



Photo: Highway into White Earth

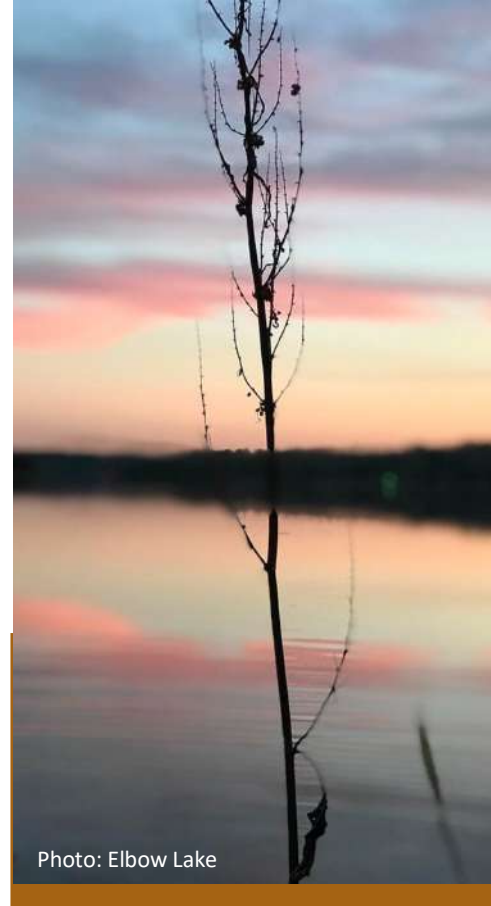


Photo: Elbow Lake

White Earth Nation **CLIMATE ACTION PLAN**

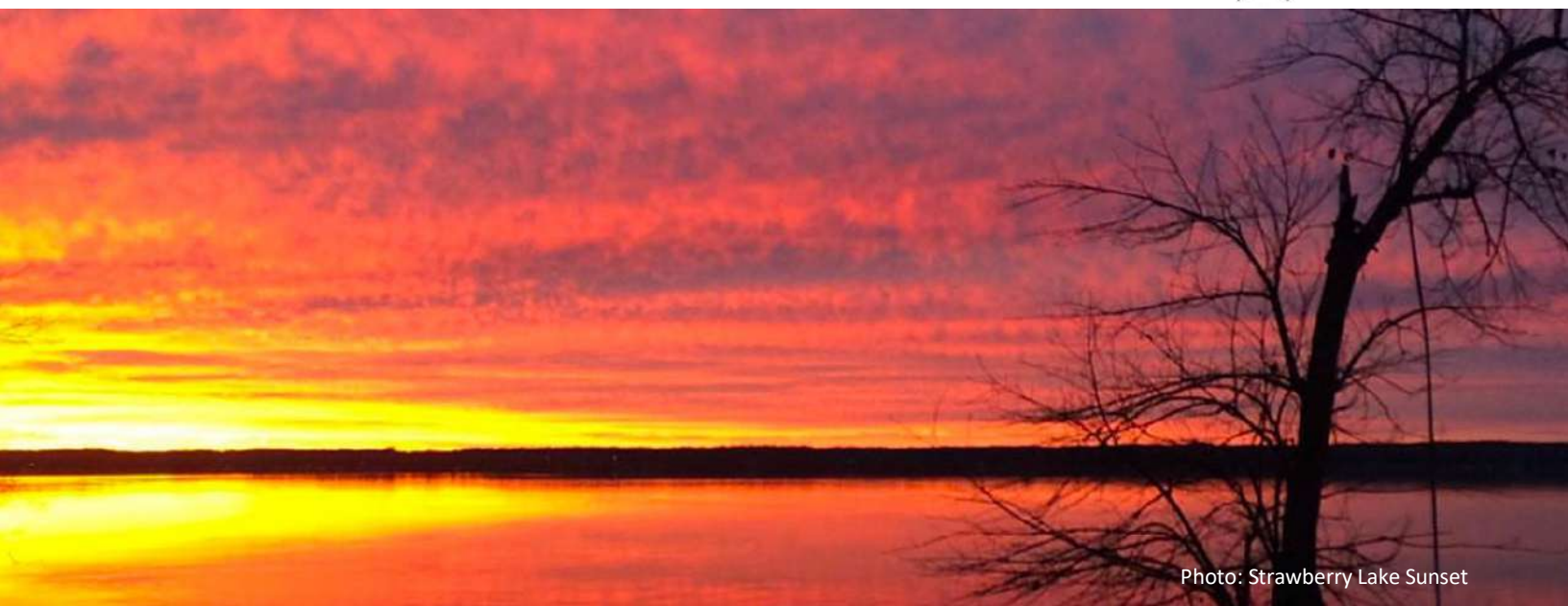


Photo: Strawberry Lake Sunset

July 2025

Supported by:



Prepared by:



Table of Contents

“ I think climate change is going to change everything .
- White Earth Tribal Youth

The White Earth Nation Climate Action Plan (summary)	0-1
Introduction	1-1
 Transportation and Mobility	2-1
 Buildings and Energy	3-1
 Waste Management	4-1
 Aquatic Health and Wild Rice	5-1
 Food Sovereignty	6-1
 Greenspace and Trees	7-1
 Health and Safety	8-1
 Climate Economy	9-1
Implementation and Cross Pollinating Actions	10-1
Appendix A Abbreviations and Glossary of Terms	A-1
Appendix B Acknowledgements	B-1

“ Individuals have to look at their own actions for climate change.
- White Earth Tribal Elder

“ No more pipelines.
- White Earth Tribal Youth

“ Climate Change is more susceptible and detrimental to us on the reservations as we are limited in our land areas to begin with. With our lands harmed where is there to go?
- White Earth Tribal Youth



White Earth Nation Climate Action

The Process

The work that went into the White Earth Nation Climate Action Plan:

12 month
planning timeframe

6
foundational research
study documents

2
online surveys for
community input

26
planning team
members

250+
community members
providing input

The Plan

Addresses
8 Sectors
of sustainability and
resilience

Through
36 Strategies
to achieve goals

Supported by a menu of
142 Actions
outlining steps that can be
taken

Over a
6 Year
implementation timeframe

Climate Action Sectors

The plan includes eight sectors focused on greenhouse gas reductions and resilience. Click on icons to view each section



**Transportation
and Mobility**



**Buildings and
Energy**



**Waste
Management**



**Aquatic Health
and Wild Rice**



**Food
Sovereignty**



**Greenspace and
Trees**



**Health and
Safety**



**Climate
Economy**

The Impact

Successfully implementing the Climate Action Plan will achieve an annual reduction of **47,350 metric tons of GHG by 2030** - a 40% reduction in annual GHG emissions.*

This is equal to eliminating **1.8 Billion Cubic Feet** of human-made greenhouse gas atmosphere through 2030.

The planned reductions align within science-based greenhouse gas emissions reductions required to limit global warming within 1.5°C to 2°C above pre-industrial levels.

Introduction

 [Click here to return to TOC](#)

“ We need Seventh Generation plans for climate change.
- White Earth Tribal Elder

Photo: Highway into White Earth

White Earth Reservation

The White Earth Reservation is a Native American reservation located in northwestern Minnesota in the United States. The White Earth Reservation is home to the federally recognized tribe of the White Earth Band of Ojibwe. The White Earth Reservation, located in Mahnomen, Becker, and Clearwater counties, is the largest Indian reservation in the state and covers 1,295 square miles. State, county & private owners can purchase and own land with the reservation boundaries. Reservation boundaries establish our jurisdictions for enforcement and social services.

White Earth Culture

White Earth has a deep cultural connection to the climate, seasons, and natural cycles, which are central to many aspects of life on the Reservation. Spiritual ceremonies are closely tied to seasonal timing, and many essential plant medicines are only available during specific times of year when growing conditions are just right. Climate shifts—such as changes in seasonal patterns or unusual levels of moisture or drought—can disrupt the availability and growth of these medicines. In addition, food sovereignty and the traditional harvesting of native species, practices that have sustained the community for millennia, are also at risk. These impacts are explored further in the sections of this plan.



Brief History of White Earth Reservation

The White Earth Reservation was established in 1867 by a treaty between the United States government and the Ojibwe people. The original reservation covered a broader land base. Much of the land was lost through a series of fraudulent transactions and government policies over the years.

Please visit <https://www.whiteearth.com/history> for an Interactive Historical Record.

Districts and Government

The White Earth Reservation is divided into three districts, with Highways 200 and 113 serving as the primary boundaries. The Reservation includes five incorporated cities and five villages. Governance is provided by the White Earth Reservation Business Council, which is composed of a Chairperson, a Secretary-Treasurer, and one elected Representative from each of the three districts.





White Earth's Climate Action Plan

The White Earth Nation has developed its first community-wide Climate Action Plan. The plan, which identifies climate resilience strategies and actions through 2030, will help those guide climate action for tribal government operations as well as support tribal members in taking climate action. The planning effort occurred through the support of the West Central Initiative, who collaborated with White Earth Nation to engage paleBLUEdot in October 2023 for planning assistance in establishing climate action goals and in the formation of the final plan.

The purpose of this plan is twofold: first, to provide guidance for climate actions to be taken by White Earth Nation to reduce greenhouse gas emissions and increase climate resilience of tribal government operations. The second is to provide White Earth tribal members support in building climate resilience and in reducing their greenhouse gas emissions.

The Role of Tribal Governments in Climate Action
Tribal and local governments play a crucial role in addressing the issue of climate change. Although the environmental impact of each individual community on global greenhouse gas emissions is relatively modest, the leadership demonstrated by tribal nations and local communities in driving change can have a profound and meaningful impact.

The United Nations' Intergovernmental Panel on Climate Change (IPCC) calculates that over 40% of the needed global emissions reductions can be met by local governments taking action. And, according to a survey conducted by the US Conference of Mayors, more than half (53%) of local governments have committed to reducing GHG emissions. White Earth Nation's Climate Action Plan represents an important step towards taking a leadership role in supporting climate action throughout White Earth Reservation.

What is a Climate Action Plan (CAP)

Climate Action Plans are comprehensive road maps that outline the specific strategies and actions to implement for GHG emission reductions and to build resilience to related climatic impacts. The White Earth Nation CAP addresses both climate mitigation and climate adaptation actions.

Why Create a Climate Plan

A Climate Action Plan offers a structured approach for communities to combat global climate change, while enhancing resilience against climate impacts. The actions in this plan can spur investment in innovative jobs and cost-saving measures, improving quality of life - especially for vulnerable community members, who often bear the brunt of climate change impacts.

What is Climate Mitigation

Mitigation actions limit the magnitude or rate of long-term global warming and its related effects. Climate change mitigation generally involves reductions in human emissions of greenhouse gases (GHG).

What is Climate Adaptation

Adaptation refers to the capacity of a natural environment or community to withstand, respond to, and recover from a disruption. Adaptation is achieved through actions taken to increase resilience to climate change impacts by reducing vulnerability of populations, ecosystems, and infrastructure.

White Earth Nation is Changing

Minnesota's changing climate is affecting community well-being and economic stability. Increasingly frequent and severe storms are damaging homes, businesses, utilities, farmland, and ecosystems—a trend expected to continue. Historic floods in Duluth (2012) and Faribault (2010 and 2016) have destroyed streets, wastewater systems, and properties, costing local governments, businesses, and residents millions in repairs.

Canadian and Western U.S. wildfires have worsened Minnesota's air quality. Our lakes now have up to 14 fewer days of ice cover than 50 years ago, impacting lake health, recreation, and local businesses. Climate change also endangers wildlife habitats, tree species like spruce, aspen, black ash, and birch, and manoomin—which is not only our state grain, but has very significant cultural, nutritional and economic importance to White Earth. Health risks include more frequent floods, longer allergy seasons, rising temperatures, and expanded tick habitats.

Climate Change in White Earth Nation

The region's climate has already changed. From 1980 to 2018, annual average temperatures rose, days over 95°F increased, heavy rain events became more frequent, and days below 32°F decreased. Key climate changes include increased variability, especially in yearly rainfall. While annual rainfall has generally risen, it's not consistent across seasons: Fall and Winter rainfall has grown by up to 15.5%, while Spring and Summer rainfall remains nearly unchanged.

