zero emissions by 2050. To meet these goals, the State of Michigan plans to develop charging infrastructure to support 2 million EVs by 2030. Vehicle electrification is projected to cause large increases in state electricity demand (0.1 TWh in 2020, 2 TWh in 2025, 20 TWh in 2035, 40 TWh in 2050, baseline retail electricity consumption of 101 TWh).

Fleet Electrification Assessment

Johnson Controls modeled the costs of different vehicle options for the County, using the cost per mile or total cost of ownership, as opposed to the current County process of using first cost. The modeling considered the 65 vehicles that were not for special use cases. Of these, 43 were light duty vehicles.

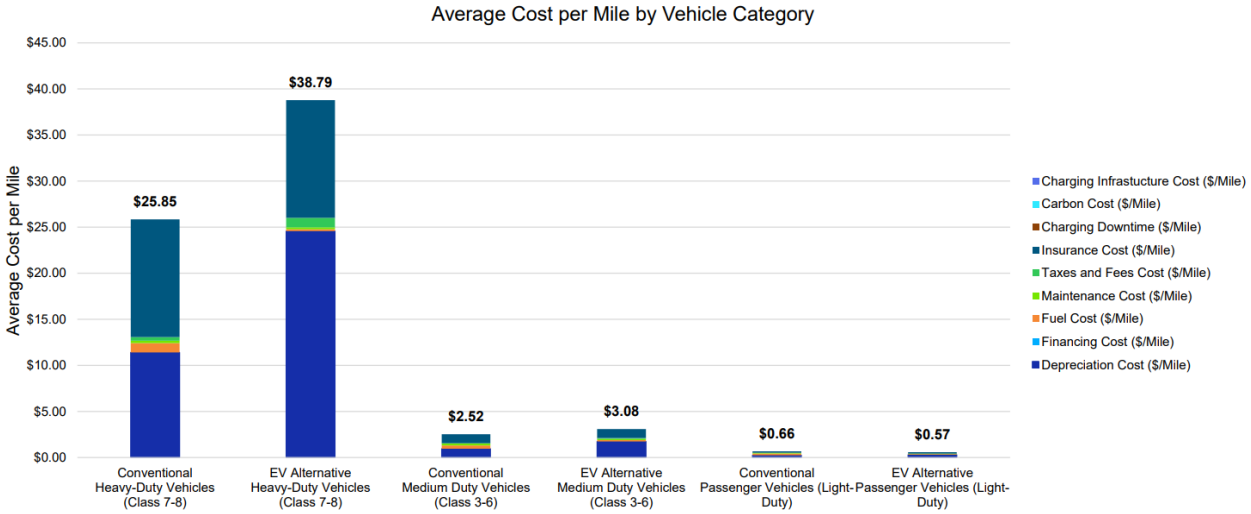


Figure: The average cost per mile was found to be cheaper for light duty vehicles but not for medium or heavy duty vehicles. This analysis does not include charging infrastructure costs.

