



KEWEENAW BAY INDIAN COMMUNITY PRIORITY CLIMATE ACTION PLAN

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Collaborators for developing the Priority Climate Action Plan include the Keweenaw Bay Indian Community (KBIC) Committee for Alternative & Renewable Energy (CARE), Michigan Technological University, Midwest Tribal Energy Resources Association (MTERA), the Village of Baraga, the Village of L'Anse, Upper Peninsula Power Co (UPPCO), Ontonagon Rural Electric Association (REA), SEMCO.



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ENVIRONMENT, GREAT LAKES, AND ENERGY



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Executive Summary

The purpose of the Priority Climate Action Plan (PCAP) is to provide the Keweenaw Bay Indian Community (KBIC) with a plan that identifies different sources of Greenhouse Gas (GHG) Emissions within the community and to develop a list of measures to reduce GHG Emissions. The plan will include a focus of high priority, near term, implementation ready measures to reduce GHG pollution and an analysis of GHG emission reductions that would be achieved through implementation within the next five years. Along with proposed GHG emission reduction measures, this report includes a benefits analysis, implementation schedule, authority to implement, funding opportunities available, workforce needed, and tracking metrics.

8th Fire Consulting, LLC was contracted by KBIC to develop the Priority Climate Action Plan (PCAP). Sarah Smith, owner of 8th Fire Consulting, LLC led the PCAP team for completion of the elements required for the PCAP. Members of the PCAP team include Don Lee, acting as technical staff on the CPRG grant. Don is a PhD Candidate in Environmental and Energy Policy, at Michigan Technological University (MTU). Don is also working as a research associate on the Michigan Community & Anishinaabe Renewable Energy Sovereignty (MICARES) project. The PCAP team also includes several staff from the Natural Resources Department (NRD), including Dione Price, Environmental Health Manager; Teal Sackett, Air Quality Specialist; Justin Woodruff, Water Resources Specialist; and Evelyn Ravindran, Natural Resources Director. NRD staff are also part of KBIC's Committee for Alternative & Renewable Energy (CARE).

PCAP elements and key takeaways

A GHG Inventory was one of the required elements of the PCAP. The EPA Tribal GHG Inventory Tool was used to record data specific to Tribal Government and Baraga County residential data. Population numbers were factored to determine the approximate GHG emissions of the Tribal community of 1130 members included in 8158 total Baraga County residents.

Below are results specific to the Tribal Community located in Baraga County only.

Total Emissions by Sector and Source (MT CO ₂ e)											
Sector	Stationary	Electricity	Mobile	Solid Waste	Waste water	Water	Agriculture & Land Management	Urban Forestry	Other	TOTAL GROSS	TOTAL NET
Residential	1,212.83	3,358.81	5,625.43	-	-	-	-	-	-	10,197.07	10,197.07
Commercial/Institutional	1,003.36	2,772.12	219.70	-	361.92	-	-	-	-	4,357.10	4,357.10
Industrial	-	-	-	-	-	-	1,743.51	-	-	1,743.51	1,743.51
Energy Generation	-	(18.30)	-	-	-	-	-	-	-	(18.30)	(18.30)
Total	2,216.19	6,112.63	5,845.13	-	361.92	-	1,743.51	-	-	16,279.39	16,279.39

GHG reduction measures for the PCAP were identified with a focus on renewable energy generation, residential and commercial building retrofits, transportation, and agriculture and land management. The Comprehensive Climate Action Plan (CCAP) will include all measures that will lead towards GHG emission reductions to address the US Strategy of reaching carbon neutrality by 2050¹. The CCAP will follow the same format as the PCAP, but will be more comprehensive and will further address measures for each sector. It is expected that the Tribe will apply for the EPA CPRG Implementation grant. If

¹ <https://www.energy.gov/articles/doe-releases-roadmap-achieve-carbon-neutral-aviation-emissions>

awarded, an environmental review will take place for each location chosen for new construction. Staff will need to be hired and contractors procured for installation of microgrids, weatherization of homes, energy efficient appliances, including the installation of heat pumps.

1 Introduction

KBIC is the successor in interest of the L'Anse and Ontonagon Bands of Lake Superior Chippewa Indians, and signatories to the 1842 Treaty with the Chippewa (7 Stat. 591) and the 1854 Treaty with the Chippewa (10 Stat. 1109). KBIC is an Anishinaabe "Ojibwa" tribe; considered the oldest federally recognized tribe and retaining the largest land base within the State of Michigan. KBIC L'Anse Reservation is located on the Keweenaw Bay of Lake Superior in Baraga County and is KBIC's main land base. The Reservation is composed of 59,067 acres, 17 miles of Lake Superior shoreline, 80 miles of streams and rivers, 15,000 acres of lakes, and 3,000 acres of wetlands. The total membership as of December 14, 2023 was 3589, with 1,130 residing in Baraga County.² KBIC is a federally recognized Tribe with a Tribal Constitution and By-Laws that were adopted and approved by the Secretary of the Interior of the United States on December 17, 1936. The reservation boundaries are non-contiguous, where there are two districts residing on opposite sides of Keweenaw Bay. KBIC has Treatment as a State for Air for monitoring purposes and Treatment as a State for Water to develop Water Quality Standards.

KBIC Tribal Council is composed of 12 members elected to serve 3-year terms by the voting membership. Tribal elections are held annually in the month of December with reorganization taking place the following January. During the reorganization, the Tribal Council elects from within its own membership positions for the Executive Board (President, Vice-President, Treasurer, Secretary, Assistant Secretary). One third of the Council is up for election every year. KBIC created a Committee for Alternative & Renewable Energy (CARE) in 2008 through Tribal Council resolution. The departments of the Tribe that participate on this committee include Natural Resources, Realty, Public Works, Grants, and Community Assistance Programs departments. A member of the Cultural Committee is also on the committee and representatives from the Tribal Council and the Chief Executive Officer's office also participate on the committee. CARE is advisory and makes recommendations to the Tribal Council for energy and energy efficiency projects, including renewable energy projects. The NRD staff that regularly participate on the committee includes the Natural Resources Director, Environmental Specialist/Environmental Health Section Lead, and Air Quality Specialist. The Tribal Council is the authority for adoption of the PCAP. KBIC Tribal Council contracted with 8th Fire Consulting, LLC to develop the Priority Climate Action Plan and Comprehensive Climate Action Plan.

The need to address climate change has been identified as a priority in the KBIC Strategic plan. In 2021, KBIC formally amended the CARE By-Laws through Resolution KB-068-2021 to work with outside organizations to promote energy sovereignty and included the Michigan Community & Anishinaabe Rural Energy Sovereignty project (MICARES) as a collaborator. In 2022, KBIC amended the CARE's By-Laws to become a member tribe and appointed a representative and proxy to serve on the Midwest Tribal Energy Resource Association (MTERA). A Strategic Energy Plan was adopted in 2008 and a draft update was developed in 2015 and again in 2019. In addition to this draft and KBIC Strategic Plan, KBIC also has several other planning documents. These include: KBIC Hazard Mitigation Plan, Great Lakes

² Email from Diana Chaudier, Enrollment Director, dated December 14, 2023.

Indian Fish & Wildlife Commission (GLIFWC) Tribal Climate Adaptation Menu, GLIFWC Climate Change Vulnerability Assessment Version 2, Michigan Tribal Climate Change Vulnerability Assessment, and Adaptation Planning: Project Report.

KBIC is one of 11 Tribes that make up the membership of the GLIFWC whose member tribes signed treaties in 1836, 1837, 1842, and 1854 with the United States government. In those treaties they ceded (sold) land in northern Michigan, Wisconsin and Minnesota, but retained the rights to hunt, fish and gather in the ceded territories.³

GLIFWC has prepared Version 2 of the Vulnerability Assessment, entitled Aanji-bimaadiziimagak o'ow aki.

“We currently stand at a fork in the road, in the age of the seventh fire. Climate change threatens the very existence of some beings in the Ceded Territories and therefore also threatens relationships held with these beings for thousands of years. Every aspect of Ojibwe culture related to these beings, including subsistence harvesting, spiritual relationships, ceremonies, language, and stories will be affected. This assessment is a first step in helping us determine how best to take care of these beings who take care of us. It is, however, only the start of a process. GLIFWC serves 11 distinct Ojibwe communities and helps them implement their treaty rights and co-manage natural resources over 60,000 square miles of Ceded Territory in three states. Adaptation, like language and culture, is place-based, so strategies and tactics that work for one community may not work or may not be appropriate in another.”⁴

KBIC is also one of 9 Michigan Tribes that participated in the development of a technical report through the Michigan Tribal Adaptation Planning Project. This report identified Energy Use and Utilities as an area to address Climate Change and recommended alternative renewable energy as a strategy for resilience and proposed changes in the electric grid due to increasing global temperatures due to climate change. The report also recommended “the installation of energy efficient heating and cooling systems within structures” (Li et al. 2012; Melilli et al. 2014).⁵ KBIC is also a member of the MTERA, whose mission is to “empower Midwest Tribes to manage Tribal energy resources through collective action”.