White Earth Nation's climate is expected to keep warming through this century, with precipitation likely to increase, particularly in Spring and Fall. Key climate changes for the reservation include:

- Warmer annual average temperatures with a more significant warming in winter months.
- Increase in extreme heat days.
- Increase in heavy rain fall events, with increase in flood potential.
- Increase in time between precipitation with increase in drought potential.
- Greater variability in temperature and precipitation trends.

Severe Weather in White Earth

On June 24, 2022, an EF1 tornado touched down in the Village of Naytahwaush, following a four-mile path through wooded areas and a residential neighborhood. With estimated peak wind speeds of 105 mph, the event, while not unusual for northern Minnesota, served as a stark reminder of the growing risk of severe weather. It highlighted the importance of community preparedness amid rising summer temperatures and the increasing potential for tornadic activity





Village of Naytahwaush Tornado damage, June 2022



Village of Naytahwaush Tornado damage, June 2022

Economic Risk of Climate Change to White Earth Nation by 2100

Future economic and social impacts of climate change include impacts to agriculture (including food costs), energy costs, labor impacts, death rates, and crime impacts among others. The estimated economic impacts for White Earth Nation are:

\$12,100,000
Annual Cost Impact
(in 2019 dollars)*

Social Cost of Carbon

“Social Cost of Carbon” measures the share of climate change economic harm and impacts from emitting one ton of carbon dioxide into the atmosphere. For White Earth Nation it can be calculated as follows:

Estimated Economic Risk of
Climate Change:

\$12,100,000
Annual Cost Impact

Annual GHG Emissions:

116,896
Metric Tons

Estimated Localized
Social Cost of Carbon:

\$104*
Per Ton

* See the [White Earth Nation Climate Baseline Assessment](#) and [Minnesota Region 4 Climate Vulnerability Assessment](#) for more information. Figure does not include increased healthcare costs due to increased illness and disease, nor increased property damage due to increased extreme weather events.

Climate Change Projections for White Earth Nation

Over their lifetime, White Earth Nation Children can expect:



Climate Conditions

Baseline

Mid-Century
(2050 averages)

End of Century
(2100 averages)

Related Climate Risks to People (see Section 4)

Average Daily Maximum Temperature

50.8° F

57° F

62.3° F



Number of Days Per Year with Maximum > 95° F

0.9

11.4

34.9



Number of Days Per Year With Minimum < 32° F

184.5

160.2

135.8



Change in Growing, Allergy, and Pest Season since 1950^{2,7}

9 days

24 days

53 days



Average Annual Precipitation and Projected Increases^{1,3}

23.7

+5%

+10%



Increase in Heavy Precipitation Events⁴

N/A

0%

+19%



Baseline Air Conditioning Demand (CDD) and Projected Increases⁵

400

+125%

+300%



Estimated Increase In Residential Per Capita Electricity⁶

N/A

+38%

+68%



Climate Risks To White Earth Nation

The projected changes to White Earth Nation’s climate in the coming decades represent potential risks to community members. These risks are inequitably felt and particularly acute in vulnerable populations such as children, seniors, and those with disabilities (see the [White Earth Nation Climate Baseline Assessment](#) for more information). Below are some of the significant risks to the community’s population (not including the destruction of native ecosystems and the continued loss of species).

Vulnerable Population Sensitivities

For White Earth nation, those are Extreme Weather / Temperature, Air Quality, Flooding, Food Insecurity, Power/ Infrastructure Failure, Wildfire, and Energy Costs.

See the Climate Risk Sensitivity Ranking Summary to the right for a summary of all risks.

Prioritizing Climate Risks

Climate change touches everyone. Climate adaptation planning requires analysis to set priorities without neglecting any community population, regardless of their "vulnerable" status. An effort to prioritize adaptation measures should not be seen as an indication that any risk should be ignored or the needs of any population within the community be discarded. Prioritization, however, is necessary to ensure the greatest impact and effectiveness of limited community resources.

Climate risks are ranked by occurrence likelihood (FEMA National Risk Index) and impact on vulnerable populations. See Prioritizing Climate Risks Summary Chart for review of each risk.

Based on these reviews, White Earth Nation’s adaptive efforts may be most effective by prioritizing strategies which address the climate risks as follows:

Primary Prioritization:

Extreme Weather / Temperature, Power/Infrastructure Failure, Food Insecurity, Wildfire, and Energy Costs.

Secondary Prioritization:

Air Quality, Flooding, and Vector-Borne Disease

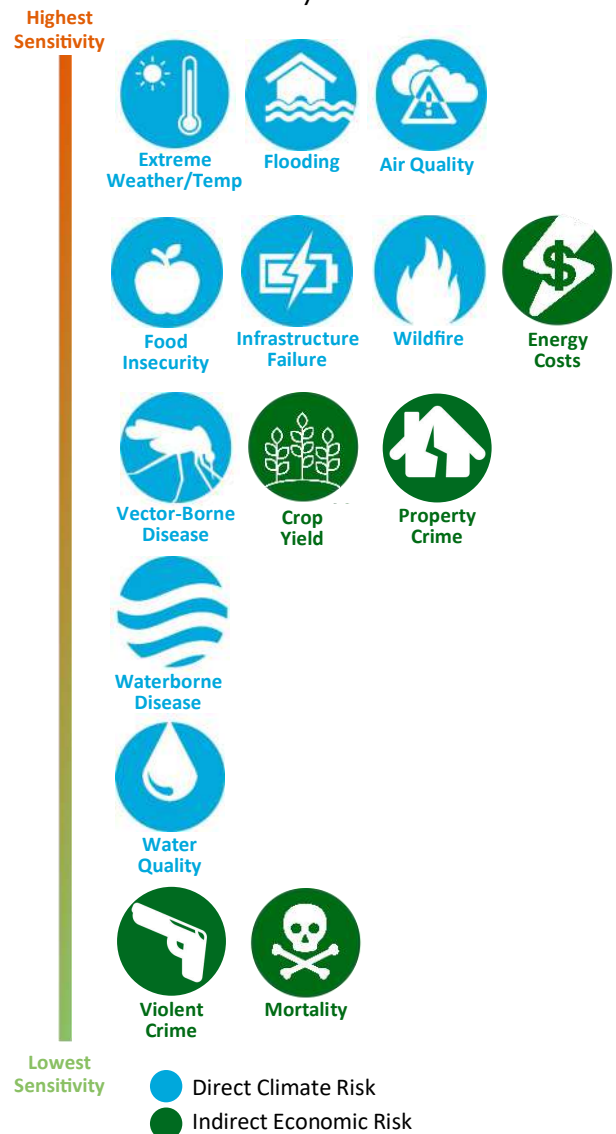
Tertiary Prioritization:

All Other Risks

With all adaptation measures, particular attention should be paid to strategies which are most effective for **those in Economic Stress, Seniors over 65, those with disabilities, and At Risk Workers.**

White Earth Nation Climate Risk Sensitivity Ranking Summary

According to the Climate Vulnerability Assessment, the Tribe's population vulnerabilities range from highest to lowest sensitivity. However, risks with lower sensitivity shouldn't be deemed irrelevant for the community.



What Causes Climate Change

Earth's Infrared Energy

When sunlight strikes the Earth, it warms the surface and becomes heat energy – or **infrared energy**. This infrared energy then radiates back towards space.

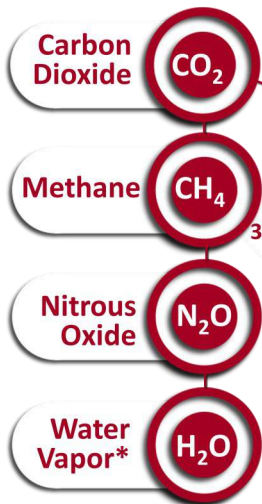


How Greenhouse Gases (GHGs) Trap Heat

GHGs such as carbon dioxide and methane are central in creating the "greenhouse effect" that traps the sun's heat. These gases interact with the infrared energy radiating from the Earth. Human activities like burning fossil fuels and deforestation have increased GHG concentrations, amplifying this effect. The additional trapped heat leads to global warming, affecting weather patterns, melting ice, and raising sea levels, all contributing to climate change.

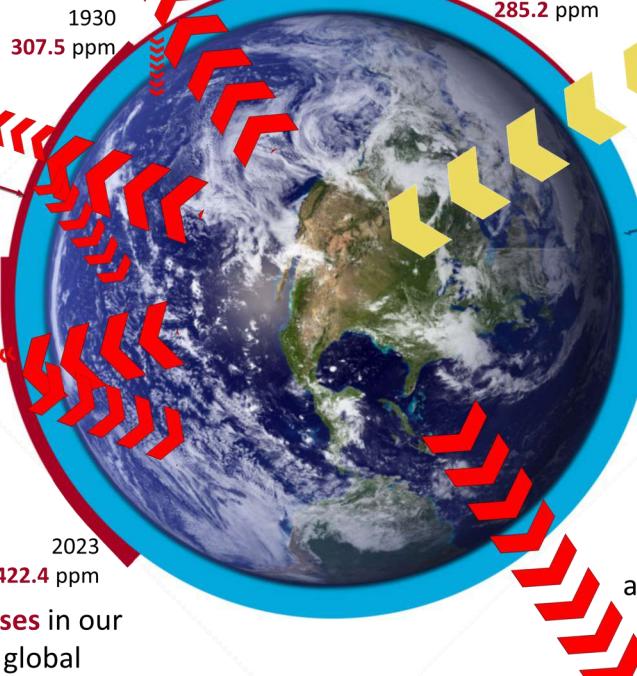
Greenhouse Gases trap Earth's heat energy and reflect it back, warming the Earth.

Greenhouse Gases

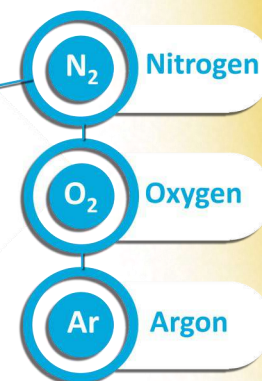


Global Levels of Greenhouse Gas:

in Parts Per Million (ppm)
1850
285.2 ppm



Non-Greenhouse Gases



Non-Greenhouse Gases allow Earth's heat energy to radiate into space

The more **Greenhouse Gases** in our atmosphere, the more global warming we experience.

*Water vapor cycles through the atmosphere rapidly via precipitation, however, warmer air can hold more water vapor. As the atmosphere warms from other greenhouse gases, increased water vapor can lead to heightened warming and extreme storms. Learn more: <https://cutt.ly/XwBaWEAk>

White Earth Nation Greenhouse Gas Emissions

What Are GHGs?

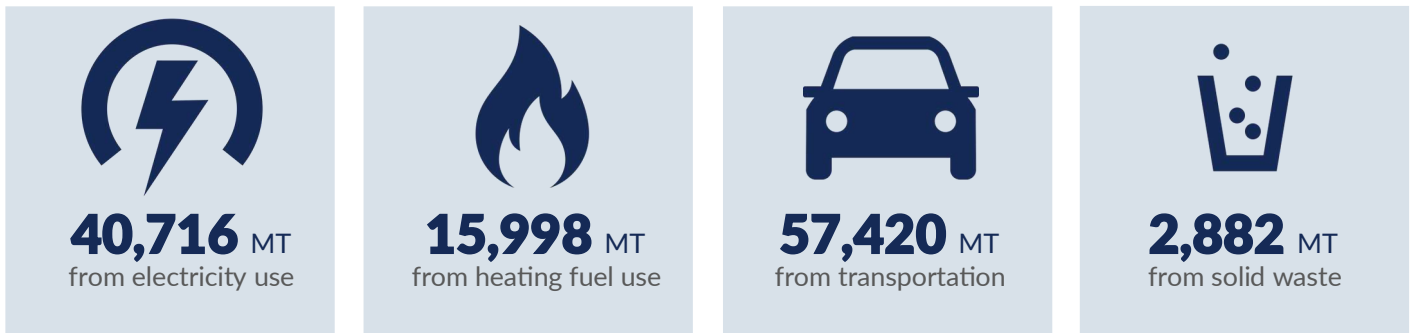
A greenhouse gas (GHG) is a molecule in the atmosphere which does not react to light energy in the visible range, but does react to light energy in the infrared range-like that which is emitted from the Earth after being warmed by the sun. The most common greenhouse gases include carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O).

