CITY OF MARQUETTE

AUGUST 2023

RESILIENCY ASSESSMENT STRATEGY MEMO GUIDE TO CLIMATE ACTION PLANNING

Image Source | Nick Perez of Unsplash

In 2021, nearly <u>half a million Americans</u> were displaced by natural disasters, a figure that continues to grow as the impacts of climate change intensify. Marquette, located in a region less prone to the most severe climate impacts, is projected to be a climate sanctuary as more and more Americans are displaced by these events. Meanwhile, the city is grappling with eroding shorelines, increasing storm frequency and severity, changes in growing season, and other consequences of human activity and the changing climate.

Marquette is a known leader in the Upper Peninsula for climate awareness and providing an encouraging and supportive atmosphere for community members to become agents for change. Though the City of Marquette, Climate Adaptation Task Force (CATF), and other regional partners have developed multiple resources related to climate preparedness and response, progress has been limited to these initial steps of resource-gathering, and there has been a shortfall of action toward achieving the identified goals.

In 2013, the City of Marquette commissioned a Climate Adaptation Plan. This plan successfully identified existing conditions, noted important trends, and highlighted the need for decisive action. However, this plan lacked guidance for implementing its recommendations.

This strategy memo outlines the next steps needed to create an impactful and implementable Climate Action Plan (CAP) update that will set Marquette as a model for climate preparedness for other cities in the UP.



Figure 1 Marquette County requests shoreline of Great Lakes be declared "disaster area" | ABC News

IMPACT OF GHG EMISSIONS & BENEFITS OF DECARBONIZATION

Greenhouse gases (GHGs) are necessary to sustain life on Earth by maintaining a habitable climate. However, excessive GHGs, primarily resulting from our reliance on fossil fuels for industry and energy production, have trapped heat in the atmosphere and warmed our planet beyond safe and sustainable levels for plants, animals, and humans. As global surface temperatures rise, we will continue to experience the following consequences of our reliance on fossil fuels for industry and energy production:

- Changes in water levels in Lake Superior, which can impact Marquette's shoreline and infrastructure
- Shoreline erosion
- Drought and subsequent wildfires, which can be especially dangerous in the heavily wooded areas surrounding the city
- Increased frequency and intensity of storms, leading to infrastructure strain and damage such as cracked roads and pipes
- Increased risk of flooding due to more frequent and severe storms
- Respiratory issues due to pollutants and particulates that reduce air quality
- Mental health risks such as prolonged stress and depression brought about by damages, displacement, or trauma as a result of extreme climate disaster events
- Physical health risks related to extreme temperatures such as heat stroke
- Risk for potential increase of vector-borne disease as higher temperatures create more favorable conditions for mosquitos and ticks
- Food insecurity due to supply chain issues related to animal illness, diseased crops, and extreme swings in temperature or precipitation that affect the growing season
- Depletion of critical ecosystem services such as pollination, decomposition, flood control, and carbon sequestration

By addressing the root cause of these problems through decarbonization and other strategies, we can begin seeing the following improvements:

- Slow the rate of global warming and its impact on climate change
- Improve health and quality of life for Marquette community members by reducing air pollution, making it easier and more pleasant to be outside and experience less frequent asthma-related health issues
- Secure valuable ecosystem services that contribute to agricultural production, healthy water quality for drinking and recreation, flood and erosion control, and the raw materials needed to produce goods, maintain the economy, and potentially enhance new economic markets such as <u>green industries</u>.
- Mitigate future increases in the frequency and intensity of extreme weather events
- Lower energy bills through the use of renewables

SETTING THE STAGE FOR A SUCCESSFUL PLAN

The Local Governments for Sustainability (or ICLEI, formerly known as the International Council for Local Environmental Initiatives) provides guiding principles for reducing GHG emissions and adapting to the impacts of climate change.

These are the ICLEI Guiding Principles for Climate Action Planning:

Ambitious

Relevant

- Inclusive
- Fair

Actionable

- Evidence-based
- Comprehensive and integrated
- Transparent and verifiable

With these principles, Marquette can hope to develop a plan that not only identifies challenges and offers recommendations for the future, but one that uses calculated projections to inform strategy, sets long- and shortterm goals with measurable targets, benchmarks real data and offers guidance for tracking progress, creates a timeline with a sense of urgency, and assigns responsible parties to take ownership of action items.