The PCAP will primarily focus on 4 areas: Reduction of energy emissions through renewable energy generation for the power sector, reduction of energy consumption through building retrofits (commercial and residential) through the Building sector, reduction of emissions from vehicles for the Transportation sector, and environmental management and planning techniques for Agriculture and land management sector. These sectors closely represent the priorities of CARE and the Tribal community based on surveys conducted in 2021 and 2024. By focusing on these GHG reduction measures, the Tribe can reduce GHG emissions that contribute to climate change and promote Tribal Energy Sovereignty and resilience.

³ [Treaty Rights \(glifwc.org\)](https://glifwc.org)

⁴ [Aanji-bimaadiziimagak o'ow aki: Climate Change Vulnerability Assessment Version 2](#)

⁵ [2016 ITCMI Report.pdf - Google Drive](#)

1.1 CPRG overview

The Climate Pollution Reduction Grant (CPRG) was one of many of the grant programs provided through the Inflation Reduction Act package that is administered by the Environmental Protection Agency (EPA). KBIC first learned of this grant through a monthly funding update provided to MTERA member Tribes. NRD staff also learned of this opportunity from one of its EPA Region 5 Project Officers. Environmental Health Manager and KBIC MTERA Alternative Representative discussed applying for the planning grant. The CPRG planning grant was seen as a pathway to applying for implementation funding to meet several goals within KBIC, while addressing several of EPA strategic goals and obtaining funding for capacity building for the planning process. Staff within Tribal communities have many priorities and often wear many hats and handle several projects at once. The CPRG planning funds created an opportunity to contract with an outside organization to assist with the planning process and build capacity. Permission to pursue the grant was obtained from the Tribe's Chief Executive Officer.

On the NRD website page, the community describes their commitment to the First Treaty,

"Since time immemorial, Great Lakes Indigenous peoples have long-standing nation-to-nation agreements between themselves and their more- than-human relatives for the protection and stewardship of the region. These agreements serve as the foundation for shared governance. According to Anishinaabeg teachings passed from one generation to the next, the people have a long-time, reciprocal obligation with all orders of creation rooted in the people's First Treaty with Gichi Manidoo (the Creator). Also known as Sacred Law or The Great Laws of Nature, the First Treaty obligates all orders of creation, all created from rock, water, fire, and wind - the physical world of sun, stars, moon and earth; plant beings; animal beings; and human beings - to care for one another. The Great Laws govern placement, movement, powers, rhythm and continuity: all things live and work by these laws. ("Ojibway Heritage," Basil Johnson, 1976)." ⁶

The Tribe had a natural progression to move towards applying for CPRG planning funding, as they had formed the Committee for Alternative & Renewable Energy in 2008, adopted a strategic energy plan in 2008, conducted an energy efficiency study and wind feasibility study, trained staff and community members for conducting home energy audits and weatherization from 2009 to 2011, planned and constructed several Solar Photovoltaic (PV) arrays to offset individual buildings from 2013 to 2017, was authorized by EPA for Treatment as a State (TAS) for Air Quality in 2019⁷ and TAS to set Water Quality Standards in 2020⁸, collaborated with MICARES project beginning in 2019 with a formal kickoff meeting in 2020, and became a member of the MTERA in 2022.

Collaboration with Michigan Technological staff and students is a long-term relationship that has been built over many years. The PCAP development strongly relates to several current MTU grant awarded projects including the MICARES project funded by National Science Foundation grant, Alfred P. Sloan Foundation project focused on electrification in the rural north, Western Great Lakes Electric Nation project focusing on EV charging stations, and US EPA STAR program is focused on energy transitions,

⁶ [About Us | Natural Resource Department \(kbic-nsn.gov\)](https://kbic-nsn.gov/about-us)

⁷ [TAS-Air-Quality-story02102020.pdf \(kbic-nsn.gov\)](https://kbic-nsn.gov/tas-air-quality-story02102020.pdf)

⁸ [EPA Authorizes Keweenaw Bay Indian Community to Set Water Quality Standards for L'Anse Reservation in Michigan | US EPA](https://www.epa.gov/press-releases/epa-authorizes-keweenaw-bay-indian-community-set-water-quality-standards-lanse-reservation-michigan)

public health, and economic wellbeing for Baraga County. In 2019, KBIC began collaborating with the MICARES partners, which included Groundworks Center for Resilient Communities, MTU, Michigan State University, 5Lakes Energy, University of Michigan, 8th Fire Consulting, LLC, and KBIC.

When KBIC formally became a member of the MTERA in 2022, the Tribe gained access to many resources for energy development and financing options. MTERA also provides technical resources for calculating GHG reduction and costs or access to a source to gain such information. MTU has provided Phd candidate, Don Lee, to be available for technical assistance. As such, MTU has assisted with research and community outreach, along with analysis of survey data. 8th Fire Consulting, LLC worked with KBIC accounting staff and the utility companies (SEMCO, Ontonagon REA, UPPCO, Village of L'Anse, Village of Baraga) to collect utility information for electricity and heat for all the Tribe's buildings.

The owner of 8th Fire Consulting, LLC is a member of KBIC and has a long history of working with the Tribe. She was previously the Tribe's CEO and is currently serving on the advisory board of the Alfred P. Sloan Foundation project, with several collaborators, such as the Village of L'Anse Manager, Robert LaFave and Native Sun Power Executive Director, Robert Blake. She previously served on the MTERAs board as KBIC's Alternate representative.

As mentioned above, there is a long-term relationship between the Tribe, MTU, and the owner of 8th Fire Consulting. In addition to Don Lee, MTU staff assisting the team includes Dr. Ana Dyreson, Assistant Professor, Mechanical Engineering-Engineering Mechanics, Michigan Technological University; and Jacob Chizek, Graduate Student, Mechanical Engineering-Engineering Mechanics, Michigan Technological University. Dr. Dyreson and Dr. Chelsea Schelly, Ph.D. Professor of Sociology Department of Social Sciences, Michigan Technological University's are co-lead of the Alfred P. Sloan Foundation project, EPA STAR program, along with a subaward for the Western Great Lakes Electric Nation project issued to MTU from Native Sun Power.

The members of the CARE are responsible for providing recommendations to KBIC Tribal Council for projects and strategies that relate to energy, including renewable energy. KBIC has Treatment as a State for Air quality and carefully monitors the air quality of Baraga County and its surrounding areas.

1.2 PCAP Overview and Definitions

The Priority Climate Action Plan is a guidance document for the Keweenaw Bay Indian Community to first identify what the Tribal Community is contributing to GHG emissions that are driving climate change. KBIC was delegated Treatment As A State authority by the Environmental Protection Agency (EPA) for Clean Air Act Sections 105 and 505(a)(2) in 2019. The PCAP team collected various data to help with quantifying the GHG emission reduction measures. Utility bills were collected for all of Tribal government buildings for heat and electricity which contribute to stationary indirect GHG emissions. The commercial vehicles the Tribe owns were inventoried, with a collection of vehicle odometer readings and year of purchase to estimate the annual vehicle miles traveled. NEI data was used to estimate the Tribal community mobile emissions. Wastewater information was collected from the two treatment plants that service the Tribal Community. The Tribe does not have any landfills within its reservation boundaries, so no entry was provided for solid waste. A scope 3 inventory will be done later to

document waste produced within its boundaries and its contribution to GHG emissions. Water is readily available within the reservation boundaries from Lake Superior's Keweenaw Bay. The Tribe does not import water. The Urban Forestry data is not readily available at this time but will be completed for the Comprehensive Climate Action Plan. The methodology for obtaining fertilizer NO₂ emissions was followed⁹, as there was not any local data available. State-level fertilizer data from the State Inventory Tool Agriculture Module¹⁰ was obtained for the 2019-2020 year and 2020-2021 years and multiplied by .35 and .65 respectively. The composition of the fertilizer applied was calculated for synthetic, dried manure, activated sewage sludge, and other organic compounds. Short tons were converted to metric tons and total was applied to all of Michigan categories. Croplands located in Michigan were then scaled to the percentage of cropland located in Baraga County using United States Department of Agriculture (USDA's) QuickStats database¹¹. The GHG potential reduction measures were obtained from the examples presented in the EPA CPRG Implementation application. A presentation on past efforts of the Tribe towards renewable energy projects, energy efficiency, feasibility studies, and climate goals of the United States were presented to a stakeholder group. The stakeholder group was given a survey, and the results were compiled. Based upon the results of the survey and the Tribal GHG inventory, a decision was made to move forward with the building energy efficiency for residential and commercially owned properties, along with the installation of microgrids at three Tribal locations, and rooftop solar for Tribal member residents of Baraga County.