Why do GHGs Matter?

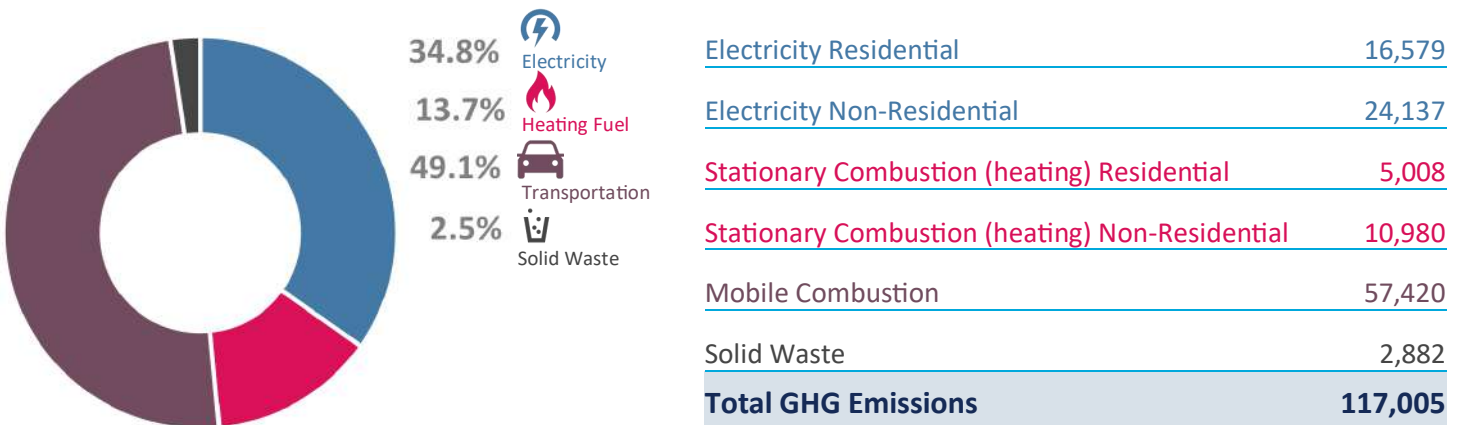
GHGs let the sun's light shine onto the Earth's surface, but they trap the heat that reflects back up into the atmosphere. In this way, they act like the insulating glass walls of a greenhouse. The more GHGs there are the more heat that is trapped in our atmosphere and the more we experience the impacts of global warming.

2021 White Earth Band Nation Community-Wide GHG Emissions

The White Earth Nation Greenhouse Gas Inventory provides an overview of Greenhouse Gas (GHG) emissions for the communities within the White Earth Reservation. The 2021 community wide emissions for the White Earth Nation is estimated to have totaled 117,005 metric tons.



2021 Community-Wide GHG by Sector



What can we do to reduce GHGs?

Greenhouse gases can be reduced by making changes to the key sectors throughout our community—particularly through the reduction and elimination of fossil fuel combustion and the advancement of clean energy sources.

Our GHG Reduction Goal

Photo: Shuckhart Lake



To reduce community-wide GHG emissions 40% below 2021 levels by 2030, and achieve carbon neutrality by 2050*

The plan looks to reduce White Earth Nation’s community-wide GHG emissions in line with the Intergovernmental Panel on Climate Change (IPCC) recommendations. Our goal is reflected in strategies established for individual sectors. Sector goals related to GHG emissions reductions are designed to balance reduction across all sectors and achieve the overall emissions goals set forth for the White Earth Nation. The goals aim for achievability while also seeking to challenge ourselves for improvement beyond business-as-usual.

* Carbon Neutrality refers to a community for which, on an annual basis, all GHG emissions resulting from community-wide operations are offset by carbon-free energy production. See Glossary of Terms for additional information on Carbon Neutrality and Net Zero.

Survey of Peer Community Carbon Reduction Goals

Blue Lake Rancheria Tribe	Zero GHG Emissions by 2030.
Sault Ste. Marie Tribe of Chippewa Indians	4% Reduction in GHG Emissions Annually.
Albert Lea	Reduction in City operations and community-wide emissions of 25% below 2019 levels by 2030 and 80% below by 2040.
Duluth	80% reduction in GHG by 2050 from municipal operations compared to 2008 levels.
Minnesota Region 4	To reduce region-wide GHG emissions 40% below 2021 levels by 2030, and achieve carbon neutrality by 2050
North Mankato	To reduce citywide GHG emissions by 55% below 2020 levels by 2040 and Net Zero emissions by 2050.
Rochester	100% renewable energy citywide by 2031 across all sectors.
Winona	Carbon neutral citywide by 2050.

The Process

The work that went into the White Earth Nation Climate Action Plan:

12 month

planning timeframe

26

planning team members

250+

community members providing input

6

foundational research study documents

2

online surveys for community input

This Climate Action Plan was developed based on the 2023 [Minnesota Region 4 Climate Action Plan](#) which was developed by West Central Initiative with a broad range of stakeholders from throughout the region, including participation by White Earth members. Using the framework established in the regional plan, the White Earth Nation CAP was developed in collaboration with a 26-person planning team (CAP Team) of community members, institutional representatives, and tribal government staff. The planning team was organized into sub-teams aligned with each of the sectors included in this plan (see Plan Framework).

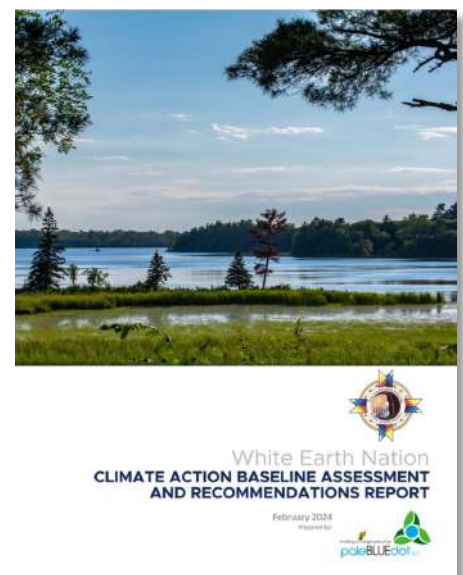
The goals and actions identified in the CAP are grounded in community input, expert analysis, and best practices from other communities and tribal governments throughout the United States. Strategic goals and detailed actions were developed, refined, prioritized, and finalized by the CAP Team through a series of workshop meetings from May 2024 through November 2024. The result of this process is a collaboratively created, co-authored CAP which directly integrates the voices of White Earth Nation community members and tribal government staff.

Research Based Climate Action Plan

In support of establishing the goals, strategies, and actions included in this plan, paleBLUEdot also produced a Greenhouse Gas Inventory and Climate Action Baseline Assessment. This document created the foundation of the CAP Team planning process.

In addition, research documents developed in support of the Minnesota Region 4 Climate Action Plan were also used to provide support for the White Earth Nation Climate Action Baseline Assessment and for additional reference material for CAP Team members in the development of the White Earth Nation Climate Action Plan. These include:

- [Minnesota Region 4 Greenhouse Gas Inventory](#)
- [Region 4 Climate Vulnerability Assessment](#)
- [Region 4 Renewable Energy Potentials Study](#)
- [Region 4 Ground Cover, Tree Canopy, and Carbon Sequestration Study](#)
- [Minnesota Region 4 Climate Action Baseline Assessment](#).



Community Input

Community Survey

The climate action planning community input effort launched in October 2023 with a Climate Action Survey open to all members of the White Earth Nation. The survey aimed to identify climate-related issues relevant to the White Earth people, gathering 206 responses by the end of December. See the [White Earth Climate Survey report](#) for a summary of all responses received. Key insights from the survey are summarized below.

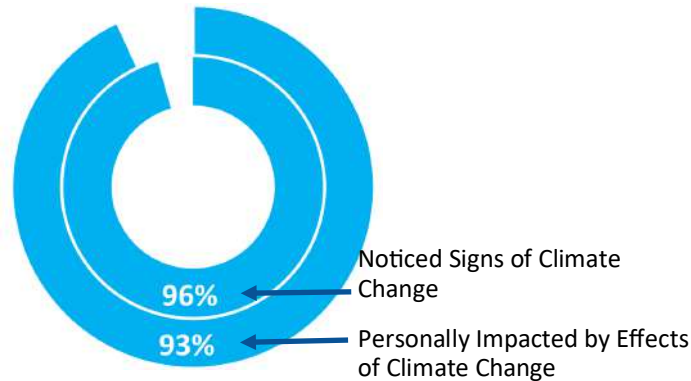
Climate Stories

White Earth Tribal Government staff invited tribal elders and youth to answer questions about their thoughts on climate change and to share their climate stories. Their responses are included throughout this plan document.

Just look for the “ quotation marks to hear their thoughts.

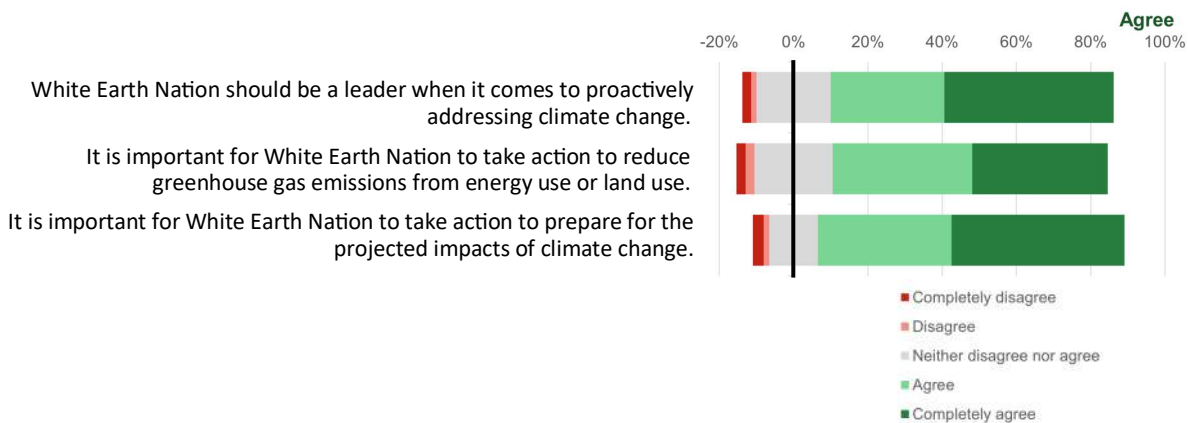
Climate Change Experience

Over **96%** of respondents have noticed signs of Climate Change while **93%** reported being personally impacted by one or more effects of Climate Change.



Support for Taking Action

83% of respondents agree that White Earth Nation should take action to prepare for the potential impacts of climate change while 74% agree that White Earth Nation should take action to reduce GHG emissions. Meanwhile 75% agree that White Earth Nation should be a leader in addressing climate change.



The Plan

The White Earth Nation Climate Action Plan:

Addresses
8 Sectors
of emissions reductions and
resilience

Through
36 Strategies
To achieve goals

Supported by a menu of
142 Actions
Outlining steps that can be
taken

Over a
6 Year
Implementation timeframe

The plan provides guidance on White Earth Nation tribal government operations as well as support for community-wide climate action. The scope of the plan includes an implementation section and eight broad sectors focused on GHG emissions reductions and climate resilience improvements. Each sector is detailed in a separate section of this plan document and is organized with sector goals, or strategies, supported by detailed actions for implementation.

Transportation and Mobility

[Click here for section](#)

Enhancing the resilience of White Earth Nation's mobility while reducing GHG emissions and environmental impacts of transportation.

Food Sovereignty

[Click here for section](#)

Increasing food sovereignty of White Earth Nation while restoring traditions and improving food access and security while increasing the reservation's food system's resilience.

Buildings and Energy

[Click here for section](#)

Increasing the resilience of White Earth Nation's building inventory and energy supply while reducing their GHG emissions.

Greenspace and Trees

[Click here for section](#)

Supporting White Earth Reservation's adaptation through expanded green infrastructure and enhanced ecosystem resilience.