Sectoral examples for how to approach climate action in Marguette include energy efficiency and reliability, increasing walkability and public transit options, and protections against temperature-related health hazards. Improvements to land use, protection of ecosystem services, and creating resilience to natural hazards are cross-sectoral, relating to all sectors and having the ability to create a more holistic system by identifying co-benefits and overlaps. Adopting cross-sectoral climate actions may be more fiscally achievable than a focused effort in one sector, so being aware of these synergies can have widespread positive impact across the city. Examples of sectoral and cross-sectoral actions can be found in the graphic to the right.



CITY OF MAROUFTTE - CLIMATE ACTION PLAN STRATEGY RECOMMENDATIONS Prepared by SmithGroup as part of the MEDC resilience pilot program | August 2023

PLANNING PROCESS

Climate action planning creates a framework and timeline for implementing positive action toward resilience, covering a range of topics from decarbonization on a large scale to involving technical recommendations for infrastructure or behavior changes for those who live and work in the community. A successful CAP will include a matrix of actions identifying exactly what needs to be done, when the action should be accomplished, and who will be the responsible party seeing it through.

- 1. Establish a Climate Action Task Force: Assemble a task force, including city officials, experts, community leaders, and stakeholders. This could be an offshoot of existing entities such as the Climate Adaptation Task Force, but it should have a clear mission and dedication to creating and implementing a CAP. This team will be responsible for guiding the CAP process, setting goals, and ensuring on-going communication and collaboration with the broader Marquette community.
- 2. Foster Community Engagement and Education: ICLEI highlights public involvement as a crucial component of a successful plan. This means that the community should be engaged at the beginning of the CAP process and have input on what goals are to be set and how they want to participate. Similarly, key stakeholder groups should be asked to participate early on to understand their interests and level of involvement. These stakeholder groups will be instrumental in successfully following through with the plan's ambitious timeline.

Engage the Marquette community in the CAP process through regular communication, education, and outreach. Encourage community members to take individual actions that support the plan's goals and contribute to the city's overall resilience. The CAP outreach can and should be integrated with existing efforts such as the community master plan, downtown plans, neighborhood conversations and more. Climate Action Task Force members will be key initial champions of conducting this engagement, with a goal for partners and community stakeholders to continue engaging as knowledge about the CAP becomes more widespread.

- **3.** Assess Climate Risks and Vulnerabilities: Build on the work conducted by MEDC and SmithGroup by using the MEDC RRC Resiliency Toolkit to conduct a comprehensive assessment of Marquette's unique risks and vulnerabilities related to climate change specifically. This assessment should consider factors such as coastal erosion, flooding, extreme weather events, and the impact on infrastructure, natural resources, and public health.
- 4. Establish an Emissions Inventory & Baseline: A GHG emissions inventory is an important set of information that will help the City to identify the most impactful opportunities for carbon reduction efforts. A baseline assessment of current water usage, waste generation, energy use and generation, mobility, supply chain operations, and other areas is important for establishing a starting point against which progress can be measured over time. ICLEI has tools that can help create a baseline inventory, forecast emissions, explore possible actions, and monitor progress.

- **5.** Set Emissions Reduction Targets: Establish short- and long-term greenhouse gas emissions reduction targets that align with state and federal goals, as well as international commitments. These targets should be ambitious, yet achievable, and should consider Marquette's specific circumstances.
- 6. Identify Strategies and Actions: Develop a comprehensive list of strategies and actions that will help Marquette achieve its emissions reduction targets and enhance its resilience to climate impacts. Utilize resources from the MEDC RRC Resiliency Toolkit and ICLEI to identify best practices and innovative solutions. Engage the community in identifying local priorities and unique opportunities.

Engage a Consultant (Optional): Consider hiring a consultant with expertise in climate action planning to assist in the development and implementation of the CAP. A consultant can provide valuable insights, recommendations, and support, helping to ensure the plan is both effective and grounded in best practices.