A benefits analysis of the proposed GHG reduction measures is to include accompanying reductions in hazardous air pollutant (HAP) and criteria air pollutant (CAP) emissions (i.e., co-pollutants).

1. Base year of 2020 inventory of co-pollutant emissions including CAP (e.g., NO_x, VOC, SO₂, and direct PM_{2.5}) and HAP emissions for impacted sources/sectors in the jurisdiction. Consistent with EPA guidance on developing base year inventories for the transportation sector, the base year inventory for that sector does not need to be provided as part of this data element.
2. Tribes and territories are not expected to quantify co-pollutant impacts associated with nonindustrial GHG reduction measures. In the CCAP, tribes and territories are expected to submit expected co-pollutant changes resulting from GHG reduction measures listed in the CCAP that were not submitted for the PCAP benefits analysis.¹²

Each measure will document the authority to implement. The Tribal Council through its Constitution adopted December 17, 1936, retains the authority to make decisions for the health and wellbeing for its community and to enact legislation for the benefit of the community and to accept funds from the Federal government and expend said funds for the benefit of the community. The Tribal Council also retains the authority to negotiate with outside local, state, and federal governments for providing electricity and heat to its community members. The Tribal Council also has the authority to negotiate Right of Ways with local utilities.

⁹ [Agriculture and Land Management Appendix to Local Greenhouse Gas Inventory Tool: Community Module \(epa.gov\)](#)

¹⁰ [Download the State Inventory and Projection Tool | US EPA](#)

¹¹ [USDA/NASS QuickStats Ad-hoc Query Tool](#)

¹² [Technical Reference Doc Copollutant Assessment FINAL TO POST.pdf \(epa.gov\)](#)

Each measure will identify other funding mechanisms, including grants available through Federal, state, non-profit, and private funding sources.

A workforce planning analysis is also included for each measure. Based upon the chosen measures, the workforce primarily consists of those positions related to energy audits, weatherization for energy efficiency, solar installation, tax attorney for the Investment Tax Credit, a project manager for microgrid development and engineers and solar installers for aforementioned microgrids and rooftop solar.

Below is a list of definitions associated with the PCAP.

Definitions

Term	Definition
Base Year	A measurement, calculation, or time used as a basis for comparison. According to LGOP, it is good practice to aim for a base year that is likely to be representative of the general level of emissions over the surrounding period.
BAU	Business As Usual. Used to refer to a future scenario in which there are no changes to the status quo.
Biogenic	Biogenic emissions or fuels are produced by the biological processes of living organisms. Note that this term refers only to recently produced (i.e., non-fossil) material of biological origin
BOD₅	Biological Oxygen Demand. The amount of oxygen consumed in five days by decomposing waste, used to measure the amount of waste input or output into a system.
CO₂	Carbon dioxide
CO₂e	Carbon dioxide equivalent emissions. This is determined by multiplying the emissions of methane and nitrous oxide by their Global Warming Potential.
CH₄	Methane. Methane is a greenhouse gas with a GWP that is 25 times that of CO ₂ . It is produced through anaerobic decomposition of waste, enteric fermentation, production of natural gas and petroleum products, and other industrial processes.
Contractual Instrument	Any type of contract between two parties for the sale and purchase of energy bundled with attributes about the energy generation, or for unbundled attribute claims. They can include energy attribute certificates (RECs, GOs, etc.), direct contracts, and residual grid mix emission rates.
Denitrification	The process by which microorganisms remove nitrogen from its fixed form in the soil and release it into the atmosphere in the form of nitrous oxide (N ₂ O)
Direct Emissions	The emissions generated on-site (as opposed to electricity delivered through a grid system), such as from the combustion of fossil fuels

EF	Emission Factor. The value for scaling emissions to activity data in terms of a standard rate of emissions per unit of activity (e.g., grams of carbon dioxide emitted per barrel of fossil fuel consumed).
Effluent	The treated or untreated wastewater that flows out of a source
Energy Attribute Certificate	A category of contractual instrument that represents certain information (or attributes) about the energy generated, but does not represent the energy itself. This category includes a variety of instruments with different names, including certificates, tags, credits, or generator declarations.
EPA	United States Environmental Protection Agency
Fossil Fuel	Any fuel derived from the prehistoric burial of organic matter. Examples include natural gas (methane or CH ₄) and petroleum products (gasoline, diesel, kerosene, propane, and others). Combustion of petroleum products releases greenhouse gases into the atmosphere.
Fugitive Emissions	Emissions of gasses that escape from pressurized equipment, such as fuel transportation pipelines or wastewater treatment plants.
G.G.E.	Gallon of gasoline equivalent
GHG	greenhouse gas
GLIFWC	Great Lakes Indian Fish & Wildlife Commission
GPC	Global Protocol for Community-Scale GHG Emissions
GWP	Global Warming Potential. Conversion factor used to compare all greenhouse gas emissions to carbon dioxide equivalent units. The GWP represents the combined effect of the differing times these gases remain in the atmosphere and their relative effectiveness in absorbing outgoing thermal infrared radiation.
Indirect Emissions	Refers to indirect emissions associated with the consumption of purchased or acquired electricity, steam, heating, or cooling. These emissions can be allocated in an inventory to an entity, but are generated offsite. An example is electricity that is not generated directly at a facility. A facility uses electricity on-site, but the fuels used to generate the electricity are combusted off-site, perhaps at a regional power plant. If the generation source is at a different site that is also operated by the tribe, it is not an indirect emission source.
KBIC	Keweenaw Bay Indian Community
Kg	kilograms
kW	kilowatt
kWh	kilowatt-hour
LEED	Leadership in Energy and Environmental Design
LFG	landfill gas
LGOP	Local Government Operations Protocol

Location-based method	Reflects the average emissions intensity of grids on which energy consumption occurs (using exclusively grid-average emission factor data).
Market-based method	Reflects emissions from electricity based on where tribes have specifically chosen to procure power (e.g., Renewable Energy Credits (RECs)), using utility-specific emission factors to estimate emissions from grid electricity purchases, where applicable, and accounting for other contractual instruments.
Mcf	thousand cubic feet of natural gas
MG	million gallons
MICARES	Michigan Community & Anishinaabe Rural Energy Sovereignty project
Microgrid	a small network of electricity users with a local source of supply that is usually attached to a centralized national grid but is able to function independently
MMBtu	million British Thermal Units, a measure of energy
MPG	miles per gallon
MW	megawatt
Mobile Combustion	The combustion of fuels to power a moving vehicle, such as gasoline or diesel fuel in a car or truck
MT CO₂e	Metric tons of carbon dioxide equivalent. This is the standard unit for measuring greenhouse gas emissions.
NRD	Natural Resources Department
N₂O	nitrous oxide
Nitrification	Biological process in which ammonia is converted to nitrate (NO ₃).
Operational Control	A tribal government has operational control over an operation if it has the full authority to introduce and implement its operating procedures
RPS	Renewable Portfolio Standard
Scope 1 Emissions	All direct GHG emissions
Scope 2 Emissions	Indirect GHG emissions from the consumption of purchased electricity, heat, or steam.
Scope Emissions	Other indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, outsourced activities, etc. The Scope 3 emissions included in this inventory are imported water consumption, waste generation, urban forestry, and agriculture & land management.
Short Tons	American ton, equal to 2,000 lbs. One short ton = 0.907 metric tons
Stationary Combustion	The on-site combustion of fuels to produce electricity, heat, or motive power using equipment in a fixed location

(EPA, 2023)

1.3 Approach to Developing the PCAP

The approach to developing the PCAP involved using stakeholders to gain input on GHG reduction measures. 8th Fire Consulting, LLC and Natural Resource Department staff identified stakeholders at the time of the EPA CPRG application. The stakeholders are primarily members of KBIC Committee for Alternative & Renewable Energy (CARE). However, other stakeholders include Tribal members, utilities, local schools (L'Anse/Baraga/Career & Technological Education (CTE)/Community College/Michigan Technological University), and the Tribal Council.

The GHG Emissions Inventory was completed by KBIC Air Quality Specialist in September 2023 for Baraga County and a 50-mile radius¹³. A more defined GHG Emission Inventory was completed in February using the Tribal GHG Inventory Tool after the presentation to refine emissions due to government operations and residential homes. This involved collecting utility bills for government operations and collecting utility information for electricity and heat use in the County and scaling it to Tribal member residents. The different sectors were explained to the members of KBIC CARE in a presentation on the CPRG process.