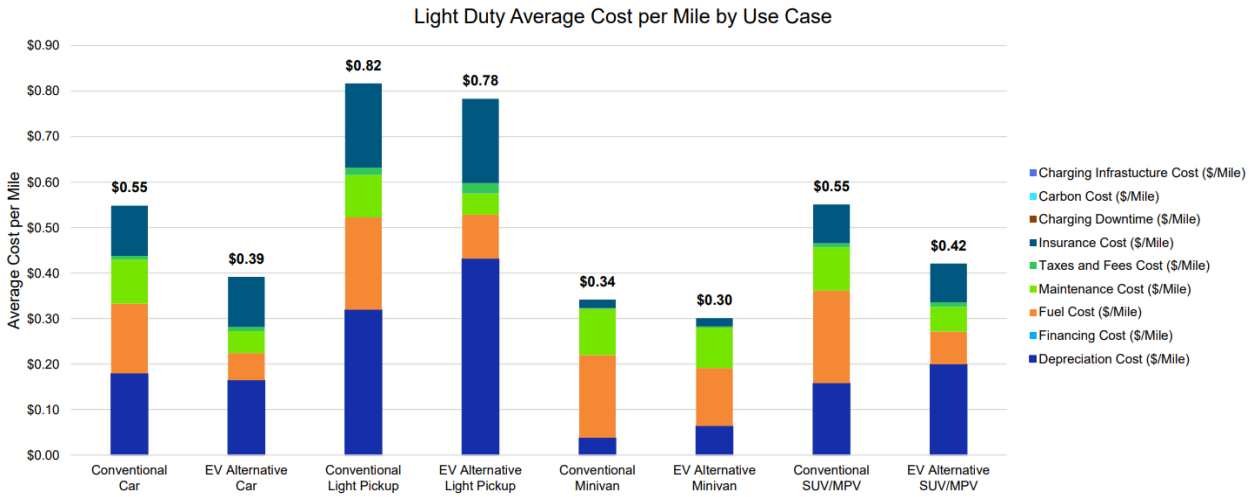


Figure: Of light duty vehicles, cars and SUVs were found to have the greatest savings. Fuel and maintenance costs are the main categories of cost savings. This analysis does not include charging infrastructure costs.

Challenges to Fleet Electrification: Charging requirement for vehicles that are in use nearly 24/7 such as patrol and first responders. Charging infrastructure cost as level 2 and 3 chargers may cost $12,000 and up to $50,000, respectively. Winter range reduction, decreases range by 16-46% of mileage range.

Charger Cost

Installation costs can vary significantly based on labor costs and implementation complexity. Johnson Controls recommends a firm quote from an installer at each location to get the full cost estimate for chargers.

Location, Charging Level	Average of Charging Equipment Cost ($/Station)	Average of Maintenance Cost ($/Station/Year)	Average Installation Costs (1-2 ports)
30A L2	$3,286	$99	$6,000-12,000
48A L2	$6,107	$183	$6,000-12,000
50kW DCFC	$34,687	$1,041	$20,000-50,000
80A L2	$23,769	$713	$6,000-12,000

Funding Opportunities

Commercial Clean Vehicle Credit: Tax refund credit from the IRS and can be claimed by tax-exempt organizations. This credit was included in the scenario analysis and recommendations.

$7,000 for plug-in hybrids less weighing less than 14,000 pounds
$7,500 for street electric vehicle weighing less than 14,000 pounds
$40,000 for vehicles weighing more than 14,000 pounds

Alternative Fuel Vehicle Refueling Property Credit: For placing qualified refueling property into service. Governments are eligible for the program through the direct pay mechanism, or a direct payment from the IRS to tax-exempt organizations for tax credits. Credit was equal to 30% of the value of the property, if meeting wage and apprenticeship requirements, with a limit of $100,000.

Recommendations

Johnson Controls recommends beginning fleet electrification for the County. There are EVs that can replace most of the County's existing vehicles and many do so with total cost of ownership savings. Recommend a phased approach to be integrated into the current vehicle procurement approach. Allow departments the opportunity to pilot vehicles prior to full conversion. Start with light-duty vehicles near the end of life to maximize savings. Pair these new EVs with chargers and look to spread across departments so that the charging infrastructure can also be phased. Utilize the Commercial Clean Vehicle and the Alternative Vehicle Refueling Property credits to help subsidize the first phase.