Waste Management

[Click here for section](#)

Reducing GHG emissions from waste management and improved community resilience through waste reduction.

Health and Safety

[Click here for section](#)

Improving White Earth Nation's resilience through healthy community connections, infrastructure, systems, and traditional medicines.

Aquatic Health and Wild Rice

[Click here for section](#)

Protecting and preserving White Earth Nation's wild rice and aquatic ecosystems and enhancing flood and stormwater resilience.

Climate Economy

[Click here for section](#)

Increasing the preparedness of White Earth Nation's businesses and workforce while leveraging economic advantage of climate action for our community.



The Impact

Successfully implementing the plan will achieve an annual reduction of **47,350 metric tons of GHG by 2030** - a 40% reduction in annual GHG emissions.*

This is equal to eliminating **1.8 Billion Cubic Feet** of human-made greenhouse gas atmosphere through 2030.

Estimated Community-Wide GHG Reductions Included in This Plan

The long-term emission reduction potentials of the strategies and actions in this plan are modeled based on projected energy and fuel reductions and the adoption rates of renewable energy and low/no emission transportation modes. This modeling indicates that successful implementation of the strategies in this Climate Action Plan could reduce White Earth Nation community-wide annual GHG emissions by 47,352 metric tons, or 40.5% below 2021 levels by 2030. The potential cumulative GHG emissions reductions over the 5-year implementation period are estimated at over 93,700 metric tons, eliminating over 1.8 billion cubic feet of human-made greenhouse gases.

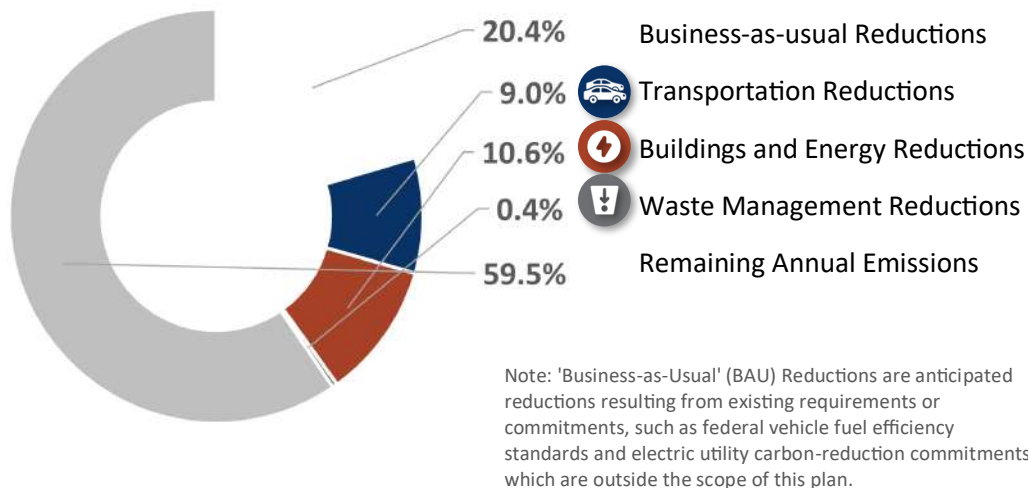




Photo: Ice Fishing Manypoint Lake



Transportation and Mobility

 [Click here to return to TOC](#)

“ I feel like not many people have transportation.
So I think they should have help.

- White Earth Tribal Youth

Transportation significantly influences climate change, accounting for approximately 49% of greenhouse gas emissions community-wide for White Earth Nation in 2021, primarily from fossil fuel combustion in various vehicles. Consequently, shifting towards cleaner technologies like electric vehicles, powered by renewable energy, and implementing efficient vehicle designs could significantly reduce emissions. Enhancing public transit and promoting walking and cycling can also decrease car ownership and related emissions. Climate change threatens transportation infrastructure too, with extreme weather events causing substantial damage, leading to disrupted travel, increased maintenance costs, and further emissions.

Transportation and Mobility Challenge and Opportunity for Rural Areas

As of 2017, households in rural areas are traveling significantly longer distances per trip compared to 2001, especially for work-related journeys. These extended trips impose greater burdens on rural Americans, impacting their economic opportunities, quality of life, and healthcare access. Furthermore, limited transportation options are compounded by inadequate internet access in dispersed rural communities, where providing infrastructure is costly and private providers lack motivation.

The higher percentage of seniors 65 and above in rural areas combined with lack of transportation options can also result in isolation. The 2004 study "Aging Americans: Stranded without Options" revealed that elderly individuals who no longer drive make significantly fewer trips for medical appointments (59% less), shopping or dining out (59% less), and visiting loved ones (65% less) compared to those who can still drive. This limited mobility negatively impacts their access to essential services and social connections, underscoring the difficulties faced by rural seniors.

Policymakers representing rural areas have a vested interest in promoting shorter trips to save time and money, and to improve the life of rural residents who lack vehicle access. Key opportunities to improve rural mobility include:

1. Make substantial investments in rural transit infrastructure.
2. Give priority to projects that enhance accessibility and decrease travel distances.
3. Emphasize safety measures for pedestrians, cyclists, and other active transportation modes, particularly within and between town centers.
4. Focus on preserving rural highways rather than expanding them.
5. Foster connectivity among rural communities by making significant investments to improve broadband access.



Transportation in White Earth Reservation

- The White Earth Department of Transportation WEDOT, maintains 150 miles plus in road maintenance on the Reservation to enhance transportation safety.
- White Earth Public Transit offers safe, reliable, affordable transportation to programs and people of the White Earth Reservation and the surrounding area.
- By riding with White Earth Public Transit, you will lower greenhouse gases by having less cars on the roads, While Transit does its part by offering New Propane buses on some of the routes which is safer for the environment.

Our Goals

by 2030:



47%

drop in GHG emissions from 2021



5%

fewer vehicle miles traveled



2%

shared mobility commuters



15%

registered electric vehicles community-wide



20%

diesel fuel switch to renewable fuels

What we've heard from the community

Responses to our community survey, youth and elder stories:



58%

of survey respondents see adopting community development standards to favor walkable communities.



Share a ride with others, carpool, or take a bus. Telecommute. Ride your bike. Don't let your car idle.

I would like to see and safer places to ride bikes and walk about in the community.

More proper lighting on roads/walkways for when it's dark.

Improve walkability/bikeability of sidewalks & streets.

Offer more forms of public transportation for people to utilize.

I would definitely use public transport if i could get to work on time.

We need cleaner forms of transportation, electric vehicles and others with minimal carbon output.



How We Get There

On the following pages:



Strategies guide how we achieve our climate action goals.



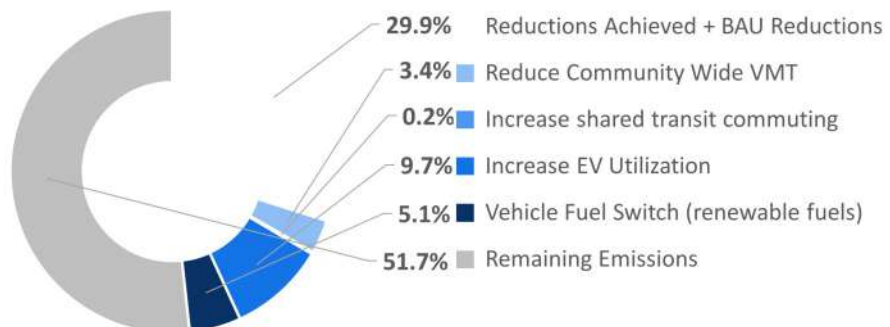
Actions outline steps White Earth Nation can take to support strategies.

Our Impact

On the following pages:

Planned Sector Emission Reductions Through 2030

The strategies and actions included in this section of the plan are projected to reduce the community's annual GHG emissions by 27,722 metric tons (MT) annually by 2030. The total change to the sector's emissions include CAP reductions and business-as-usual (BAU) emission changes as follows:





Decrease community wide VMT by 5% by 2030.

The total vehicle miles traveled (VMT) in the White Earth Reservation in 2021 is estimated at was 115 million miles. Decreasing driving alone by 5% would decrease vehicle miles traveled by up to 5.75 million miles and reduce community-wide GHG emissions by over 1,800 metric tons annually. Increasing opportunities and safety of bike and walking routes to schools, retail nodes, and recreation centers can support reduced vehicle use for other types of daily trips.

ACTIONS

- TM 1-1 Support increased work from home opportunities throughout the White Earth Reservation through expansion of rural broadband, and cultural normalization. Explore establishing incentives such as regional tax breaks for home office spaces or supporting local businesses with improved access to technology to enable an increased work-from-home shift.

- TM 1-2 Develop a public communications campaign and incentives promoting alternative transportation for mid and long-range travel between communities in the White Earth Reservation and from outside the reservation, such as rideshare, carpool, public transit, shuttle, bike, ebike, walk etc.

- TM 1-3 Change of habits in regards to weekend shopping - Local vs Large City shopping. Working with local grocery stores for health produce and protein sources.

- TM 1-4 Identify environmental impact assessment tools and approaches for rural infrastructure projects to support infrastructure investment choices that support the goals of this Climate Action Plan and climate resilience.



Increase shared mobility or public transit options, especially those serving tribal members with limited access to vehicles. Achieve shared commuter ridership of 2% by 2030.

The average commute in the region is 19.1 minutes, or approximately 25 miles. Of the 3,100 jobs within the White Earth Reservation, over 1,600 are filled by employees who live on the reservation. These workers generate an estimated 12 million vehicle miles commuting to and from work. Meanwhile, AAA estimates that the cost per mile for operating a vehicle is \$0.82. Consequently, every 1% increase in commuter utilization of shared transit within the White Earth Reservation may decrease vehicle miles traveled by 270,000 miles, saving an estimated \$200,000 annually.

ACTIONS

- TM 2-1 Develop a reservation-wide Multimodal Transportation Plan (MTP) to facilitate the expansion of strong multimodal transportation connections (walk, bike, carpool, etc.) and transit connections within and between municipalities. MTP to identify prioritized active transportation projects in the White Earth Reservation, emphasizing multimodal transportation, access to transit, pedestrian safety, bike racks and lockers, beautification, green infrastructure, and a seamless community multimodal transportation network that

- TM 2-2 Explore establishing partnerships with institutions, government entities, organizations, houses of worship, and others to connect low income people to housing and jobs through the provision of transportation options like shuttles, rideshare, carpooling, etc. Program could leverage idle equipment (school buses in the summer) to



Increase electric vehicle (BEV and PHEV) utilization to 15% of community wide vehicles.

(from approximately 35 vehicles to 1,000 vehicles community-wide)

According to U.S. Census data, there are approximately 6,700 vehicles on the White Earth Reservation. Transitioning from gas-powered vehicles to low- or zero-emission alternatives is essential for long-term emissions reductions. Electric vehicles can cut emissions by 50–70%, with battery production impacts offset within two years. Battery recycling now recovers over 95% of key materials and allows batteries to be produced with 80% fewer emissions—sometimes even outperforming new ones. As of September 2022, only about 34 battery electric or plug-in hybrid vehicles were registered in the area. Each 1% shift to EVs can eliminate 460 MT of GHG emissions annually (including electricity use).

ACTIONS

- TM 3-1 Support improved awareness of EV technology, performance, operational cost savings and other benefits through organized "EV Ride and Drive" events throughout the White Earth Reservation.

- TM 3-2 Create an Electric Vehicle Action Plan (EVAP). An EV Action Plan should: 1) address increased public access to chargers, 2) identify locations for chargers in commercial areas, 3) identify DC Fast Charging locations 4) explore charging infrastructure technologies including streetlight integration, smart cable technologies, bi-directional charging, inductive charging and others 5) address barriers to charging at homes and rental properties (such as households without garages), 6) identify strategies to increase use of EVs in car sharing programs, and 7) assess the potential to partner with third-party EV charging station providers to lower program and construction costs.

- TM 3-3 Educate the public on existing state, federal, and utility incentives for efficient and electric vehicles, including tax incentives and at-home electric vehicle charging outlet incentives. Establish a community information and outreach campaign including regional events like the Detroit Lakes 2023 EV Event.

- TM 3-4 Establish incentives promoting low or no emission vehicles. Incentives may include financial incentives based on federal or state grant support, or supportive policies such as dedicated and prominent parking areas for EV's.