Measures to reduce GHG emissions were explored and presented based on the United States Long Term Strategy to reduce GHG emissions, along with the measures listed in the EPA CPRG Implementation grant application. A survey was developed to identify the priority measures within each sector and sent to each member of the CARE to be completed using Survey Monkey. All measures listed in the EPA CPRG Implementation application were included and the stakeholders were asked whether they would like to see the measure as a priority (to be completed within 5 years), a longer-term goal for completion, or not at all. An open-ended question was included for each sector in case a stakeholder had suggestions that were not listed. Those measures ranking more than 80% were chosen as priorities to be further analyzed for KBIC's PCAP. The potential GHG reduction measure impacts were calculated using EPA's Greenhouse Gas Equivalency Calculator¹⁴ for several of the proposed measures. The administrative procedure for each measure was outlined for each proposed measure.

The presentation given to the CARE included an outline of previous work done by CARE and KBIC and high-level measures presented in the United States Strategy to address climate change to remain less than 1.5°C.

The below goals are listed as the Nationally Determined Contribution (NDC)¹⁵:

- The 2030 NDC of 50-52% reductions below 2005 levels, covering all sectors and all gasses
- The goal for 100% carbon pollution-free electricity by 2035
- The goal for net-zero emissions no later than 2050.

¹³ [KBICLevel4EI2020 \(002\)_0.pdf \(kbic-nsn.gov\)](#)

¹⁴ [Greenhouse Gas Equivalencies Calculator | US EPA](#)

¹⁵ [The Long-Term Strategy of the United States, Pathways to Net-Zero Greenhouse Gas Emissions by 2050 \(whitehouse.gov\)](#)

The survey was created using measures provided in the CPRG implementation application and respondents included 11 CARE members. The survey was designed so that the results could inform KBIC's Tribal priorities for GHG reduction measures. Below are some high-level findings:

- A total of 12 measures rate $\geq 81.82\%$ for PCAP within 5 years.
- Top three sectors included Building, Carbon Sinks, and Electric Power Sectors respectively
- There is potential for overlap in implementation between measures in different sectors.

Sector 2 (Electric Power Sector)

- Installation of renewable energy and energy storage systems on Tribal government-owned facilities (90.91%)
- Development of distributed or community-scale renewable energy generation, microgrids, or vehicle-to-grid infrastructure. (81.82%)
- Tribal Energy Utility. (81.82%)

Sector 3 (Building Sector)

- New construction commercial and residential buildings-energy code (90.91%)
- Energy efficiency measures in existing Tribal government-owned, commercial, and residential buildings (90.91%)
- Incentive programs for the purchase of certified energy-efficient appliances, heating and cooling equipment, lighting, and building products to replace inefficient products (90.91%)
- Electrification of Tribal government-owned, commercial, and residential buildings (81.82%)
- Programs to promote recovery and destruction of high-global warming potential (GWP) hydrofluorocarbons (HFCs) used in existing appliances, air conditioning systems, and commercial chillers (81.82%)

Sector 7 (Carbon Sinks Sector)

- Policies to promote improved forest management to enhance carbon stocks on forested land (81.82%)
- Restoration of degraded lands (e.g., brownfields, mine reclamation) and forested lands to enhance carbon sequestration (81.82%)
- Protect Forest (81.82%)

The survey results are analyzed below with the sectors selected based on the number of measures in each sector $\geq 81.82\%$. These include measures from the *building*, *electric power*, and *carbon sink* sectors respectively. This section explores overlap between priority measures within and across sectors.

After this analysis, 8th Fire Consulting, LLC looked at electricity use within the Tribal Government buildings and residential areas to identify the highest usage.

	Unit Description	Sector	Utility	Electricity Consumed kWh
1	Tribal Member Residential Electric-Slope data ¹⁶	Residential	MROE eGRID subregion	4546589

¹⁶ [Data Viewer \(Net Electricity and Natural Gas Consumption\) | State and Local Planning for Energy | NREL](#)

2	Casino	Commercial/Institutional	Village of Baraga	1618080
3	Ojibwa Motel and Restaurant	Commercial/Institutional	Village of Baraga	395360
4	Niiwin Akeaa (old Ojibwa College)	Commercial/Institutional	Village of Baraga	251800
5	Pines	Commercial/Institutional	Village of Baraga	227480
6	NRD 14359 Pequaming Rd-2nd meter REA 4492321	Commercial/Institutional	REA	210520
7	Health Clinic	Commercial/Institutional	Village of Baraga	163360
8	Ojibwa BP, 201 US 41 South, Baraga, MI	Commercial/Institutional	Village of Baraga	155240
9	Bingo Hall	Commercial/Institutional	Village of Baraga	128000
10	Tribal Center	Commercial/Institutional	Village of Baraga	112320
11	Rez Stop	Commercial/Institutional	Village of L'Anse	65145

From the above list, a grouping of locations was identified for Microgrid construction.

The Casino Complex (Casino, Ojibwa Hotel & Restaurant, Niiwin Akeaa, Tribal Center, Pre-Primary and Maintenance Garage (not on list but in close proximity), Pines/Police (not on list but in close proximity to Pines), and NRD (included 2 other meters and estimated new building meter) complex were identified as 3 areas where the Tribe could construct renewable energy for energy resilience and reduction of GHG emissions.

Many webinars and informational meetings were attended by 8th Fire Consulting, LLC, MTU, and KBIC NRD staff. This included weekly check-in meetings amongst team partners, and bi-weekly MI Tribal/state partnership meetings, along with EPA check-in meetings, and Technical Assistance meetings.

The NREL PVWatts tool¹⁷ was used to estimate the size of each microgrid. A cost estimate was obtained for each microgrid¹⁸ and GHG reduction was calculated using EPA tools¹⁹.

The MTERA tool was used to estimate GHG reductions and costs for the building retrofits. This tool was also used for estimating the GHG reduction emissions for charging stations and associated cost.

Each measure was then placed in a table to reference later under GHG Reduction Measures.

The Benefits Analysis guidance document was reviewed by 8th Fire Consulting, LLC. Tribes are required to report on the inventory for the base year for criteria air pollutants (CAP) and hazardous air pollutants

¹⁷ [PVWatts Calculator \(nrel.gov\)](https://pvwatts.nrel.gov/)

¹⁸ [U.S. Solar Photovoltaic System and Energy Storage Cost Benchmarks, With Minimum Sustainable Price Analysis: Q1 2023 \(nrel.gov\)](https://www.nrel.gov/solar/pv/learning/solar_resource_center/articles/US_Solar_Photovoltaic_System_and_Energy_Storage_Cost_Benchmarks_With_Minimum_Sustainable_Price_Analysis_Q1_2023_nrel.gov)

¹⁹ [Greenhouse Gas Equivalencies Calculator | US EPA](https://www.epa.gov/greenhouse-gas-equivalencies-calculator)

(HAP) and any GHG reduction measures related to industry. Thus, since there are not any reduction measures related to industry, there is no estimate for CAP and HAP reductions.

Review of Authority to Implement (*required*) was reviewed for each measure. This includes looking at each utility's website for interconnection agreements, the Tribal constitution, and homeownership, along with land ownership.

Identification of Other Funding Mechanisms was done by looking at updates from Pilar Thomas provided through the MTERA website²⁰. The Tribe has a history of obtaining grants from various sources. Those sources were included under each proposed measure.

The Workforce Planning Analysis included looking at the Tribe's current organizational structure, meeting with the Tribal Employment Rights Office (TERO), touring the Keweenaw Research Center with Dr. Ana Dyreson to view their mobile training unit.

1.4 Scope of the PCAP

The scope of the PCAP includes GHG emission reduction measures that can be implemented within 5 years within Baraga County. The PCAP also includes a benefits analysis of GHG emission reductions, an implementation schedule, milestones for completing a reduction measure, authority to implement each measure, the estimated cost of each measure, and workforce necessary for the successful implementation of the measure.