EV Fleet Conversion: Phase 1 Recommendations

Department	Year	Make	Model	EV replacement vehicle make	EV model	MSRP (estimate)	30A Level 2 Charger	Charging infrastructure cost (estimate)	Charging installation cost (estimate)	Total cost
Airport	2002	Chevy	Pickup	Ford	2023 F-150 LIGHTNING 4WD BEV	$49,995	4	$13,144	$36,000	$99,139
Airport	2006	GMC	Sierra P/U	Ford	2023 F-150 LIGHTNING 4WD BEV	$49,995				$49,995
Airport	2007	Chevy	Colorado P/U	Ford	2023 F-150 LIGHTNING 4WD BEV	$49,995				$49,995
Airport	2008	Chevy	Impala	Chevrolet	2023 BOLT EV BEV	$26,500				$26,500
Airport	2011	Chevrolet	Colorado P/U	Ford	2023 F-150 LIGHTNING 4WD BEV	$49,995				$49,995
Codes	2014	Ford	Lgt 'F' P/U	Ford	2023 F-150 LIGHTNING 4WD BEV	$49,995	4	$13,144	$36,000	$99,139
Facilities	2013	Dodge	Ram 1500 ST	Ford	2023 F-150 LIGHTNING 4WD BEV	$49,995				$49,995
MCHD	2014	Chevrolet	Cruze-red	Chevrolet	2023 BOLT EV BEV	$26,500	2	$6,572	$18,000	$51,072
MCHD	2014	Chevrolet	Cruze-gray	Chevrolet	2023 BOLT EV BEV	$26,500				$26,500
MCMCF	2003	Chevrolet	Pickup	Ford	2023 F-150 LIGHTNING 4WD BEV	$49,995	3	$9,858	$27,000	$86,853
MCMCF	2012	Toyota	Rav 4	Toyota	2024 RAV4 PRIME 4WD PHEV	$43,440				$43,440
MCMCF	2013	Ford	F250 Van	Ford	2023 TRANSIT VAN CUTAWAY BEV	$46,000				$46,000
Perkins Park	1999	Ford	Ranger P/U	Ford	2023 F-150 LIGHTNING 4WD BEV	$49,995	1	$3,286	$9,000	$62,281
Road Patrol	2013	Chevrolet	Silverado	Ford	2023 F-150 LIGHTNING 4WD BEV	$49,995				$49,995
Road Patrol	2014	Chevrolet	Impala	Ford	2024 Mustang Mach-E	$39,999				$39,999
Water/Sewer	2007	Chevrolet	P/U	Ford	2023 F-150 LIGHTNING 4WD BEV	$49,995	1	$3,286	$9,000	$62,281
					Totals	$708,889	15	$49,290	$135,000	$893,179 Before incentives

Indicates highest TCO savings (>20%)

Indicates some TCO savings (0-20%)

Indicates near cost parity for TCO compared to conventional vehicle

Could be fully offset by incentives

Facilities Assessment Summary

The purpose of a facilities assessment is to provide a detailed analysis of a building's condition. The January 2025 Facility Analysis assesses the Marquette County Courthouse, Courthouse Annex, Marquette County Jail, Negaunee Service Center, and Ishpeming Service Center. This assessment was completed by Northern Design Works.

Marquette County Courthouse

Recommended projects include paint dome wood windows, reseal dome skylights, masonry tuck-pointing and sealants, air conditioning, hydronic pump upgrades and variable frequency drives, water heater replacement, upgrade power distribution to support air conditioning, upgrade emergency lighting, and replace lighting above stained glass dome.

Courthouse Annex

Recommended projects include brick veneer and lintel repair, window replacement, connector roofing replacement, ceiling replacement, fire suppression system, pneumatic controls to direct digital control, variable air volume box replacement, air handling unit replacement, humidifier water treatment, replace lighting, and add exterior emergency lighting.

Marquette County Jail

Recommended projects include brick veneer and lintel repair, window replacement, painting, shower tile replacement, wood decking replacement, air handling unit replacement, humidifier water treatment, kitchen exhaust fan replacement, pneumatic controls to direct digital control, electrical gear infrared scanning, update exterior lighting, update emergency light at exterior, and lighting upgrades.

Negaunee Service Center

Recommended projects include siding replacement, parking reconstruction, window replacement, elevator upgrade, air handling unit upgrades, humidifier, electrical service upgrade, update emergency lighting, fire alarm notification updates, and LED lighting upgrades.

Ishpeming Service Center

Recommended projects include brick repair, exterior painting, air handling unit replacement, water heater replacement, exterior emergency lighting, and lighting upgrades.