- 7. Develop a Climate Action Plan: Combine the findings from the risk and vulnerability assessment, emissions reduction targets, and identified strategies and actions into a cohesive and comprehensive plan. This plan should include a clear timeline, assigned responsibilities, and performance metrics to track progress. The graphic on the following page demonstrates what we have found to be an effective timeline for climate action planning.
- 8. Adopt & Implement the Climate Action Plan: Work collaboratively across city departments, with community partners, and stakeholders to implement the strategies and actions outlined in the CAP. Establish a system for monitoring and reporting on progress, and regularly review and update the plan as needed to ensure its continued effectiveness.
- **9. Track Progress & Update the Climate Action Plan:** As Marquette works its way through the action items laid out in the CAP, the City should update the plan to reflect the current status and next steps.

It is important for the CAP to be treated as a living document, as to prevent the plan from becoming stagnant and outdated.

CAP Methodology



SMITHGROUP

Example methodology

CREATING MEASURABLE CHANGE

Sustainable development *goals* are high level statements of commitment toward a greener and more resilient future. *Targets* refer to specific, measurable, time-bound efforts that can be tracked over time to monitor progress. Choosing the right *key performance indicators* (KPIs) will be helpful in tracking progress toward targets. It is important that KPIs are decided upon and tracked as part of a baseline assessment, as these are the most reliable and evidence-based indicators of progress.

Many municipalities choose to use target years to instill a sense of urgency. The Climate Clock¹ can be utilized as a point of reference for determining the City's commitment, as this countdown shows the critical time window to reach zero emissions before the "tipping point", or the point at which global surface temperature is projected to rise 1.5 degrees Celsius above pre-industrialization levels and put us past the threshold of irreversible damage. This is based upon calculations made by the Intergovernmental Panel on Climate Change which state that this temperature rise is likely to occur between 2030 and 2052.²

Here are some reduction targets, along with KPIs to measure them:

Percent reduction of per capita waste diversion from landfill

Work with waste and recycling collection services including the City of Marquette, The Recycling Partnership, Recycle 906, and EGLE to provide **waste data by weight**.

Carbon neutrality

GHG emission inventory should include at minimum Carbon Dioxide (CO_2) , Nitrous Oxide (N_2O) , and Methane (CH_4) . The ICLEI US Community Protocol provides resources, tools, and guidance about how to complete a GHG inventory and which sources to track.³



¹ <u>Climate Clock</u>

² <u>Summary for Policymakers — Global Warming of 1.5 ^oC (ipcc.ch)</u>

³ <u>ICLEI US</u>

Percent recycled water for landscaping

Commit to using greywater for irrigation on City owned property. Sources of greywater may include harvested rainwater and water from sinks in public buildings. Efforts to minimize the amount of water needed may include using native and drought tolerant species, xeriscaping, and reducing the amount of turf used. Water metering can be helpful for tracking gallons of water consumption.

Annual potable water use reduction by percent per capita

Work with the Water Filtration Plant to obtain data. This metric can be calculated by dividing the volume of water sold by the number of residents served.

Percent alternative fuel fleet and public transit

Determine the percentage of bus, rail, and city owned vehicles that are run by sustainable alternative fuels such as electricity, hydrogen, and biogas.

Dollar amount of annual grant funding toward residential energy efficiency projects

This is a dollar amount dedicated toward incentivizing green energy home upgrades.

PARTNERING FOR CHANGE

Community and stakeholder engagement is essential to the climate action planning process. The reality is that the City can't do this alone, and it shouldn't try! Partnerships are needed and encouraged to expand the City's capacity to achieve the action items specified in the CAP as well as to get the community involved in and excited for the evolution of the place they call home. As part of the MEDC RRC Resiliency Pilot Program, the planning team hosted a working session with City of Marquette staff, agency representatives, and local subject matter experts.

Objectives included:

- Explaining the MEDC RRC Pilot Program process and timeline;
- Sharing our findings to date;
- Discussing major projects that the City and its partners are working on;
- Prioritizing key challenges yet to be addressed; and,
- Identifying opportunities to overcome those challenges.

These conversations with community members and stakeholders who displayed interest regarding climate action identified valuable partnerships with organizations that are eager and willing to participate in strategic planning.