An Emission Inventory was completed by the Air Quality Specialist and submitted to EPA in October 2023. The EI was noted to be lacking the CO₂e from Erin Newman, EPA Region 5 Climate Change Mitigation Coordinator, and noted that the CCAP would need all Sectors addressed. Thus, the Tribe made the decision to move forward with using the Tribal GHG Emissions Inventory Tool²¹, to ensure completeness and provide for correct reporting in CO₂e. Planning for the PCAP began in June 2023, with preparation of the application for EPA CPRG planning funds. The CPRG was awarded in September of 2023. The Quality Assurance Project Planning document was completed and approved by EPA on November 21, 2023. Procurement for a consultant to complete the PCAP began in September 2023. The Tribal Council approved and later signed the final contract on October 30, 2023. A kickoff meeting with the Natural Resources staff was held in November 2023. A stakeholder presentation and survey were sent out in December 2023. Results were compiled and presented of measures to reduce GHG emissions in January 2023. A brochure was developed and printed for the Midwinter pow wow. This brochure gave a high-level overview of the CPRG planning grant, along with potential and current partnerships. The Tribal Community was also asked if they wanted to submit their email information for further developments of the PCAP. The timeline for the PCAP was written to be completed by 8th Fire Consulting, LLC by March 1, 2024. This was written this way, so that the Tribe would have a planning document for applying for the general competition due April 1, 2024, or the Tribal set-aside competition due May 1, 2024 for implementation funding. The Committee for Alternative & Renewable Energy (CARE) would review the PCAP and provide a recommendation to the Tribal Council on adoption of the PCAP. CARE conducts their business using Robert's Rules of Order, with a majority vote providing a

²⁰ [MTERA](#)

²¹ [Tribal Greenhouse Gas Inventory Tool | US EPA](#)

decision. The Tribal Council also uses Robert's Rules of Order to conduct business, where the majority of the Tribal Council present would decide on adoption of the PCAP.

1.5 Special Considerations for Tribal/Territorial Entities

Many KBIC members rely on wood or propane for heating. In addition, the area has a long history of community logging. One of the utilities, UPPCO, is an investor-owned utility that services many of the residents that have wood or propane heating. For members to switch to heat pumps, they would also need to install renewable energy at the same time to keep monthly utility bills at a reasonable level. MTU student, Jacob Chizek, also prepared an analysis of electrifying a building with a heat pump without renewable energy and found that it would emit more GHG emissions without the offset of renewable energy generation.

KBIC is historically a fishing community that encourages sustenance and commercial fishing. The Tribe submitted an Emissions Inventory in September 2023 that documents high GHG emissions from watercraft.

Emission reductions accomplished through the implementation grant represent progress towards protecting and improving the health of Baraga County residents. Almost 16% of Baraga County residents live below the federal poverty level. Residents experience a cancer mortality rate 172% higher than the Michigan average with current primary care shortage designations in both Health Professional Shortage Area (HPSA) and Medically Underserved Area/Population (MUA/P). Given the difficulty in accessing primary care and the socio-economic statistics of residents, preventing exposure to air pollution is a lifesaving benefit to Michiganders facing these challenges.

Previous work was carried out for the governmental building by completing an energy efficiency report. Costs were obtained for all the buildings. Since that time, some of the work has been completed and some new buildings have either been acquired or built. A building inventory is available through the Energy Star software program. It would be useful for KBIC to consolidate access to energy usage through a centralized utility billing process or ensuring that one individual from NRD has electronic access to energy usage across KBIC government and enterprise assets. Energy efficiency considerations should be prioritized, and new technologies should be considered including heat pumps²². However, deployment of renewable energy generation would also have to occur at the same time.

Residential homes received energy audits completed through a weatherization program initiated by KBIC. The funding for that program was through the Department of Health & Human Services Low Income Home Energy Program Leveraging Incentive program. Funding was obtained from the Department of Energy EECBG to train 14 Tribal members to complete Home Energy Audits and to weatherize homes for energy efficiency. Several elder's homes were weatherized at that time. Each home had an allotted amount to upgrade for energy efficiency as outlined in the audit.

A strategic energy plan was developed in 2008, and later updated, but not finalized to include energy usage from buildings owned by the Tribal government and estimated energy usage based upon local

²² <https://www.energy.gov/energysaver/heat-pump-systems>

utility usage with the Tribal population usage estimates completed through ratios of Tribal population/Total population.

Frontline communities including Indigenous communities bear the brunt of the fossil fuel economy. In the United States treaties with indigenous communities have been consistently violated. Until recently, federal policy has limited the advancement of Tribal energy development through excessive bureaucracy, exorbitant loan application fees, restrictive federal authority, and lack of useful financial incentives. Resources allocated to Tribes through the American Rescue Plan Act (ARP), Bipartisan Infrastructure Law (BIL), and the Inflation Reduction Act (IRA) represent a shift in federal policy that recognizes and addresses the systemic injustices of the fossil fuel economy endured by frontline communities and shortcomings in federal policy to address environmental injustices.

2 PCAP ELEMENTS

2.1 Greenhouse Gas (GHG) Inventory

The scope of GHG emission inventory was limited to the Tribal Government and tribal member residents located in Baraga County, MI. Information was also included for Baraga County Wastewater.

Wastewater system information was collected from both the Village of L'Anse and the Village of Baraga. The Village of L'Anse staff was contacted to obtain utility bills for the system for both electric and natural gas usage and for information on nitrification and whether or not it was an anaerobic or aerobic system. The Zeba Wastewater system is connected to the Village of L'Anse commercial system through a main valve. The number of customers on the Zeba Wastewater system was added to the number of customers for the anaerobic system located in L'Anse. The Village of Baraga provided the electric bills for their system, along with the type of system. They did not include the gas utility bills. The number of septic systems was collected from the Tribe's Public Works Director who maintains a log of Tribal member owned septic systems.

Vehicle information was collected from the accounting office and the Air Quality Specialist. Odometer readings for each vehicle were obtained by visually collecting information from each department with vehicles. The vehicle miles were calculated using the odometer reading divided by the years in use to obtain the annual vehicle miles traveled. The type of fuel was also recorded. Residential data was recorded by using the assumption that half of the 1130 residential members located in Baraga County drove a car and the other half drove a light duty truck. Average annual fuel consumption was obtained for each type of residential and commercial vehicle. The average miles per gallon from the EPA Tribal Greenhouse Gas Inventory Tool.

- Residential Light duty Truck =
 - 636 gallons²³ x 565 residents x 18.5 mpg= 6,647,790 miles
- Residential Car
 - 433 gallons x 565 residents x 24.1 mpg = 5,895,945 miles

²³ [Alternative Fuels Data Center: Maps and Data - Average Annual Fuel Use by Vehicle Type \(energy.gov\)](#)

Building Sector Data was primarily collected from utility bills for each of the Tribe's commercial buildings. Utility bills were located in various accounting departments (government, housing, Ojibwa Holding Company, and casino). In some instances, the utility bills were obtained directly from SEMCO, UPPCO, Ontonagon REA, Village of Baraga, and the Village of L'Anse. Many of the bills had to be hand entered into an excel spreadsheet to calculate MCFs and kwh. Baraga County residential heat and electricity use was obtained from the National Renewable Energy Laboratory. "Net Electricity and Natural Gas Consumption," *State and Local Planning for Energy*²⁴. Natural Gas for residential members in Baraga County was 154, 000 MMBTUs and for electricity was 112, 000 MMBTUs. This data was converted into MCFs for natural gas and kwh for electricity. Baraga County residential data was then scaled for Tribal member residents by multiplying both natural gas and electricity amounts by the factor of Tribal member residents to Baraga County residents.

- Tribal Member residents ÷ Baraga County residents = $1130 \div 8158^{25} = 0.138514342$
- Baraga County Natural Gas 154,000 MMBTUs ÷ 1.037²⁶= 148505.3 MCFs
- Baraga County Residential Electricity 112,000 MMBTUs x 293.07107²⁷= 32823959.84 kwh
- Tribal member residential Natural Gas =148505.3 MCFs x 0.138514342 =20570.11 MCFs
- Tribal member residential Electricity =32823959.84 kwh x 0.138514342 = 4546589 kwh

Half of the VOL Wastewater natural gas was also entered. The VOB Wastewater did not provide their SEMCO utilities at the time of submission. Half of the VOL and the VOB electricity usage was included for the wastewater treatment facilities for the building sector.

There was no Solid Waste Sector information collected, as there are no landfills located in Baraga County. A scope 3 emissions may be done at a later date.

The Agricultural Data for fertilizers applied was collected from the state of Michigan and scaled to Baraga County. 263,315 Metric Tons of Fertilizer was applied for the year2019-2020 and 263, 315 Metric Tons of Fertilizer was applied for 2020-2021²⁸. 35% of 2019-2020 data and 65 % of 2020-2021 data was calculated for a total 263,315 Metric Tons of Fertilizer applied for the year 2020.

The next equation was used to convert Metric Tons into Short Tons by dividing by.9072 which gave 290250.2 Short Tons. The distribution of types of fertilizers was applied to the 290250.2 Short Tons by multiplying the percentage times the total Short Tons of Fertilizer for Michigan for 2020 to obtain the amount for each type.