Establish, or find viable renewable diesel and/or biodiesel sources to serve community by 2027. Achieve 20% diesel and propane consumption replacement by 2030.

The transition to electric vehicles is a major climate solution, but it's challenging for some diesel-powered equipment due to performance needs and infrastructure issues. Consequently, immediate alternatives are essential for rapid emission reductions. Biodiesel, produced from organic matter and waste biomass oils, can reduce greenhouse gas emissions by over 70% compared to standard diesel. Renewable diesel, typically derived using green electricity sources, can also reduce emissions by 60-80%. Renewable diesel also serves as an energy storage for excess renewable electricity. By adopting bio and renewable diesel, we can significantly cut climate pollution from equipment within the White Earth Reservation during the shift to zero-emission vehicles.

ACTIONS

- TM 4-1 Identify and engage partners to establish adequate bio and/or renewable diesel supply chain for community.

- TM 4-2 Convert Tribal Government operations diesel fuel and propane vehicle fuel utilization to bio and/or renewable diesel fuel by 2030.



Achieve 20% conversion of gasoline vehicles and equipment within tribal government fleet to EV's by 2030. Achieve 100% conversion by 2050.

Tribal governments can lead the transition to electric vehicles (EVs), showcasing the benefits and feasibility of sustainable transportation. By converting tribal government fleets to EVs, White Earth Nation can significantly reduce their carbon footprint, demonstrating a commitment to environmental stewardship. This shift can stimulate local economies by creating demand for charging infrastructure and electric vehicle services. Additionally, public exposure to municipal EV fleets can increase community awareness and acceptance of electric mobility, inspiring individuals and businesses to follow suit.

ACTIONS

- TM 5-1 Conduct a municipal fleet inventory and EV transition Implementation plan. Effort to identify opportunities for electrifying, right-sizing, and improving overall efficiency of vehicles to meet CAP Goals. Include implementation recommendations to incorporate EV's through right-timing purchases with a planned vehicle-replacement schedule.
- TM 5-2 Establish a vehicle purchasing policy and budget process to default to no / low emission alternative fuel with traditional internal combustion engine (ICE) as optional requiring proof of need. Policy to take emissions/fuel reductions into account when purchasing vehicles/equipment. Focus on small vehicles as well as large vehicles for alternative fuels. EV replacement to be prioritized for high mileage vehicles.



Convert 30% of tribal government fleet diesel fuel utilization to renewable diesel and/or biodiesel fuel by 2030 and 100% by 2040.

As with electrification of tribal government fleets, the White Earth Nation has an opportunity to lead the decarbonization of the area’s transportation during the transition to a zero-emission vehicle future. By adopting bio and renewable diesel, White Earth Nation can significantly reduce it’s operational carbon footprint while supporting the development of a supply chain for lower emission renewable fuels available for all community members.

ACTIONS

- TM 6-1 Conduct a "Renewable Fuel Study" to identify viable no/low emission diesel vehicle fuel alternatives, sources, and outlets for increasing no/low emission fuel alternative availability and utilization. Study to include analysis of efficiency chain and impact on land use and other communities. Study may include exploration of existing supply chains as well as potential new sources such as through a locally operated biodiesel plant, renewable diesel produced through renewable energy and electrolysis plant, plasma gasification plant producing hydrogen or renewable diesel, as well as other hydrogen generation and supply chain opportunities. Study to identify a pilot project and next steps.
- TM 6-2 Establish a Diesel Free Transition Plan (DFTP) for diesel equipment in vehicle and equipment fleets. The DFTP should include fleet vehicle use case identification and operational monitoring resulting in determination of viable alternative fuel supply chain and vehicle options for near, mid, and long term replacement. Alternatives explored should include hydrogen, renewable diesel produced through renewable energy and electrolysis plant, plasma gasification plant producing hydrogen or renewable diesel, and biodiesel. The DFTP should include an overview of “Diesel Free Ready” strategies to support conversion of the diesel vehicle fleet and equipment to alternatives, establish an infrastructure implementation plan for facilities, and identification of group purchase options, funding, and incentives such as grants from the US EPA and other agencies in support of the Diesel Emissions Reductions Act (DERA).



Increase fuel efficiency of remaining tribal government operations combustion engine fleet by 5% by 2030.

Enhancing the fuel efficiency of vehicles not yet ready for electrification is crucial in the immediate fight against climate change. Less fuel consumption per mile means less greenhouse gas emissions per mile. As a practical interim measure, it helps lessen the transportation sector's environmental footprint while electric vehicle tech and infrastructure advance. This can be achieved by cultivating fuel-efficient driving practices, such as avoiding abrupt acceleration or deceleration, maintaining ideal speeds, and minimizing idling. Proper vehicle maintenance and selecting high-efficiency replacement components like tires and engines is equally crucial. Vehicles that are designated for replacement but whose use is not yet well suited for electric should be replaced with plug-in hybrid vehicles or others with very high fuel efficiency. These measures collectively amplify a vehicle's fuel economy, marking a vital stride in our journey towards sustainable transportation.

ACTIONS

TM 7-1 Adopt an anti-idling policy. Support policy by compiling an "Eco Driving Guide" and provide to local governments to distribute to all employees and include in new employee training.

TM 7-2 Identify fuel-efficient ICE vehicle models, prioritizing PHEV and HEV options, to meet fuel efficiency goals where EVs are not available/practical.

What You Can Do

You can support the goals of the Transportation and Mobility section of this climate action plan as an individual, household, or a business. Here are just a few things you can do:

1. Walk or bike when traveling short distances.
2. Drive an electric, plug-in hybrid or low-emission vehicle.
3. If possible, telecommute or carpool to avoid transportation emissions.
4. Don't idle your car – even in the winter. The best way to warm up your car in the winter time is by driving it. No more than [30 seconds of warm-up is needed](#).
5. Keep your personal vehicle well-tuned and tires inflated properly, saving up to 20% in gasoline use.
6. Ditch your grass lawn and plant native pollinators that support our wildlife and don't require mowing.
7. Replace your lawn equipment with electric
8. Refuel your car and mow your lawn after 7pm, which helps prevent ground-level ozone.





Buildings and Energy

 [Click here to return to TOC](#)

“ Alternative energy generation and other steps are obviously necessary, feasible and critical for the survival of future generations.

- White Earth Tribal Elder

Buildings significantly influence climate change, contributing to over 48% of White Earth Nation carbon emissions through their energy demands and simultaneously being vulnerable to climate-induced risks. They are primary candidates for climate change mitigation, with more energy-efficient structures and renewable energy integration helping reduce emissions.

The built environment is increasingly at risk from climatic events, especially in Minnesota. Extremities like heatwaves stress a building's cooling system, resulting in higher energy use and emissions, while impairing occupant comfort and health. Heavy rain and flooding can harm a building's structure and indoor air quality through damage, dampness, and mold. More intense storms with high winds can particularly harm older, less robust buildings, and shifting freeze-thaw cycles can degrade building materials.

These escalating risks underscore the necessity for climate-adaptive building practices. Designs and renovations must consider insulation improvements for temperature extremes, flood-resistant materials and designs, and enhanced structural resilience against high winds. Community planning strategies, such as green spaces and permeable surfaces, can aid in managing water runoff and reducing micro-heat island effects. Buildings throughout the region, as significant climate change contributors and potential victims of its impacts, must shift towards low-carbon, energy-efficient, and climate-adaptive strategies to mitigate and adapt to climate change impacts.

Saving Money and Reducing Emissions Through the Inflation Reduction Act

The Inflation Reduction Act, enacted in 2022, provides new tax credits to encourage U.S. households to transition to cleaner energy, addressing climate change and potentially lowering energy costs for millions. Key credits include a previously owned clean vehicles credit, offering a maximum of \$4,000 for the purchase of used electric vehicles, and an energy-efficient home improvement credit, providing up to \$1,200 per year for energy-efficient installations and upgrades in homes. Additionally, the residential clean energy credit supports the installation of clean energy units in homes. The Act protects households from energy price volatility while encouraging cost savings and job creation in the clean energy sector.

Several provisions in the Act synergize with other programs, increasing the benefits of transitioning to cleaner energy. The Act also ensures that disadvantaged communities benefit from these incentives, with a focus on outreach and technical assistance. The new credits lower costs for Americans, stimulate the creation of quality jobs in the clean energy industry, and promote the equitable distribution of benefits.

Our Goals

by 2030:



34%

drop in GHG emissions from 2021



10%

less total energy consumption



25%

fuel switching from on-site combustion



20%

renewable electricity use

What we've heard from the community

Responses to our community survey, youth and elder stories:



89%

of survey respondents support one or more strategy advancing renewable energy for White Earth Nation.



More renewable energy opportunities for our members.

I would like to see all tribal program buildings using renewable energy to power their buildings.

Give incentives or discounts for tribal members for installing solar panels and other energy efficient tools.

Develop tribal owned and managed renewable energy.

Secure government funding to update commercial and residential building's insulation, windows and appliances.

Alternative energy generation and other steps are obviously necessary, feasible and critical for the survival of future generations.



How We Get There

On the following pages:



Strategies guide how we achieve our climate action goals.



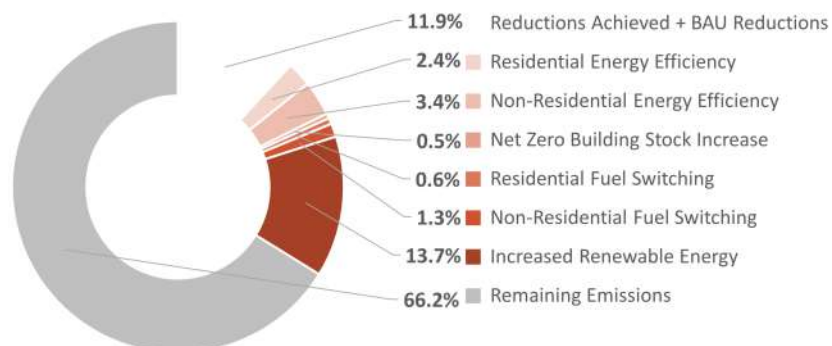
Actions outline steps White Earth Nation can take to support strategies.

Our Impact

On the following pages:

Planned Sector Emission Reductions Through 2030

The strategies and actions included in this section of the plan are projected to reduce the community's annual GHG emissions by 19,169 metric tons (MT) annually by 2030. The total change to the sector's emissions include CAP reductions and business-as-usual (BAU) emission changes as follows:





Improve total community-wide building energy efficiency by 10% by 2030. (electricity and heating fuel)

The US Energy Information Administration reports that homes constructed after 2000 consume 15% less energy per square foot compared to those built in the 1980s, and 40% less than those pre-1950. Therefore, there's considerable scope for enhancing energy efficiency by retrofitting older homes with modern technologies. It is estimated that homes built before 1980 make up 47% of homes within White Earth Reservation. Upgrading the energy efficiency of these older structures could significantly curb community energy use, especially in terms of heating fuel consumption.

ACTIONS

- BE 1-1 Promote incentives for improving energy efficiency (e.g., insulation, energy-efficient windows, electric heat pumps) in new construction and retrofit residential and commercial properties. Coordinate with Inflation Reduction Act, Utility incentives and PACE financing information (currently available to commercial properties only).

- BE 1-2 Implement the Building Energy report for Tribal Council for Tribal government buildings

- BE 1-3 Promote and distribute education and information to residents and businesses on advantages of and options for energy efficient appliances.

- BE 1-4 Work with utility providers and the State of Minnesota to conduct a robust energy end-use analysis to inform future energy planning efforts by the Tribe.

- BE 1-5 Identify strategies and funding to support residents and businesses in implementing energy efficiency improvements and energy usage reductions



Increase adoption of high-performance building construction technology, achieving 1/2% Net Zero households and commercial properties community-wide by 2030.

These buildings cut energy use and carbon emissions, promoting environmental sustainability and reducing utility costs over time. Built with advanced materials and technologies, they also lower maintenance expenses. Improved indoor air quality and natural light support occupant health and productivity. Net zero buildings, which are designed to consume minimal energy and produce an equal amount onsite—usually from renewable sources like solar or wind—add resilience against power outages and further increase savings. Altogether, they offer a sustainable path forward.