Conclusion

The Facilities Analysis had a different focus from the Energy Audit, but there was some overlap in the recommended projects from these reports. This analysis provides another input when considering future capital projects and energy efficiency improvements. Both reports and perspectives will be important to maximize the cost savings, reduce energy use, safeguard employee health & safety, and improve building function for the County moving forward.

County Employee Engagement

Employee engagement was conducted through two “Lunch and Learn” events and an employee survey. The lunches consisted of the Planning Department providing a brief overview of the Climate Action Plan process followed by employee input on the County operations portion of the plan. The employee survey received 72 employee responses. Key themes from employee feedback include challenges recycling in the Courthouse, some employees were not aware that there was any recycling. Employees also discussed a desire for more educational material to give info on sustainable actions that can be taken.

Table Summary of Marquette County Operations Strategies follows on pages 45-46.

Strategy	Timeline Short - Within year Medium - 2-5 years Long - 5+ years	Responsible Parties	Resources Needed $ - allocation within budget $$ - minor grant or financing $$$ - major grant or financing
1. Track emissions and progress towards County goals (Mitigation)			
1.1 Continue GHG Inventory Each Year	Short-term	Planning Division	Staff Time
1.2 At 5 year intervals contract out a GHG inventory and assess the County's progress to meeting its goal of 2050 carbon neutrality	Long-term	Planning Division	Funding ($$), Staff Time
1.3 Website feature to provide a status update and a link to completed step or on-going work	Short-term	Planning Division, IT Department	Staff Time
2. Reduce emissions from County electricity (Mitigation)			
2.1 Investigate renewable energy generation on Marquette County land	Short-term	Planning Division, Johnson Controls	Staff Time, Funding ($$)
2.2 Explore Voluntary Green Pricing with Marquette BLP	Medium-term	Planning Division, Finance Department, Marquette BLP	Staff Time
3. Reduce County building emissions and energy costs (Mitigation)			
3.1 Implement facility	Medium-term	Facilities Department, Finance	Funding ($$$), Staff Time

improvement measures identified in the Johnson Controls Energy Audit and the Northern Design Works Facility Analysis		Department, Planning Division	
3.2 Investigate the potential of heat pumps at the County Courthouse complex, the Negaunee Service Center, and the Ishpeming Service Center	Long-term	Facilities Department, Planning Division	Staff Time
4. Begin electrification of County vehicle fleet (Mitigation)			
4.1 Pilot EVs with departments	Short-term	Planning Division, Finance Department	Funding ($$$), Staff Time
4.2 Evaluate pilot and set EV goal	Medium-term	Planning Division, Finance Department	Staff Time
4.3 Set a date to re-evaluate cost for medium- and heavy-duty vehicles	Medium-term	Finance Department, Planning Division	Staff Time
5. Meet State of Michigan recycling goals for County operations (Mitigation)			
5.1 Improve employee recycling accessibility and awareness	Short-term	Planning Division, Facilities Department	Staff Time, Funding ($)
5.2 Establish composting at Marquette Courthouse complex	Medium-term	Planning Division, Facilities Department, Partridge Creek Compost	Staff Time, Funding ($$)

1. Track emissions and progress towards County goals (Mitigation)

Strategy 1.1: Continue GHG Inventory internally each year

Description: The main goal of this Climate Action Plan is to guide the County to carbon neutrality by 2050. Johnson Controls has provided a baseline GHG Inventory for 2022 and 2023 to understand the current emissions profile of the County. To measure the progress of the County moving towards 2050, the County should continue to inventory its GHG emissions each year using the same methodology and, year one, develop the process for future years.
Timeline: Short-term
Responsible Party: Planning Division
Resources Needed: Staff Time

Strategy 1.2: At 5 year intervals contract out a GHG inventory and assess the County's progress to meeting its goal of 2050 carbon neutrality