	Short Tons Fertilizer	% of each type -was same for 2020 and 2021	Short Tons of each type for MI
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²⁴ [State and Local Planning for Energy \(nrel.gov\)](https://www.nrel.gov/state-local-planning-for-energy/)

²⁵ [Baraga County, Michigan - Census Bureau Search](https://www.census.gov/data/tables/2010/decennial/baraga-county-michigan-census-bureau-search)

²⁶ [MMBTU To MCF Conversion: Calculator + Chart \(Natural Gas\) - LearnMetrics](https://www.learnmetrics.com/conversion/mbbtu-to-mcf/)

²⁷ [Million BTU to Kilowatt-Hours Conversion \(MMBTU to kWh\) \(inchcalculator.com\)](https://www.inchcalculator.com/million-btu-to-kilowatt-hours-conversion/)

²⁸ [Download the State Inventory and Projection Tool | US EPA](https://www.epa.gov/state-inventory-and-projection-tool)

Synthetic	290250.2	99.75%	289524.6
Dried Manure	290250.2	0.01%	29.02502
Activated Sewage Sludge	290250.2	0.15%	435.3753
Other	290250.2	0.09%	261.2252

There are 6,305 acres of croplands for Baraga County and 7,515,740 acres of cropland for Michigan²⁹. Baraga County acres were divided by Michigan acres to scale the different types of Fertilizer in Michigan to Baraga County. The ratio of.000839 was multiplied by each type of fertilizer's Short Ton amount. This information was then entered into the Industrial Sector for Agriculture as the example indicated anything grown as crops was considered industrial.

- $6305 \div 7515740 = 0.000839$
- Synthetic $289524.6 \times 0.000839 = 242.8839$
- Dried Manure $29.02502 \times 0.000839 = 0.024349$
- Activated Sewage $435.3753 \times 0.000839 = 0.365239$
- Other $261.2252 \times 0.000839 = 0.219143$

The activated Sewage and Other amounts were added together for the Organic entry.

- Activated Sewage 0.365239 Short Tons + Other 0.219143 Short Tons = 0.584382 Short Tons

No Urban Forestry data was available at this time.

Emissions by Source (MT CO ₂ e)								
Source	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	Total	Total
Stationary Combustion	2,258.78	5.62	1.13	-	-	-	2,265.53	14%
Mobile Combustion	5,522.69	-	-	-	-	-	5,522.69	34%
Solid Waste	-	-	-	-	-	-	-	0%
Wastewater Treatment	-	344.49	17.44	-	-	-	361.92	2%
Electricity - Location Based	6,383.64	16.28	22.17	-	-	-	6,422.09	
Electricity - Market Based (for informational purposes only)	6,374.68	16.25	22.13				6,413.07	39%
Water	-	-	-	-	-	-	-	0%
Ag & Land Management	-	-	1,743.51				1,743.51	11%
Urban Forestry	-	-	-				-	0%
Waste Generation	-	-	-				-	0%
Total (Gross Emissions)	14,156.14	366.36	1,784.22	-	-	-	16,306.72	100%
Total (Net Emissions)	14,156.14	366.36	1,784.22	-	-	-	16,306.72	100%

²⁹ [USDA/NASS QuickStats Ad-hoc Query Tool](#)

2.2GHG Reduction Measures

GOAL 1: REDUCE EMISSIONS THROUGH ENERGY GENERATION

Energy Sector Measures

Measure 1.1: Install 2.5 MW Solar PV System plus battery storage microgrid for Casino/Hotel/Bingo Hall/Tribal Center/Niwiin Akeaa/PrePrimary/Maintenance Garage

Estimate of Quantifiable GHG emission reductions	2529593.012 kWh of electricity avoided = 1767 Metric Tons of annual CO ₂ equivalent in GHG emission reduction ³⁰
Implementing Agency	Keweenaw Bay Indian Community, Village of Baraga
Implementation Milestones	Environmental Review, Engineering Firm hired for design, Design, engineering and permitting approved; construction of covered parking, installation, interconnection, and programming; commissioning
Geographic location	Baraga MI- combination of covered parking and ground mount located east of PrePrimary building
Milestones for obtaining implementing authority approval	Environmental Review-Month 4 Project Manager to be hired-Month 2 Procurement of Engineering Firm-Month 4 Negotiation of Net-metering (KBIC and Utility)-Month 9 Design approval by Tribal Council- Month 12 Construction of Covered Parking - Month 24 Approval of Substantial Completion- Month 36
Funding Sources	EPA CPRG Implementation funding, DOT Investment Tax Credit, MEDC, DOE CLEAN ENERGY TECHNOLOGY DEPLOYMENT ON TRIBAL LANDS
Metrics for tracking progress	EPA progress reports, Solar Installer Progress Reports, Project Manager monthly updates, Tribal Council minutes
Sector	Renewable Energy Generation
Cost	\$7,360,000=\$2,944 per kW x 2500 kW (2.5 MW System with battery storage) ³¹
Cost/MT CO ₂ e	\$4,165/MT CO ₂ e

Energy Sector Measures

Measure 1.2: Install 300 kW Solar PV System plus battery storage microgrid for Pines/Tribal Police Complex

Estimate of Quantifiable GHG	295577 kWh of electricity avoided = 206 Metric Tons of annual CO ₂ equivalent in GHG emission reduction ³²
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³⁰ [Greenhouse Gas Equivalencies Calculator | US EPA](#)

³¹ [U.S. Solar Photovoltaic System and Energy Storage Cost Benchmarks, With Minimum Sustainable Price Analysis: Q1 2023 \(nrel.gov\)](#)

³² [Greenhouse Gas Equivalencies Calculator | US EPA](#)

emission reductions	
Implementing Agency	Keweenaw Bay Indian Community, Village of Baraga
Implementation Milestones	Environmental Review, Engineering Firm hired for design, Design, engineering and permitting approved; construction of covered parking, installation, interconnection, and programming; commissioning
Geographic location	Baraga MI- combination of covered parking and rooftop solar
Milestones for obtaining implementing authority approval	Environmental Review-Month 4 Project Manager to be hired-Month 2 Procurement of Engineering Firm-Month 4 Negotiation of Net-metering (KBIC and Utility)-Month 9 Design approval by Tribal Council- Month 12 Construction of Covered Parking - Month 24 Approval of Substantial Completion- Month 36
Funding Sources	EPA CPRG Implementation funding, DOT Investment Tax Credit, MEDC, DOE CLEAN ENERGY TECHNOLOGY DEPLOYMENT ON TRIBAL LANDS
Metrics for tracking progress	EPA progress reports, Solar Installer Progress Reports, Project Manager monthly updates, Tribal Council minutes
Sector	Renewable Energy Generation
Cost	\$883,200=\$2,944/kW x 300 kW (300 kW with battery storage) ³³
Cost/MT CO ₂ e	\$4,287/MT CO ₂ e

<u>Energy Sector Measures</u>	
Measure 1.3: Install 300 kW (100%) Solar PV System plus battery storage microgrid for Natural Resources Dept Complex	
Estimate of Quantifiable GHG emission reductions	306,996 kWh of electricity avoided = 214 Metric Tons of annual CO ₂ equivalent in GHG emission reduction ³⁴
Implementing Agency	Keweenaw Bay Indian Community, Ontonagon REA Utility
Implementation Milestones	Environmental Review, Engineering Firm hired for design, Design, engineering and permitting approved; construction of covered parking, installation, interconnection, and programming; commissioning
Geographic location	L'Anse, MI-combination of rooftop solar, covered parking, and ground mounted solar
Milestones for	Environmental Review-Month 4

³³ [U.S. Solar Photovoltaic System and Energy Storage Cost Benchmarks, With Minimum Sustainable Price Analysis: Q1 2023 \(nrel.gov\)](#)

³⁴ [Greenhouse Gas Equivalencies Calculator | US EPA](#)

obtaining implementing authority approval	Project Manager to be hired-Month 2 Procurement of Engineering Firm-Month 4 Negotiation of Net-metering (KBIC and Utility)-Month 9 Design approval by Tribal Council- Month 12 Construction of Covered Parking - Month 24 Approval of Substantial Completion- Month 36
Funding Sources	EPA CPRG Implementation funding, DOT Investment Tax Credit, MEDC, MPSC, USDA REAP, DOE CLEAN ENERGY TECHNOLOGY DEPLOYMENT ON TRIBAL LANDS
Metrics for tracking progress	EPA progress reports, Solar Installer Progress Reports, Project Manager monthly updates, Tribal Council minutes
Sector	Renewable Energy Generation
Cost	\$883,200=\$2,944 per kW x 300 kW (300 kW System with battery storage) ³⁵
Cost/MT CO ₂ e	\$4,127/MT CO ₂ e