ACTIONS

- BE 2-1 Establish a program to encourage and educate residents and businesses on the benefits of Net Zero Energy and on-site solar, share best practices, providing training, technical assistance, and promote the Net Zero Energy Building and Solar-Ready Guides. Establish a resource hub and include links to helpful resources and tools supporting site owners in exploration and procurement of on-site solar. Include a list of local installers and contractors with high performance building, sustainable construction, and renewable energy experience. Include promotion of rebates and tax credits available for energy efficiency, high performance buildings, and on-site renewable energy, particularly those included in the Inflation Reduction Act.

- BE 2-2 Consider future climate conditions when designing or upgrading Tribal buildings and incorporate resilience-building elements such as heat-resistant materials, passive cooling, and "cool"/"green" roofs

- BE 2-3 Establish a Net Zero Energy Building Guide providing building owners, renters, developers, designers, and contractors with detailed information on strategies to make new construction or significant renovation projects Net Zero Energy or Net Zero Energy ready. Include a project strategy checklist for building owners and teams to use and report sustainable strategies used.



Achieve 25% residential and commercial and industrial building "fuel switching" from on-site fossil fuel combustion to no/low emission sources by 2030. (no/low emission sources include electrification, solar thermal, and renewable fuel sources)

On the White Earth Reservation, about 75% of heating comes from propane or natural gas, 14% from fuel oil, and 11% from wood. As the grid increases its renewable electricity share, shifting building heating from fossil fuels to electrification becomes crucial for reducing emissions. Replacing traditional heating systems with electric ones lowers carbon emissions, improves energy efficiency, and is essential to meeting White Earth Nation’s building-sector GHG reduction goals.

ACTIONS

- BE 3-1 Establish a communication campaign to educate contractors, installers, and homeowners about benefits of electrification and other on-site fossil fuel combustion reduction strategies, currently available technology such as heat pumps, and manufacturer resources for installation training and support. Include promotion of rebates and tax credits available for electrification upgrades and appliances, particularly those included in the Inflation Reduction Act.
- BE 3-2 Coordinate and promote a White Earth Reservation residential and small business "Electrification and Energy Efficiency/Weatherization" group purchase campaign annually to help reduce the costs of energy efficient heating systems such as air source heat pumps and ground source heat pumps through volume purchasing power (goal, 200 households and 20 businesses/institutions annually). Program design to focus on improved equity (residential and commercial) in its implementation and explore strategies to support local small business contractors. NOTE: Action may be implemented in combination with the renewable energy group purchase program action.



Increase renewable energy to 20% of community-wide residential and commercial electric use by 2030. (distributed solar, community solar, or purchased renewable through utilities)

GHG reductions from grid-supplied electricity don’t lessen the need for consumer-driven renewable energy to meet our targets. For those unable to install solar panels, purchasing renewable energy from utilities or community solar provides a path to Net Zero electricity and supports a “greener” state electric grid. For properties suited to solar, on-site renewables offer added benefits like cost savings, energy resilience, and progress toward energy sovereignty. These advantages highlight the importance of expanding renewable energy adoption for White Earth Nation's sustainable future.

ACTIONS

- BE 4-1 Incentivize local renewable energy projects. Explore leveraging existing incentives to increase renewable energy utilization and generation throughout the White Earth Reservation. These incentives should include support for low-income solar installations and the creation of green jobs.
- BE 4-2 Establish a White Earth Reservation renewable energy program(s) which increase utilization of on-site / in-community renewable energy while creating benefit for low-income community members. Explore options with renewable energy generation owned by tribal government. Goal: 5 MW clean energy generating capacity delivered through programs annually by 2030.
- BE 4-3 Join the Department of Energy's National Community Solar Partnership and explore utilizing the program's grant and technical assistance support in advancing solar for the White Earth Reservation.
- BE 4-4 Establish a Solar-Ready Guide providing building owners, renters, developers, designers, and contractors with detailed information on strategies to make new construction or significant renovation projects solar ready. Include a project strategy checklist for building owners and teams to use and report sustainable strategies used.

White Earth Tribal Government Leading The Way

Tribal governments can lead on climate action by making their buildings energy-efficient, powered by renewables, and free from fossil-fuel heating. These efforts demonstrate a commitment to sustainability, set an example for residents and businesses, and drive local economies toward low-carbon solutions. This leadership can inspire wider community engagement, magnify impact, and accelerate progress toward shared environmental goals. For White Earth Nation, the following strategies are crucial for achieving this vision:

Strategy BE 5

Improve total tribal government building energy efficiency by 12% for electricity and heating fuel by 2030.



ACTIONS

- BE 5-1 Conduct Energy Audits on all primary Tribal Government facilities to identify energy efficiency upgrades appropriate for each facility in line with the this plan's energy efficiency goals. Establish an implementation timeframe for upgrades.
- BE 5-2 Collaborate with local partners and governments to establish an LED Streetlight Replacement Masterplan, implementation schedule, and funding plan to achieve 100% LED streetlighting community-wide by 2030.
- BE 5-3 Establish a Green Building policy that requires all new Tribal Government buildings to meet and maintain energy, resource efficiency, and on-site fossil fuel combustion reduction and elimination goals or building standards (ENERGY STAR, LEED, B3 or other). Encourage school districts, and other public agencies located within the White Earth Reservation to establish similar policies.

Strategy BE 6

Achieve 20% tribal government building thermal "fuel switching" from on-site fossil fuel combustion to no/low emission sources by 2030.



ACTIONS

- BE 6-1 Create a Fuel Switching Assessment and Action Plan to outline building specific actions and priorities for fuel switching of all Tribal Government facilities to move towards zero on-site fossil fuel combustion. Assessment may be done in coordination with the Tribal Facilities Energy Audits. Plan to include an outline and implementation schedule of facility modifications to achieve short and long-term fossil fuel combustion goals. Work with regional energy partnerships to implement plan for all Tribal Government facilities and establish a schedule for improvements (such as hot water and space heating appliance replacement). Explore strategies to address electricity storage, and create a case study to highlight and share challenges, solutions, and lessons learned to share with the broader community. Goal: achieve conversion of 20% of Tribal Government facilities to electric / non-fossil fuel combustion by 2030.
- BE 6-2 By 2030 Establish a policy that requires all future new Tribal Government buildings to be 100% electric (or zero onsite fossil fuel combustion).

Strategy BE 6

Increase renewable energy to 40% of tribal government operations electricity consumption by 2030. (distributed solar, community solar, or purchased renewable through utilities)



ACTIONS

- BE 7-1 Conduct a detailed solar assessment and "Renewable Energy Master Plan" for all primary Tribal Government facilities. Include new and existing buildings, incorporate strategies to address electricity storage, and focus on highlighting any hurdles or solutions that would be applicable to the broader community. The Tribal Government's largest energy consuming properties should be prioritized for assessment. Provide an overview of funding strategies and incentives including those in the Inflation Reduction Act of 2022, and illustrate potential return on investment and operational savings.



ACTIONS

- BE 7-1 Conduct a detailed solar assessment and "Renewable Energy Master Plan" for all primary Tribal Government facilities. Include new and existing buildings, incorporate strategies to address electricity storage, and focus on highlighting any hurdles or solutions that would be applicable to the broader community. The Tribal Government's largest energy consuming properties should be prioritized for assessment. Provide an overview of funding strategies and incentives including those in the Inflation Reduction Act of 2022, and illustrate potential return on investment and operational savings.
- BE 7-2 Identify funding sources to finance energy efficiency and renewable energy retrofits for commercial and residential buildings that have low barriers to entry and limited risk for tribal government
- BE 7-3 Support installation of solar on all Tribal Government facilities where feasible, based on implementation established in Renewable Energy Master Plan. Explore creation of a WEN Solar Purchase program to support cost competitive installations for participating local governments.

What You Can Do

You can support the goals of the Buildings and Energy section of this climate action plan as an individual, household, or a business. Here are just a few things you can do:

1. Set your thermostat 2 or more degrees higher during cooling season, lower during heating season.
2. Turn down your water heater to 120°.
3. Replace an older home thermostat with a "smart," programmable model.
4. Replace a major appliance (e.g., refrigerator, air conditioner, furnace) with a newer, energy-efficient model.
5. Replace a gas range or clothes dryer with an electric model.
6. Schedule a home energy audit with a licensed contractor or through your utility.
7. Install solar panels at your home, working with a licensed contractor. If possible, participate in a residential solar group purchasing program within the Region.
8. If you don't own your home (or if your home is not suitable for solar) but support clean, renewable energy, enroll in your utility's clean power option to support renewable energy.
9. Install — or have a licensed contractor install — more insulation in your home.
10. Install energy-efficient windows and doors, working with a licensed contractor.



Waste Management

[Click here to return to TOC](#)

“ Be more strict with the littering and trash.
- White Earth Tribal Youth

Municipal solid waste (MSW) contributes significantly to climate change, primarily through methane emissions from landfill decomposition and carbon emissions from fossil-fuel transport. Mitigation strategies such as waste reduction, recycling, and organic collection can help reduce these impacts. Lower waste generation reduces methane emissions by decreasing landfill volume. Improved recycling reduces the need for new resource extraction and manufacturing, saving energy and reducing carbon emissions. Composting organic waste instead of landfilling it lowers methane emissions, sequesters carbon, and provides an eco-friendly alternative to synthetic fertilizers.

White Earth Nation Solid Waste Per Capita Trends

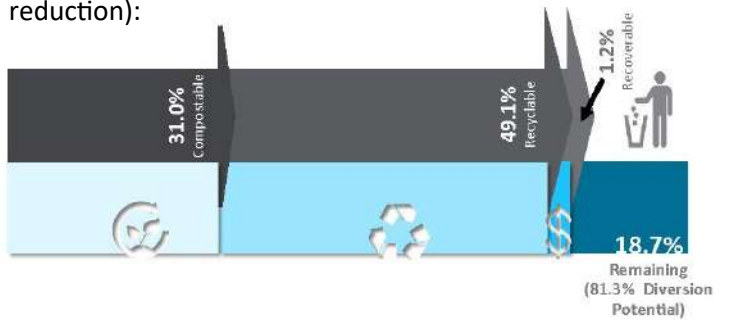
In 2021, White Earth Nation generated an estimated 5,369 tons of MSW. Recycling accounted for 20.6% of this total, organics collection for 8.1%, refuse-derived fuel management for 50.8%, and landfilling for the remaining 20.4%.

Waste Characterization Study

In 2013, the State of Minnesota initiated a comprehensive, quantitative evaluation to understand the make up of the current waste stream (materials not diverted through recycling or organics collection). The classifications of waste defined in the 2013 study were organized into broad categories based on their diversion potential including: Compostables, Potential Recyclables, Potential Recoverables, and Other.

Waste Diversion Potential

Based on the State of Minnesota Waste Characterization Study, there may be waste diversion potential of up to 81.3% in the current landfilled materials (idealized maximum). Below is the breakdown of the estimated total maximum potential waste diversion (excluding waste reduction):



Waste Management on White Earth Reservation

White Earth Sanitation service route includes:

- Appx.1600 pick-up sites weekly. (some seasonal)
- 375+ private and business owned dumpsters
- 2 trucks operated by 2-man crews perform all the collections.
- The waste pick-up routes run 6 days a week including holidays.
- White Earth also has a C&D landfill that is not open to the public.

Recycling on WE

In collaboration with Becker Co. and Mahnomon Co.

Single Sort

- Aluminum, glass, plastic
- Cardboard
- Tires HHW
- Batteries / Lithium Ion
- Motor Oil
- Scrap Metal



Opportunity for Growth:

- Shingles
- Pallets
- Compost
- Building Materials & Lumber

Our Goals

by 2030:



16%
drop in GHG
emissions from
2021



5%
less solid waste
community-wide



50%
more organics
diversion



50%
more recycling
diversion

What we've heard from the community

Responses to our community
survey, youth and elder stories:



95%

of survey respondents support one or more strategy advancing waste
management reductions for White Earth Nation.



Better waste management practices and public information on
climate impacts.

Incentivize proper waste disposal.

Help reduce household waste by having more recycling centers.