Description: Every 5 years (2028, 2033, 2038, etc.) the County should contract out a GHG inventory to double check its own internal inventory. This 5-year interval should also be used to assess whether the County is on track to meet the goal of carbon neutrality by 2050. The report assessing this progress should consider the trajectory of emissions and the status of longer term projects outlined in this CAP.
Timeline: Long-term
Responsible Party: Planning Division
Resources Needed: Funding ($$), Staff Time

Strategy 1.3: Website feature that provide a status update and a link to completed step or on-going work

Description: Annually the County should update the community with the progress of meeting the Climate Action Plan strategies on their website.
Timeline: Short-term
Responsible Party: Planning Division, IT
Resources Needed: Staff time

2. Reduce emissions from County electricity (Mitigation)

Strategy 2.1: Investigate renewable energy generation on Marquette County land

Description: The single largest source of County emissions, as identified in the GHG Inventory from JCI, was emissions from electricity generation. Following energy efficiency work to reduce the amount of electricity the County buildings consume each year, the County should explore the potential for renewable energy generation, specifically solar, to reduce its electricity generation emissions. The County should ask Johnson Controls to provide a Solar Feasibility Study and Report as a part of its current working agreement.
Timeline: Short-term

Responsible Party: Planning Division, Johnson Controls
Resources Needed: Staff Time, Funding ($$)

Strategy 2.2: Explore Voluntary Green Pricing with Marquette BLP

Description: An option to reduce and eliminate emissions from County electricity generation, that can be used in tandem with County renewable energy, is a utility Voluntary Green Pricing (VGP) program. A VGP program allows a utility customer to choose to have a portion of their electricity tied to renewable generated electricity. Participating customers are then charged a premium on their bills for this renewable electricity. Michigan requires utilities to offer VGP programs. Currently, Marquette Board of Light & Power offers a VGP program at four different levels: 25%, 50%, 75%, or 100%. As the County continues to explore its options to reduce and eliminate emissions from its electricity generation, it should consider and research the role that a VGP program could play in its future plans.
Timeline: Medium-term
Responsible Party: Planning Division, Finance Department, Marquette BLP
Resources Needed: Staff Time

3. Reduce County building emissions and energy costs (Mitigation)

Strategy 3.1: Implement facility improvement measures identified in the Johnson Controls Energy Audit and the Northern Design Works Facility Analysis

Description: The Johnson Controls Building Audit identified facility improvement measures that reduce the County's building emissions by 37.8%, or over a quarter of total County emissions. Northern Design Works also identified building projects in its Facility Analysis. The County should implement all or a portion of these projects focusing on old and failing equipment, and emissions reductions. The County should use the financing mechanism that maximizes the facility improvement measures possible utilizing available funds, specifically evaluating an energy performance contract vs traditional financing.
Timeline: Medium-term
Responsible Parties: Facilities Department, Finance Department, Planning Division
Resources Needed: Funding ($$$), staff time

Strategy 3.2: Investigate the potential of heat pumps at the County Courthouse Complex, the Negaunee Service Center, and the Ishpeming Service Center

Description: A heat pump is a way of using electricity to provide heating and cooling to a building. It works by pumping heat out of the building during the summer and by pumping heat inside during the winter. This process can be very efficient, with heat pumps moving 3-4 times as much heat energy as electricity is required to power it. This heat exchange can occur with outside air (air-source heat pump), with water (water source heat pump), or with the ground (geothermal heat pump). Heat pumps, when paired with renewable electricity, would allow the County to eliminate building emissions.