<u>Energy Sector Measures</u> Measure 1.4: Install 4 kW Solar PV System plus battery storage microgrid for Residential Tribal member homes (includes Housing stock owned by the Tribe)	
Estimate of Quantifiable GHG emission reductions	2689504 kWh ³⁶ of electricity avoided = 1879 Metric Tons of annual CO ₂ equivalent in GHG emission reduction ³⁷
Implementing Agency	Keweenaw Bay Indian Community, Tribal Member HomeownerOntonagon REA Utility, Village of Baraga, Village of L'Anse, UPPCO
Implementation Milestones	Environmental Review, Solar Installer Company to be contracted, net-metering agreement; installation, interconnection, and programming; commissioning
Geographic location	Baraga County, MI-combination of rooftop solar, covered parking, and ground mounted solar
Milestones for obtaining implementing authority approval	Environmental Review-Month 4 Project Manager to be hired- Month 2 Program Policy approval – Month 6 Solar Installer Procurement-Month 6 Net-metering agreement-Month 12 Approval of Substantial Completion- Month 60
Funding Sources	EPA CPRG Implementation funding, DOT Investment Tax Credit, EPA Solar for All, HUD ICDBG, Native Network CDFI, Individual Tax Rebates, MEDC, DOE CLEAN ENERGY TECHNOLOGY DEPLOYMENT ON TRIBAL LANDS
Metrics for tracking progress	EPA progress reports, Solar Installer Progress Reports, Project Manager monthly updates, Tribal Council minutes

³⁵ [U.S. Solar Photovoltaic System and Energy Storage Cost Benchmarks, With Minimum Sustainable Price Analysis: Q1 2023 \(nrel.gov\)](#)

³⁶ [PVWatts Calculator \(nrel.gov\)](#)

³⁷ [Greenhouse Gas Equivalencies Calculator | US EPA](#)

Sector	Renewable Energy Generation
Cost	\$13,165,600=\$4,702 ³⁸ per kW x 4 kW/home x 700 homes (4 kw System with battery storage)
Cost/MT CO ₂ e	\$7,007/MT CO ₂ e

Goal 2: Reduce energy consumption by buildings (Commercial and residential)

Building Sector Measures

Measure 2.1: Increase building energy efficiency for commercial buildings (roof and wall insulation, window film)

Estimate of Quantifiable GHG emission reductions	259 Metric Tons of annual CO ₂ equivalent in GHG emission reduction ³⁹
Implementing Agency	Keweenaw Bay Indian Community
Implementation Milestones	Staff trained, energy audits completed, contractor procured, substantial completion
Geographic location	Baraga County, MI
Milestones for obtaining implementing authority approval	Staff Trained-Month 12 Energy Audits- Month 24 Weatherization Contractor Procured- Month 28 Approval of Substantial Completion- Month 60
Funding Sources	EPA CPRG Implementation funding, DOT Investment Tax Credit, MEDC, DOE CLEAN ENERGY TECHNOLOGY DEPLOYMENT ON TRIBAL LANDS, (IRA) Assistance for the Adoption of the Latest and Zero Building Energy Codes
Metrics for tracking progress	EPA progress reports, training certificates, Contractor reports, Tribal Council minutes
Sector	Building Sector
Cost	\$804,300 (Assumes 51 commercial buildings at \$2.86/sq ft for retrofit of 5,000 sq ft building-cost based on median cost of weatherization: LBNL Cost of Decarbonization and Energy) Training costs of \$75,000.
Cost/MT CO ₂ e	\$3,105/MT CO ₂ e

Building Sector Measures

Measure 2.2: Increase building energy efficiency for residential buildings (roof and wall insulation, window film)

³⁸ [U.S. Solar Photovoltaic System and Energy Storage Cost Benchmarks, With Minimum Sustainable Price Analysis: Q1 2023 \(nrel.gov\)](#)

³⁹ [Tribal Energy Updates — MTERA](#) V2 MTERA GHG Emissions Reductions Measures Tool

Estimate of Quantifiable GHG emission reductions	336 Metric Tons of annual CO ₂ equivalent in GHG emission reduction ⁴⁰
Implementing Agency	Keweenaw Bay Indian Community, Tribal Member Homeowner
Implementation Milestones	Staff trained, energy audits completed, contractor procured, substantial completion
Geographic location	Baraga County, MI
Milestones for obtaining implementing authority approval	Staff Trained-Month 12 Energy Audits- Month 24 Weatherization Contractor Procured- Month 28 Approval of Substantial Completion- Month 60
Funding Sources	EPA CPRG Implementation funding, DOT Investment Tax Credit, HUD ICDBG, HUD IHBG, Utility Rebates, DHHS LIHEAP, MEDC, DOE CLEAN ENERGY TECHNOLOGY DEPLOYMENT ON TRIBAL LANDS, (IRA) Assistance for the Adoption of the Latest and Zero Building Energy Codes
Metrics for tracking progress	EPA progress reports, training certificates, Contractor reports, Tribal Council minutes
Sector	Building Sector
Cost	\$3, 411,160 (Assumes 700 residential homes at \$4, 782/home for retrofit based on median cost of weatherization from sampled home retrofit data: LBNL Cost of Decarbonization and Energy) Assumes 2/3 cost for Multifamily homes (20)
Cost/MT CO ₂ e	\$10,152/MT CO ₂ e

<u>Building Sector Measures</u> Measure 2.3: Increase building energy efficiency for residential buildings by installing high energy appliances.	
Estimate of Quantifiable GHG emission reductions	181 Metric Tons of annual CO ₂ equivalent in GHG emission reduction ⁴¹
Implementing Agency	Keweenaw Bay Indian Community, Tribal Member Homeowner
Implementation Milestones	Program policy approved, Appliances procured, Substantial completion
Geographic location	Baraga County, MI
Milestones for obtaining implementing authority approval	Program policy approved-Month 4 Appliance procured- Month 12 Approval of Substantial Completion- Month 60

⁴⁰ [Tribal Energy Updates — MTERA](#)V2 MTERA GHG Emissions Reductions Measures Tool

⁴¹ [Tribal Energy Updates — MTERA](#)V2 MTERA GHG Emissions Reductions Measures Tool

Funding Sources	EPA CPRG Implementation funding, DOT Investment Tax Credit, HUD ICDBG, HUD IHBG, DOE Home Electrification & Rebate for Appliances, Utility Rebates, (IRA) Assistance for the Adoption of the Latest and Zero Building Energy Codes
Metrics for tracking progress	EPA progress reports, Director monthly reports, Contractor reports, Tribal Council minutes
Sector	Building Sector
Cost	\$7,995,400 (Assumes 700 residential homes at \$11, 472/home for purchase of Energy Star appliances to replace refrigerator, dishwasher, clothes washer, clothes dryer, and central air conditioning: LBNL: Cost of Decarbonization and Energy)
Cost/MT CO ₂ e	\$44,173/MT CO ₂ e

<u>Building Sector Measures</u>	
Measure 2.4: Increase building energy efficiency for residential buildings by electrifying heat equipment.	
Estimate of Quantifiable GHG emission reductions	350 Metric Tons of annual CO ₂ equivalent in GHG emission reduction ⁴²
Implementing Agency	Keweenaw Bay Indian Community, Tribal Member Homeowner
Implementation Milestones	Program policy approved, HVAC contractor procured, Substantial completion
Geographic location	Baraga County, MI
Milestones for obtaining implementing authority approval	Program policy approved-Month 4 HVAC contractor procured- Month 12 Approval of Substantial Completion- Month 60
Funding Sources	EPA CPRG Implementation funding, DOT Investment Tax Credit, HUD ICDBG, HUD IHBG, Utility Rebates, (IRA) Assistance for the Adoption of the Latest and Zero Building Energy Codes
Metrics for tracking progress	EPA progress reports, Director monthly reports, Contractor reports, Tribal Council minutes
Sector	Building Sector
Cost	\$2, 040,000 (Assumes 100 residential homes at \$20400/home including installation from the Building Decarbonization Coalition)
Cost/MT CO ₂ e	\$5,829/MT CO ₂ e

<u>Building Sector Measures</u>
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⁴² [Tribal Energy Updates — MTERA](#) V2 MTERA GHG Emissions Reductions Measures Tool

Measure 2.5: Increase building energy efficiency by adopting Green Buildings Standards for major renovations; layout framework for Tribal Utility formation	
Estimate of Quantifiable GHG emission reductions	191 Metric Tons of annual CO ₂ equivalent in GHG emission reduction ⁴³
Implementing Agency	Keweenaw Bay Indian Community
Implementation Milestones	Procure additional attorney, legislative process for code revisions
Geographic location	Baraga County, MI
Milestones for obtaining implementing authority approval	Attorney approved-Month 12 Green Energy Code- Month 60
Funding Sources	EPA CPRG Implementation funding, Utility Rebates, BIA Tribal Energy Development Capacity Grant , DOE EECBG, MTERA TA, (IRA) Assistance for the Adoption of the Latest and Zero Building Energy Codes
Metrics for tracking progress	EPA progress reports, Director monthly reports, Tribal Council minutes
Sector	Building Sector
Cost	\$500,000 (Assumes 100,000/year for additional attorney)
Cost/MT CO ₂ e	\$2,617/MT CO ₂ e