Requirements for reservation residents to keep yards clean/ utilize
garbage services and not throw trash along roadways.



How We Get There

On the following pages:



Strategies guide how we achieve our climate action goals.



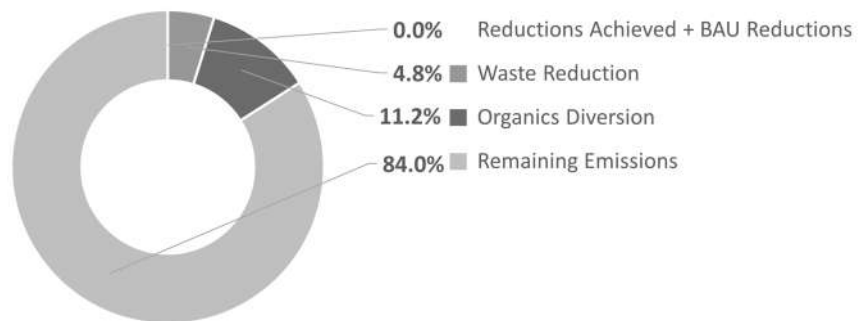
Actions outline steps White Earth Nation can take to support strategies.

Our Impact

On the following pages:

Planned Sector Emission Reductions Through 2030

The strategies and actions included in this section of the plan are projected to
reduce the community's annual GHG emissions by 460 metric tons (MT) annually
by 2030. The total change to the sector's emissions include CAP reductions and
business-as-usual (BAU) emission changes as follows:





Decrease total per capita municipal solid waste generated by 5% by 2030.

The MPCA has established a hierarchy of waste management methods, prioritizing them based on environmental impact. This framework emphasizes waste reduction, reuse, recycling, and organic recovery. By using fewer materials and minimizing waste, we lower energy consumption and reduce greenhouse gas emissions from landfills. White Earth Nation households and businesses practicing waste reduction can also benefit financially.

ACTIONS

- WM 1-1 Create a comprehensive regional communication campaign to provide standardized information and communication on waste reduction, reuse, recycling and organics collection option and promote existing resources, services, incentives, and programs. Include identification of regional and county resources. Partner with county and municipal departments, Habitat for Humanity's ReStore and other regional recycling and re-use organizations for promotional content sharing.
- WM 1-2 Establish a Tribal Government operations towards-zero-waste plan and policy to identify strategies to move the tribal government operations toward zero-waste. Achieve the waste reduction and diversion goals of this section within government operations by 2028.
- WM 1-3 Identify and promote reuse and repair businesses and opportunities which can reduce the disposal of used goods.



Increase organics waste diversion 50% by 2030. (from 8.1% to 12% of total MSW)

Organic waste decomposes in landfills, making it the largest source of methane in waste management. Diverting organics to composting turns waste into valuable soil amendments, boosting soil carbon and productivity. The 2013 Statewide Waste Characterization study found that compostable organics make up 28.4% of landfilled waste (excluding paper and construction wood). Increasing diversion of these materials to composting and organics recycling offers White Earth Nation a significant opportunity to cut waste-related GHG emissions and enhance sustainability.

ACTIONS

- WM 2-1 Collaborate with the waste haulers operating within the White Earth Reservation to determine capacity for increased organics collection and handling, barriers to reaching organics diversion goals, identify solutions, and recommend pilot projects to test solutions.
- WM 2-2 Encourage local governments to offer increased and consistent collection for food waste and certified compostable material at businesses. Change the type of compost operation or increase land allocation to handle additional feedstock, as needed.
- WM 2-3 Land-Use Code Updates - improve commercial and multifamily recycling and organics collection requirements by revising Land Use Code to require commercial indoor and outdoor space for recycling and organics diversion equal to or greater than the space provided for disposal. Explore how a Waste Minimization Grant program may support this and other actions.
- WM 2-4 Increase support for back-yard composting for communities without curbside compost pickup including compost education and improved access to materials like compost bags and composters.
- WM 2-5 Collaborate with waste haulers, school districts, and other local partners to establish organics diversion programs for schools, residential, and commercial buildings. Explore options such as trash Integrated Food Scrap Compost Collection by Ramsey/Washington Recycling and Energy Center.



Increase recycling waste diversion 50% by 2030. (from 20.6% to 30.6% of total MSW)

Creating a circular economy through recycling requires less extraction of resources, generates less waste, increases energy savings, reduces greenhouse gas emissions, and supports local job creation and economic investment. The 2013 Statewide Waste Characterization study indicates opportunities for increased capture of recyclables, especially paper and plastic.

ACTIONS

- WM 3-1 Expand consumer education (e.g. host community forums and provide direct outreach, recycling quiz or activity at community events) on sustainable consumption, materials management, available services, incentives, and facilities as well as proper recycling, composting, source reduction methods and accepted materials.

- WM 3-2 Encourage local governments to adopt a deconstruction/diversion ordinance to require the reuse or recycling of salvageable construction and demolition materials. Policy should require that all real estate developments that receive financial assistance from the local government or special zoning approval adhere to a higher standard of recycling and reuse. Include a phased implementation within ordinance as may be needed based on recycling / reuse capacity within community. Actively seek partnerships with Habitat for Humanity's ReUse store and others in support of establishing capacity following the proposed policy changes.

- WM 3-3 Work with local governments in the White Earth Reservation to ensure public recycling bins are as readily available as public waste bins in public facilities and locations.

- WM 3-4 Coordinate with local partners and recycling haulers to increase local recycling capacities, center hours, change hours, or change collection process in order to ensure access to the center during operational hours convenient for people who work.



Establish no/low emission waste-to-energy operations producing biodiesel (or other needed energy) from tribe's landfilled waste.*

*Plasma Gasification is an example option to achieve this (see MN Region 4 Renewable Energy Potentials Study for more: <https://view.publitas.com/palebluedot/mn-region-4-renewable-potentials-study>)

Diverting waste from landfills to waste-to-energy plants creates opportunities to produce emission-free energy and fuels, advancing sustainability and reducing environmental impact. Technologies like plasma gasification convert waste into syngas for electricity or biofuels and create a safe, reusable slag, while anaerobic digestion transforms organic waste into biogas for heat and electricity, along with biofertilizer, thus reducing landfill emissions and providing renewable energy.

ACTIONS

- WM 4-1 Conduct a detailed feasibility study for regional potential of anaerobic digesters including wastewater-to-energy installations at White Earth Reservation's wastewater treatment plants and agricultural based systems. Identify and implement pilot projects based on findings of the study.

- WM 4-2 Conduct a detailed feasibility study for the development of a plasma gasification system using all of the White Earth Reservation's municipal solid waste currently being sent to landfill directly, or as RDF reject materials. Study should include overall feasibility, projected electrical generation potential, identification of beneficial use end products, long-term return on investment, detailed environmental benefit/impact statements, and an identification of implementation challenges, opportunities, and next steps.

The background of the page is a close-up, high-angle photograph of a large pile of shredded paper and waste. The paper is mostly white and grey, with some colorful fragments of paper and plastic scattered throughout. The texture is rough and uneven, suggesting a recycling facility or a waste transfer station. The lighting is somewhat dim, highlighting the chaotic nature of the waste.

What You Can Do

You can support the goals of the Waste Management section of this climate action plan as an individual, household, or a business. Here are just a few things you can do:

1. Compost food and yard waste.
2. Aim to eliminate food waste. Eat existing fridge contents first. Plan meals and shop accordingly. More at <https://www.epa.gov/recycle/reducing-wasted-food-home>.
3. Use LEDs and rechargeable batteries to reduce eWaste.
4. Upgrade, donate, or recycle old electronics.
5. Use reusable bags for all shopping.
6. Swap single-use plastics for durable, reusable alternatives.
7. Choose items with no, minimal, compostable, or fully recyclable packaging.
8. Repair or donate reusable or repairable items instead of discarding.



Aquatic Health and Wild Rice

 [Click here to return to TOC](#)

“ Climate change can affect ricing, fishing because the water will start to rise and flood out the rice .

- White Earth Tribal Youth

Climate change adaptation in the Midwest is closely linked with water and wastewater management. As global warming alters temperature and rainfall patterns, it impacts water availability and quality, posing challenges for wastewater management. Climate adaptive measures to address the Region’s water risks are essential.

With changing climate affecting water supply, measures like water conservation, efficient irrigation and agricultural techniques, and drought-tolerant landscaping – also known as Xeriscape - are vital for an agriculturally dominant region like the Midwest. Implementing efficient water usage can stretch limited water resources to meet needs under fluctuating climate conditions.

Intensified rainfall can overwhelm wastewater infrastructure, leading to untreated sewage seeping into water sources. Adaptive strategies include strengthening wastewater facilities, employing green infrastructure like rain gardens and bioswales to manage stormwater runoff, and preventing contamination.

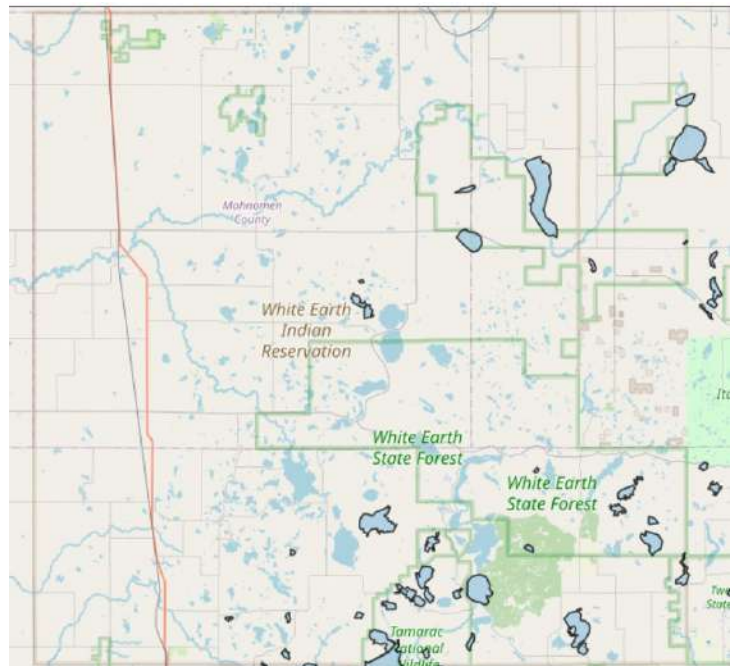
Changes in water availability and quality also challenge the effectiveness of water treatment plants. Adaptation might involve using advanced treatment technologies or modifying treatment processes to deal with varying water quality.

Incorporating climate forecasts into planning promotes proactive adaptation, enhancing the long-term sustainability of water and wastewater management. By prioritizing resilience through strategies that anticipate climate change impacts, Minnesota Region 4 can secure safe water and effective wastewater treatment, protecting public health, the economy, and the environment.

Climate Change Threat to Wild Rice

Climate change poses a threat to wild rice in Minnesota through increased water temperatures, which disrupt its growth and reproduction cycles. Additionally, extreme weather events and heavy or early season precipitation can increase the water depth beyond the levels wild rice requires to thrive, leading to habitat loss and diminished populations.

Many tribal members in northern Minnesota today rely on wild rice, maple syrup, venison, fish, and other wild resources for subsistence, as well as for income from sales of these products. The map identifies lakes and rivers with wild rice stands. It was developed by the Minnesota Department of Natural Resources and can help guide wildlife habitat restoration and wild rice management. (Sources: Minnesota Department of Natural Resources accessed via University of Minnesota:)



<https://mnatlas.org/resources/wild-rice-mn-dnr/>



Aquatic Health and Wild Rice in White Earth Reservation

The White Earth Reservation lies mainly in the Red River Drainage Basin, which is the headwaters area of the greater Hudson Bay Drainage Basin. Surface water on the Reservation consists of lakes, wetlands, rivers and streams. There are approximately 530 bodies of water greater than 10 acres, covering 48,362 acres, 53,243 acres of wetlands and approximately 300 miles of rivers and streams. White Earth has a robust fishery program focusing on Lake Sturgeon, Walleye and a pilot White Fish rearing program.

Other managed fish species include muskellunge, northern pike, bass species, sunfish species, yellow perch, black crappie, burbot, bowfin, channel catfish, flathead catfish, rainbow trout, brown trout, brook trout, whitefish and tullibee. There are also several species of rough fish found on the Reservation including suckers, redhorse, mooneye, goldeye and carp.