Across the US heat pumps are becoming very popular, even outselling gas furnaces in 2022 and 2023. But, at lower temperatures there is less heat available, which decreases the efficiency of heat pumps. In colder areas, such as Marquette County, to maintain proper indoor conditions with lower temperatures requires a cold climate heat pump, typically paired with a backup, traditional source of heating. Between being a newer type of heat pump and the general decreased efficiency of heat pumps in cold weather, there has limited the uptake of this technology in colder climates. The County should track the development of cold climate heat pumps and the local implementation of these heat pumps. The County should examine the feasibility for heat pumps to be implemented and used to reduce County building emissions and energy costs.
Timeline: Long-term
Responsible Parties: Facilities Department, Planning Division
Resources Needed: Staff Time

4. Begin electrification of County vehicle fleet (Mitigation)

Strategy 4.1: Pilot EVs with departments

Description: Vehicle emissions were the second largest emissions source in the GHG Inventory. The County should use the recommendations in the Johnson Controls Fleet Electrification Report and local cost estimates to develop an electric vehicle pilot for County vehicles.
Timeline: Short-term
Responsible Parties: Planning Division, Finance Department
Resources Needed: Funding ($$$), Staff Time

Strategy 4.2: Evaluate pilot and set EV goal

Description: The pilot evaluation should examine the impact of the EVs on County emissions, solicit feedback from department heads, and perform a cost evaluation. The evaluation of the pilot should then be used to set County vehicle electrification goals that will be in alignment with the larger County goal of carbon neutrality by 2050.
Timeline: Medium-term
Responsible Parties: Planning Division, Finance Department
Resources Needed: Staff Time

Strategy 4.3: Set a date to re-evaluate cost for medium- and heavy-duty vehicles

Description: In the Johnson Controls Fleet Electrification report, medium- and heavy-duty vehicles were not found to have lifetime savings compared to internal combustion engine vehicles. As a result, these vehicle classes were left out of their EV pilot recommendations. The County should re-evaluate the costs of these vehicle classes as technology improves and develop an electrification timeline that aligns with the County goal of carbon neutrality by 2050.
Timeline: Medium-term

Responsible Parties: Finance Department, Planning Division
Resources Needed: Staff Time

5. Meet State of Michigan recycling goals for County operations (Mitigation)

Strategy 5.1: Improve employee recycling accessibility and awareness

Description: A key piece of feedback from County employees was the difficulty of recycling in County buildings. The County should provide better info on what can be recycled, better and more recycling receptacles, and expand recycling categories (such as E-waste, glass, batteries, and printer cartridges).
Timeline: Short-term
Responsible Parties: Planning Division, Facilities Department
Resources Needed: Staff Time, Funding ($)

Strategy 5.2: Establish composting at Marquette Courthouse complex

Description: The County should establish compost collection at the Courthouse complex and other County buildings to improve the diversion of organics from the County waste stream.
Timeline: Medium-term
Responsible Parties: Planning Division, Partridge Creek Compost, Facilities Department
Resources Needed: Staff Time, Funding ($$)

Appendix

Marquette County Board Climate Resolution

ASHRAE Level 2 Energy Audit

Greenhouse Gas Emissions Inventory

Fleet Review

10 Year Facilities Analysis

2013 Climate Adaptation Plan for Marquette County

2019 Marquette Area Climate and Health Adaptation Guidebooks

List of Stakeholder Meetings and Engagement Sessions

List of Stakeholder Meetings and Engagement Sessions

January 26, 2024	Marquette 2049 Kick-off Event	Community Leaders, CATF Members (80+ attendees)
January 31, 2024	Marquette 2049 Kick-off Event- Student version	Community Members, High School Students, NMU Students and Faculty, CATF Members (40+ attendees)
May 8, 2024	Marquette 2049 Learning Circles Series: Food Systems & Security	Community members and leaders, CATF members, Staff
June 12, 2024	Marquette 2049 Learning Circles Series: Trash & Recycling	Community members and leaders, CATF members, Staff
June 12, 2024	Marquette County Planning Commission CAP Sub-Committee Meeting #1	CAP Sub-Committee, County Staff
July 23, 2024	Employee CAP Lunch and Learn	County Employees
July 31, 2024	Marquette County Planning Commission CAP Sub-Committee Meeting #2	CAP Sub-Committee, County Staff
August 5, 2024	Marquette 2049 Learning Circles Series: Healthcare, Housing, Transportation, & Public Services	Community Members and Leaders, CATF members, Staff
August 15, 2024	Marquette County Planning Commission CAP Sub-Committee Meeting #3	CAP Sub-Committee, County Staff
August 21, 2024	Employee CAP Lunch and Learn	County Employees
August 29, 2024	Dialogue Dinner River Rock Lanes	Community members and leaders, Staff
September 11, 2024	Marquette 2049 Learning Circles Series: Economic Development & Diversification	Community members and leaders, CATF members, Staff