<u>Building Sector Measures</u>	
Measure 2.6: Increase building energy efficiency for commercial buildings by electrifying heat equipment.	
Estimate of Quantifiable GHG emission reductions	241 Metric Tons of annual CO ₂ equivalent in GHG emission reduction ⁴⁴
Implementing Agency	Keweenaw Bay Indian Community
Implementation Milestones	Program policy approved, HVAC contractor procured, Substantial completion
Geographic location	Baraga County, MI
Milestones for obtaining implementing	Program policy approved-Month 4 HVAC contractor procured- Month 12 Approval of Substantial Completion- Month 60

⁴³ [Tribal Energy Updates — MTERA](#)V2 MTERA GHG Emissions Reductions Measures Tool

⁴⁴ [Tribal Energy Updates — MTERA](#)V2 MTERA GHG Emissions Reductions Measures Tool

authority approval	
Funding Sources	EPA CPRG Implementation funding, DOT Investment Tax Credit, HUD ICDBG, HUD IHBG, Utility Rebates, (IRA) Assistance for the Adoption of the Latest and Zero Building Energy Codes
Metrics for tracking progress	EPA progress reports, Director monthly reports, Contractor reports, Tribal Council minutes
Sector	Building Sector
Cost	\$430,714 (Assumes installation of 10 buildings with high efficiency Heat Pump with a COP of ~3. \$8.61/sq ft for total replacement of a commercial heating system according to the Building Decarbonization Coalition)
Cost/MT CO ₂ e	\$1,787/MT CO ₂ e

Goal 3: Reduce Emissions from Vehicles	
<u>Transportation Sector Measures</u>	
Measure 3.1: Replace 10 current government vehicle fleet with electric vehicles and install charging station	
Estimate of Quantifiable GHG emission reductions	44.9 Metric Tons of annual CO ₂ equivalent in GHG emission reduction ⁴⁵
Implementing Agency	Keweenaw Bay Indian Community
Implementation Milestones	Install charging station, electric vehicles procured, Delivery of vehicles
Geographic location	Baraga County, MI
Milestones for obtaining implementing authority approval	Install charging station approved - Month 12 Vehicles procured - Month 36 Delivery of vehicle s- Month 60
Funding Sources	EPA CPRG Implementation funding, vehicle Rebates, Native Sun Power, Department of Transportation
Metrics for tracking progress	EPA progress reports, Director monthly reports, Contractor reports, Tribal Council minutes
Sector	Transportation Sector
Cost	\$725,000 (Assumes \$60,000/EV car +\$125,000/charging station) 10 vehicles and 5 charging stations
Cost/MT CO ₂ e	\$16,147/MT CO ₂ e

⁴⁵ [Greenhouse Gas Equivalencies Calculator | US EPA](#)

Goal 4: Increase Carbon Sequestration	
<u>Forestry Sector Measures</u>	
Measure 4.1: Plant 1000 trees.	
Estimate of Quantifiable GHG emission reductions	12 Metric Tons of annual CO ₂ equivalent in GHG emission reduction ⁴⁶
Implementing Agency	Keweenaw Bay Indian Community
Implementation Milestones	Procurement for trees, Substantial completion
Geographic location	Baraga County, MI
Milestones for obtaining implementing authority approval	Trees procured- Month 12 Substantial Completion - Month 60
Funding Sources	EPA CPRG Implementation funding, Nature Conservancy, USDA NRCS
Metrics for tracking progress	EPA progress reports, Director monthly reports, Contractor reports, Tribal Council minutes
Sector	Forestry Sector
Cost	\$300, 000 - Assumes \$300/tree (cost of tree and labor) for a midsize 5-9 ft tree
Cost/MT CO ₂ e	\$25,000/ MT CO ₂ e

2.3 Benefits Analysis

The National Renewable Energy Lab updated the *Life Cycle Greenhouse Gas Emissions from Electricity Generation in 2021*⁴⁷. Using a systematic review of “approximately 3,000 published life cycle assessment studies on utility-scale electricity generation from wind, solar photovoltaics, concentrating solar power, biopower, geothermal, ocean energy, hydropower, nuclear, natural gas, and coal technologies, as well as lithium-ion battery, pumped storage hydropower, and hydrogen storage technologies” we can demonstrate that for grid-scale technologies the median total life cycle CO₂e/kWh for photovoltaic solar is 43gCO₂e/kWh and Lithium-ion battery storage is 33gCO₂e/kWh. In comparison natural gas is 486gCO₂e/kWh (a factor greater than 10), and coal 1001gCO₂e/kWh (a factor greater than 23).

⁴⁶ [Tribal Energy Updates — MTERA](#) V2 MTERA GHG Emissions Reductions Measures Tool

⁴⁷ <https://www.nrel.gov/docs/fy21osti/80580.pdf>

EPA power profiler (<https://www.epa.gov/egrid/power-profiler#/MROE>) shows the grid electricity mix for this area (zip code 49908, MRO East) of 54% coal, 32% gas, 5% hydroelectric, 3% wind, 3% biomass, and 1% solar. The CO₂ emission intensity is 1582 lb/MWh, 85% higher than the national grid average demonstrating the outsized impact of deploying renewables in the region through improvements in air quality for residents and to habitat. All areas chosen to install renewables are in areas that are currently developed.

Reduction estimates for criteria air pollutants (CAP) and hazardous air pollutants (HAP) are only required for industrial sector measures listed in the PCAP. KBIC did not list any industrial sector measures. Thus, an inventory of the 2020 amounts excluding the Transportation Section are below:

Baraga County has a total hazardous air pollutant (HAP) of 822.71072 tons. Total criteria air pollutants (CAP) for Baraga County is 12,573.02147 tons.

2.4 Review of Authority to Implement

The KBIC Tribal Council has the authority implement the above measures through the authority of the Tribal Constitution, Article VI Powers and Duties of the Tribal Council. For all measures, the Tribal Council would be the authority to implement, except for Tribal member owned homes. The Tribal member homeowners would have authority for home weatherization and appliance upgrades. The Tribal Council retains authority to negotiate with utilities on behalf of the Tribe. The Tribal Council has a legislative process in place to enact ordinances. The Implementation schedule for each measure is outlined as describe in Section 2.2 GHG Reduction Measures above.

2.5 Identification of Other Funding Mechanisms

Several other funding sources were identified for the above measures. The list of funding sources includes several energy-related and home or community development grants that the Tribe has previously been awarded. These include MEDC, BIA TEDC, DOE EECBG, USDA NRCS, Utility Rebates, HUD IHBG, HUD ICDBG, DHHS LIHEAP. Potential other sources are listed for each measure in 2.2 GHG Measures. They include Native Network CDFI, Invest Tax Credits, DOE CLEAN ENERGY TECHNOLOGY DEPLOYMENT ON TRIBAL LANDS. Pilar Thomas provides monthly updates to MTERA member Tribes, and the list would need to be updated based upon due dates, etc.

2.6 Workforce Planning Analysis

KBIC will need to hire Energy Auditors and weatherization crew. Previously, the Tribe trained fourteen individuals for weatherization of homes⁴⁸. Energy audits were conducted on various homes. These individuals will need to update their certifications to conduct energy audits and perform building retrofits. The Tribe's Building Inspector will also need training in energy audits and weatherization. Solar installers will be needed to install residential solar panels. HVAC personnel will be necessary for the installation of heat pumps. The training for weatherizing homes can be done at local schools through their Career & Technical Education program, the Keweenaw Bay Ojibwa Community College, and Michigan Technological University (MTU). MTU currently has a mobile training unit to train various communities on solar. It will be necessary to hold future meetings with all the aforementioned institutions. The Tribal Rights Employment Office (TERO) has hands-on experience with setting up

⁴⁸ [Keweenaw Bay Indian Community - 2010 Energy Efficiency Project | Department of Energy](#)

training in home energy auditing and weatherization. Career maps for solar, green buildings, and HVAC are available through the links below.

- <https://www.irecsolarcareermap.org/>
- <https://greenbuildingscareermap.org/>
- <https://hvaccareermap.org/>

3 Next Steps

The next steps include the Tribe deciding on measures to include in their EPA CPRG Implementation application. An email or letter of intent would need to be submitted to the EPA project officer by April 1, 2024, if the Tribe desires to apply for implementation funds. The Comprehensive Climate Action Plan will continue to be worked on and will include developing a more thorough list of GHG emission reduction measures and quantifying them like how the PCAP was done. A more comprehensive inventory will be completed by adding Solid Waste amount produced within Baraga County and hauled to landfills, along with Urban Forestry.