Utilizing the City's social capital can stretch budgeting to accommodate more projects and assign responsible parties to take ownership of different portions of the plan. While it is important to engage with participants who have already been involved and shown excitement about climate action planning, some other potential partnerships are listed below:

- Community Energy Plan | The Marquette Board of Light and Power may be able to assist in creating a sustainable community energy plan focused on ways to improve grid reliability and implement a demand response program to encourage customers to participate in peak load reduction.
- Education | Work with Recycle 906 and Marquette Public Schools to adopt strategies for residents to correctly participate in recycling and composting efforts to reduce contamination and improve system efficiency. This may include bin markings or signage in public areas and cafeteria waste composting and education programming at K-12 schools. (Call for action: Marquette Messenger | District, Community Encourages Educated Recycling)
- Air Quality Monitoring | Initiate collaboration with the Marquette County Climate Adaptation Task Force, EGLE, and the Northern Michigan University Environmental Sciences program to perform air quality monitoring, data review, and recommendations for improvement.
- Preparing for Emergencies | UP Health System and the Marquette Police and Fire Departments may be valuable partners for developing a city disaster preparedness and response plan including evacuation routing, ADA assistance, search and rescue operations, training for first responders, and emergency communications.
- Leveraging the Volunteer Community | The Marquette Beautification & Restoration Committee is a non-profit focused on enhancing the appearance of the city through efforts such as gardening, graffiti removal, and litter clean-up. Collaboration with this group and others such as The United Way could involve using city funding to support more volunteer-led projects.

Community Energy Plan

A community energy plan with a focus on sustainable energy choices and resilient infrastructure can help fortify Marquette against system shocks. Due to the increasing frequency of extreme weather events, Americans have seen a 67% increase of major blackouts since the turn of the century.⁴ These power outages can often take hours or days for utility companies to resolve, compounding stressors on residents the longer they are left in the dark.

This time without power can:

- put vulnerable populations at risk. Even worse, unreliable power can mean a death sentence to those relying on critical life support services
- easily lead to food waste due to lack of refrigeration. This can put stress on family budgets and create high demand for local grocery stores to resupply the community after an event, throwing off procurement operations
- put business operations on pause, leaving the owners and their employees without an income

⁴ <u>Renewable Energy and Energy Storage Can Help You Power Through Natural Disasters | Department of Energy</u>

Our daily lives rely so heavily on energy that a power outage can easily bring an entire community to its knees, but an energy plan can help to prevent avoidable down-time as well as assist in regulating utility costs for customers by having reliable, local energy resources. The Superior Watershed Partnership Energy and Climate Office has recently taken exciting steps forward toward securing the energy grid for some of Marquette's most vulnerable households through <u>an innovative income-qualified solar program</u>. This program will provide over 30% of household energy needs, reducing emissions while helping families save on their energy bills. For more information about current regional energy initiatives, see Section 5 of the Community Resiliency Assessment.

The creation of systemic resilience through infrastructure involves several moving pieces, check out the graphic below to learn more.



CITY OF MARQUETTE - CLIMATE ACTION PLAN STRATEGY RECOMMENDATIONS Prepared by SmithGroup as part of the MEDC resilience pilot program | August 2023 Just as one diversifies their financial portfolio to avoid risk and allow for market fluctuation, energy diversification can lighten the burdens brought about by climate change and other factors in the same way. Smart grids using decentralized energy distributions, renewable energy sources, and technology to assist with daily usage adjustments can help to balance system load and absorb some of the shocks of external market forces by supplementing the supply. The graphic below shows examples of what a modernized grid looks like.

To offer guidance on grid modernization, the World Economic Forum has developed a framework which balances energy security and sustainability. The framework includes steps for improving efficiency and taking advantage of immediate cost savings, implementing incentives to encourage public buyin, collaboration between public and private entities, diversification of energy mix for supply security, utilizing smart grid strategies for optimized resilience, and establishing physical and digital security measures to protect against cyberterrorism.⁵ Following this framework, the City, in partnership with the Marquette Board of Light & Power, can hope to implement a smooth transition to a smarter, more reliable energy grid.