September 12, 2024	Marquette County Planning Commission CAP Sub-Committee Meeting #4	CAP Sub-Committee, County Staff
September 12, 2024	Dialogue Dinner Up North Lodge	Community members and leaders, Staff
September 19, 2024	Dialogue Dinner Jerzi's 41	Community members and leaders, Staff
September 26, 2024	Dialogue Dinner Barrel and Beam	Community members and leaders, Staff
October 1, 2024	Employee CAP Snack and Chat and Composting Demonstration	County Employees, Partridge Creek Compost: Ali O'Neal
October 9, 2024	Marquette 2049 Learning Circles Series: Economic Development & Diversification	Community members and leaders, CATF members, Staff
October 24, 2024	Marquette County Planning Commission CAP Sub-Committee Meeting #5	CAP Sub-Committee, County Staff
November 6, 2024	Marquette 2049 Learning Circle - Energy and Power	Community members and leaders, CATF members, Staff
December 5, 2024	CATF Quarterly Meeting: Discuss Plan Development	Marquette County Climate Adaptation Task Force (CATF) Members and Guests
December 10, 2024	Johnson Controls Inc.: Discuss Report Drafts	Johnson Controls Inc. (Jake Tuenas, John Ingraham), Antonio Adan, Don Bianchi (Facilities Manager), Emily Leach, Nico Vermaat
December 17, 2024	Marquette County Planning Commission CAP Sub-Committee Meeting #6	CAP Sub-Committee, County Staff
December 18, 2024	Discuss incorporating 2013 Adaptation Plan and local adaptation and mitigation efforts	SWP Staff: Geri Grant, Tyler Penrod, Carl Lindquist, Kathleen Henry, Emily Leach, Nico Vermaat

January 8, 2025	Johnson Controls Inc. Report Presentation	Marquette County Planning Commission, Emily Leach, Nico Vermaat and Johnson Controls Inc.: Jake Tuenas, John Ingraham, John Crawford and Sarah Paris
January 10, 2025	Discuss incorporating MICHAP Guidebooks and updates to local and statewide climate and health trends.	Aaron Ferguson, Manager, Climate and Tracking Unit Michigan Department of Health and Human Services, Brad Neumann, Senior MSU Extension Educator, Emily Leach, Nico Vermaat
January 14, 2025	Discuss UPPCO Utility Scale Solar Project in Marquette County	Gradon Haehnel, UPPCO CEO; Scott Erbisch, Thyra Karlstrom, Emily Leach
January 27, 2025	Marquette County Planning Commission CAP Sub-Committee Meeting #7	CAP Sub-Committee, County Staff
February 5, 2025	Johnson Controls Inc. Report Review and Financing Options Discussion	Emily Leach, Nico Vermaat Thyra Karlstrom, Scott Erbisch, Anne Giroux, Antonio Adan, Don Bianchi, and Johnson Controls Inc.: Jake Tuenas, John Ingraham
February 7, 2025	Board of Light and Power Discussion	Patrick Havel, MBLP Manager of Metering and Customer Service, William Toomey, MBLP, Nico Vermaat, Emily Leach
February 11, 2025	Marquette County Planning Commission CAP Sub-Committee Meeting #8	CAP Sub-Committee, County Staff
March 2, 2025	Marquette County Planning Commission CAP Sub-Committee Meeting #9	CAP Sub-Committee, County Staff
March 12, 2025	Marquette County Planning Commission Plan Approval	Marquette County Planning Commission