Figure 2 The Smart Grid | SmartGrid.gov

Education

The Three R's (reduce, reuse, recycle) has been one of the most effective programs for teaching the public about environmentalism, and it started in communities and schools. Children across the United States have learned about waste reduction and how to be eco-friendly through events, programming, and school curriculum since the 1970s, when the first Earth Day was held. Recycle 906 and Marquette Public Schools are already in the business of education, making them great partners for teaching families about their role in climate adaptation.

⁵ <u>6 ways to simultaneously advance energy security and sustainability | World Economic Forum (weforum.org)</u>

The links below offer examples of outreach and educational materials:

- List: Climate and Sustainability | Curated by City of Palo Alto | Medium
- Lexington Climate Summary Factsheet R3 (lexingtonma.gov)
- <u>Change For Climate Lunchbox Series | City of Edmonton</u>
- <u>Green Education Resources | City of Edmonton</u>

The City can support the Marquette County CATF, Northern Michigan University, and other related educational institutions in developing educational materials for implementation in the public school system and City owned spaces. The schools can introduce ways to practice the methods that are being taught by incorporating composting and recycling into classrooms and cafeterias, leading class projects on public grounds about how to create a rain garden, and getting involved in community swap meeting to learn about the benefits of using secondhand items. These educational materials can also be used on social media, in notices mailed with water and energy bills, and at events held throughout the year. This communications process should be a multi-pronged effort to build awareness and explain how residents can take part in climate action.

Air Quality Monitoring

Continuous air quality monitoring can be a helpful tool for identifying trends over time and the types of pollutants that are present; it can also assist with observing progress toward improvement after implementing strategic solutions. While there are many State monitoring sites throughout the lower peninsula, the UP only has one site regulated by EGLE, located in Seney.⁶ Individual contributors in L'Anse and Sault Ste Marie are monitoring air quality in their areas, however these locations do not offer localized data that would be helpful for those living in Marquette to understand daily air pollution levels.

Partnering with Northern Michigan University could be a great way to introduce more monitoring stations to the UP. Marquette residents can benefit from this by having data that can inform their daily activities, the State benefits by acquiring public stations to expand their reach into the UP, and students at the university can participate in hands-on learning through maintenance, operation, and monitoring of the data. In conjunction with this effort, the City can implement an <u>Air Quality Flag</u> <u>Program</u> so that members of the community are aware of high sensitivity days.



⁶ <u>Air Monitoring Sites (arcgis.com)</u>

Preparing for Emergencies

First responders are among those most familiar with the events that unfold following a disaster. They see first-hand the flaws in the system, where the infrastructure failed or was not there to support access, and how people were affected. This experience makes police, fire departments, and health care providers some of the most valuable partners to have when preparing a disaster preparedness plan. First responders deal with on-the-spot, critical decisions, so it is best to know what factors can be controlled and prepared ahead of an event to save time, resources, and human lives. These partnerships can also be helpful in providing community training opportunities in first aid so residents can learn how to help before help arrives. FEMA provides a <u>Preparedness Community</u> and <u>Training and Education</u> with valuable resources that can be used in brainstorming sessions with these partners. The City of Marquette should support the Marquette County Emergency Management Office in creating a disaster preparedness plan in partnership with city staff and local first responders.

Leveraging the Volunteer Community

Marquette has a robust community of volunteers, from the United Way to the Marquette Beautification & Restoration Committee. Leaning on volunteer-led efforts to tackle issues such a litter removal and community gardening can improve the look and feel of the city, produce much needed sources of fresh fruits and vegetables, get residents outside and active, and build strong social connections. The CAP process can help to identify important partnerships and offer suggested action items. Each volunteer organization involved in the climate action plan should be able to find clear action items for them to implement which align with their organizational goals and objectives. Check in with these organizations annually to ensure progress is being made and track their performance metrics.

SUSTAINABILITY COORDINATION

While partnerships are key to the implementation of a successful CAP, expanding internal staff capacity through a dedicated sustainability staff person could be extremely beneficial to the City in both the short and long term. There are several benefits of having a team dedicated to environmental sustainability and climate initiatives. The most impactful benefit is having access to professionals who excel at systems thinking, are technically savvy regarding tools for energy modeling and climate projection, who use science-backed research and real data to identify and track the most impactful key performance indicators, and who can provide guidance to the City for building a resilient future.

There is also advantage to having a dedicated City staff member with a background in sustainability who knows the intricate inner workings of the city of Marquette, understands its economy and supply chains, has experience interfacing with local business owners and investors, and most importantly, has a personal connection to the city. This staff member can ensure that growth is encouraged and celebrated without compromising the integrity of the built and natural environments so that Marquette can continue to thrive, now and in the future. They can also be there to ensure that the public knows why policies are being enacted, how these policies might affect their lives, and what community members can do to engage in climate adaptation in a way that benefits their lifestyles.

This local champion will be able to coordinate with other planners and consultants to define and implement actionable, measurable, results-driven tasks that are focused entirely on maintaining a balanced effort of supporting the **people** who make up Marquette's unique community, the **places** they live and work, and the local **economy** that supports their daily lives. This effort will engage residents, business owners, and developers in practices that are convenient and simple to integrate into daily routines and operations, empowering them to be part of the process by making the "green" choice, the easy choice.

WHAT'S NEXT?

Marquette is in a great position to begin the CAP process, having recently been a MEDC Resiliency Assessment Pilot Community and updating the community Master Plan. Through these efforts, many of the community's concerns regarding the impacts of climate change have already been identified. With many of the initial steps already having been accomplished as part of the Community Assessment, the City can begin benchmarking and identifying strategies on an expedited timeline, meaning climate action can begin being implemented much more quickly than it could if the City were to wait until a future date.

Immediate Actions

The immediate next steps involve organization and coordination. We recommend the formation of a dedicated Climate Action Task Force. This team would consist of city officials, community leaders, representatives from key partnerships identified in the CAP, and engaged citizens. This Task Force will be responsible for propelling the implementation of the CAP.

As we move forward, it's important for the Climate Action Task Force to:

Establish Clear Metrics: Develop measurable indicators of progress for each part of the CAP. This includes setting short- and long-term goals connected to each strategy and action item.

Secure Funding: Identify and secure funding for the initial stages of the CAP. This might involve looking into potential grants, public-private partnerships, and other funding sources.

Engage the Community: Initiate comprehensive community engagement efforts. This could include town hall meetings, public forums, and using social media to share information about the CAP and solicit input from residents.

Medium-term Actions

The medium-term actions will concentrate on putting the key strategies in the CAP into action:

Energy Transition: Collaborate with the Marquette Board of Light & Power to commence the development of a sustainable community energy plan. This includes investigating grid modernization and diversification of energy sources.

Education Initiatives: Launch cooperative efforts with Recycle 906 and Marquette Public Schools to incorporate environmental education into schools and community programs.

Air Quality Monitoring: Form a partnership with Northern Michigan University to install air quality monitoring stations throughout the city. Emergency Preparedness: Coordinate with UP Health System and Marquette Police and Fire Departments to start drafting a comprehensive emergency preparedness and response plan.

Long-term Actions

The long-term actions will focus on the ongoing advancement of the CAP:

Ongoing Implementation: Continuously monitor the implementation of the CAP, making adjustments as necessary to ensure that the plan remains effective and responsive to the changing climate and evolving community needs.

Continuous Improvement: Regularly review and update the CAP, incorporating new technologies, strategies, and information as they become available. This ensures that Marquette's approach to climate action remains at the forefront of environmental stewardship.

Sustainability Culture: Foster a culture of sustainability in Marquette. This involves promoting sustainable practices in homes, businesses, schools, and public spaces.

Throughout the long-term actions, the services of a consultant could continue to be invaluable. As the CAP evolves, a consultant can provide guidance on emerging best practices, new technologies, and innovative strategies in climate action.

Throughout the process of creating and implementing a CAP, enlisting additional expert opinion outside the aforementioned partnerships could be extremely beneficial. Whether collaborating with relevant consultants or hiring dedicated resiliency staff, having expert knowledge can be helpful in the short-, midand long-term. These professionals can provide specialized knowledge and support to ensure that the City is utilizing the most effective strategies, carrying out the CAP efficiently, and continuously update the CAP based on emerging best practices or new technologies.

With its foundation as an MEDC Resiliency Assessment Pilot Community, Marquette is already off to a strong start. As Marquette moves forward, it will build on this foundation, working to create a city that is not just resilient to the challenges of climate change, but also sets a standard for sustainable living.