The White Earth Reservation has been involved with several multi-agency cooperative plans since 1983. Past cooperative efforts have taken place with Lac du Flambeau, Fond du Lac, Bad River and Red Lake Reservation fisheries programs. White Earth is currently in cooperative agreements with the Leech Lake Reservation, USFWS and MN DNR for walleye production and stocking. (All above Whiteearth.com)

Habitat loss, pollution, species introductions, and overfishing have been impacting inland fisheries for decades. Climate change threatens to compound the factors that lead to fisheries decline. Walleye, an ecologically, economically and culturally important cool-water sportfish, have been declining in the Upper Great Lakes Region since the early 2000s. [Walleye Fisheries: Bright Spots in a Changing Climate | U.S. Geological Survey](#)



Above: Students Learn to filet Walleye and other fish.



Above: Walleye hatchery tour.



Ricing and Wild Rice (Manoomin) itself is an important part of the Ojibwe Culture

Of the many traditions across Anishinaabe country, one of the eldest teachings dates back to the tribes beginning to move west until they found the food that grows on water. Wild rice, also known across Indian Country as the ‘good berry,’ was said to have been plentiful in the Lake Superior region and has faced adversity in the last 100 years. [THE FOOD THAT GROWS ON WATER — Ojibwe Inaajimowin](#)

In 2022 over 170,000 pounds of green rice was purchased by White Earth. Finished rice equaled around 77,000 pounds.



Above: 2023-Students learning to harvest wild rice Tamarac Lake.

Climate Change Impacts

A major concern today is water quality, drought and pollution that endangers rice producing lakes and waterways. Climate change impacts could endanger this traditional food. Wild rice can be considered the “canary in the mine” as far as its sensitivity to climate change.

Our Goals

by 2030:



Restore

health to aquatic ecosystems



Protect

and preserve Wild Rice



5%

reduction in community-wide water use



Prepare

for flood impacts of climate change

What we've heard from the community

Responses to our community survey, youth and elder stories:



86%

of survey respondents are moderately, very, or extremely concerned about potential impacts on water quality.



Protect the water rights and restore land on the Reservation.

Promote boat safety and cleaning to reduce invasive aquatic species.

Lower water levels in summers mess with beaver ponds, creeks and duck swamps.

Stop running oil pipes through the water.

Keep motor boats off our rice lakes.

Lower ground water levels mean failing water wells.

Not as many wild rice bodies, wild rice crops are not as robust as 40-50 years ago on western fringe of wild rice habitat.



How We Get There

On the following pages:



Strategies guide how we achieve our climate action goals.



Actions outline steps White Earth Nation can take to support strategies.

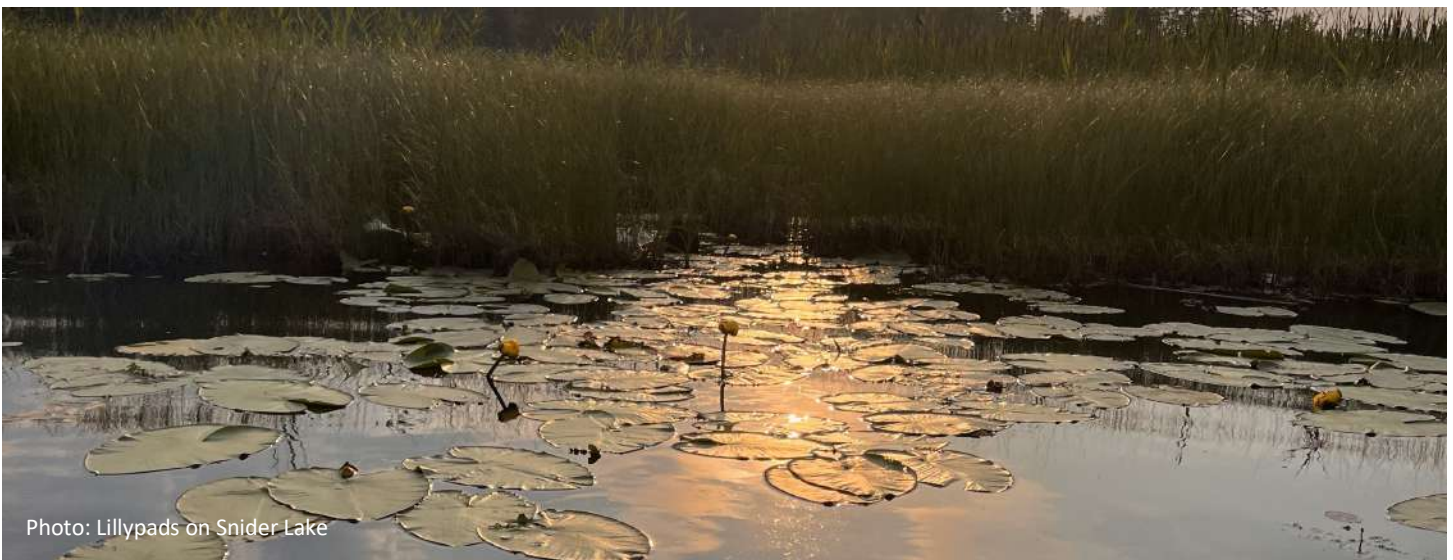


Photo: Lillypads on Snider Lake



Restore health to aquatic ecosystems through appropriate restorative and sustainable resource management practices.

Protecting aquifers, waterways, and lakes is essential for effective climate adaptation. These sources are critical for freshwater storage, ecosystem health, and human well-being, ensuring water security, ecosystem resilience, and stormwater management. Sustainable groundwater practices, careful land use planning to prevent contamination, and preserving riparian zones are key to their protection. Enforcing pollution regulations and educating communities on the importance of these resources are also crucial steps for long-term safeguarding and climate adaptation.

ACTIONS

- AH 1-1 Collaborate with federal, state, county, and Soil and Water Conservation District partners to establish increased water quality testing to increase data availability and support ongoing refinement of water quality actions in the White Earth Reservation.

- AH 1-2 Establish a WEN-specific plan in collaboration with counties and MDNR to eliminate or slow the spread of invasive species between waters by continuing to: washing boats and other equipment after use; educating community and visitors on procedures for eliminating spread of invasive species; and organizing community events to physically or chemically eradicate invasive species.

- AH 1-3 Work with federal, state, and local partners to take action through existing authorities to ensure better enforcement of water quality standards, support reduced use of pesticides and fertilizer usage, and to promote regeneration of aquifers through strategic water storage, irrigation, and land use.

- AH 1-4 Support collaboration in watersheds that cross county and municipal lines. Work with partners to create accessible and useful environmental impact statements (EIS) for residents and businesses. EISs to include a climate change impact, and the options for development available within them need to be widely accessible and easy to adopt.

- AH 1-5 Improve the resilience of lakes, rivers and streams through expanded restoration or enhancement of riparian buffer zones, increased stream buffer requirements, using in-stream restoration techniques as well as revegetation with native species

- AH 1-6 Establish a baseline and monitor water chemistry and physical and biological changes over time to protect Tribal uses of water. Baseline should include degraded riparian areas, charting water wells, septic systems, water extraction sites, and abandoned wells and septic's, petroleum holding tanks, and USTs.

- AH 1-7 Strengthen partnerships with the MNDNR and universities to continue to evaluate and monitor impacts on walleye including mercury and climate change.

- AH 1-8 Develop and maintain water quality database for reservation waters and for waters within White Earth Nation reservation.

- AH 1-9 Educate recreational users about the impacts they can have on fisheries and fisheries habitat

Strategy
AH 2

Protect and preserve the health of Wild Rice in the face of climate change for future generations.

Manoomin, or wild rice, is essential to the culture, economy, and way of life for the White Earth Nation, yet climate change poses significant pressures on all these aspects. Manoomin grows in shallow lakes, requiring a hard winter freeze and low spring temperatures for germination, and is highly sensitive to water temperatures throughout the growing season. Projected climate changes for the White Earth Reservation threaten each of these conditions, adding stress to this vital resource.

 **ACTIONS**

-
- AH 2-1 Protect wild rice habitat, regardless of current density or presence.

 - AH 2-2 Promote the recruitment and retention of wild rice harvesters and conduct education about proper wild rice harvesting techniques and practices.

 - AH 2-3 Continue to advocate or work with EPA to promulgate White Earth Reservation water quality standards to protect wild rice.

 - AH 2-4 Manage and remove barriers to water movement, to the extent they are impeding flow to wild rice waters and/or altering water levels. Care needs to be taken to ensure culverts and road/trail crossing are properly designed to accommodate changing climate conditions, Monitoring dam levels.

 - AH 2-5 Explore landscape water retention projects to protect wild rice habitat against extreme runoff events and low flow/high temperature events (e.g. increase and/or reconnect floodplain habitat to streams and rivers).

 - AH 2-6 Develop models to understand potential water quality changes. For example, increasing water temperatures may cause eutrophication and excess algal growth, which could impact drinking water quality and lead to toxic or harmful algal blooms (HABs). Water quality and aquatic habitat may also be compromised by increased sediment or nutrient inputs due to extreme storm events. These impacts may be addressed with targeted watershed management plans.
-

Strategy
AH 3

Promote increased water conservation community-wide with a targeted water use reduction of 5% by 2030.

Reducing water consumption and minimizing wastewater are crucial in addressing climate change. Water resources, energy use, greenhouse gas emissions, and ecosystem health are linked. Water scarcity is a global concern made worse by climate change – and White Earth Nation will be equally impacted. By reducing water use, we reduce pressure on freshwater supplies, support ecosystems and biodiversity, and reduce the energy needed for water treatment, transportation, and pumping, thereby cutting greenhouse gas emissions.

 **ACTIONS**

-
- AH 3-1 Promote agricultural land water management (retention) to address shifting weather patterns (spring snow pack and summer drought).

 - AH 3-2 Facilitate a collaboration with the water utilities within the White Earth Reservation to create and promote a program focused on reduction of water use by top 20 water consumers annually for each utility through an opt-in program. Offer free technical resources to large institutions and businesses to identify specific opportunities for employees or customers to conserve water and incorporate water efficiency into internal operations.

 - AH 3-3 Expand water conservation outreach, communication, and education programs promoting water conservation for residents and businesses.
-

Mitigate the projected increased flood hazards and impacts due to climate change.

The US National Climate Assessment indicates that Minnesota’s ten rainiest days can account for up to 40% of its annual precipitation. By 2070, the White Earth region may see up to a 15% increase in annual precipitation, with wetter springs and longer dry periods. Preparing for this requires assessing flood-prone areas, improving stormwater management, reducing impervious surfaces, implementing green infrastructure, and updating plans to address these anticipated changes.

ACTIONS

-
- AH 4-1 Identify, encourage, and incentivize programs promoting increased on-site storm water management such as rain gardens, water storage in natural landscapes or in ditches, and impervious surfaces as well as commercial, institutional, and residential sites.
-
- AH 4-2 Encourage local governments to identify lead pipes within reservation's water distribution network and establish a plan and timeline for replacement.
-
- AH 4-3 Develop outreach program and training support for residential stormwater and shore best management practices.
-
- AH 4-4 Chart water wells, septic systems, water extraction sites, stock water reservoirs, and oil wells to identify potential hazard areas and mitigation needs related to stormwater and flash flood events.
-

What You Can Do

You can support the goals of the Aquatic Health and Wild Rice section of this climate action plan as an individual, household, or a business. Here are just a few things you can do:

1. Be mindful of your water use and focus on changes in habits such as turning off water when brushing your teeth and taking shorter showers.
2. Trade your shower heads and faucets for WaterSense labeled low-flow, water-efficient options.
3. Replace your lawn with prairie grass, wildflowers, or landscape using drought resistant and low maintenance native plants.
4. Collect rainwater in rain barrels to water your lawn and/or plants
5. If you have a lawn and garden irrigation system, or use hoses and sprinklers, water thoroughly less often, and do so in the early morning or evening
6. Install — or have a licensed plumber install — a WaterSense labeled, water-saving low-flow toilet.

Photo: Gull Creek



Food Sovereignty

[Click here to return to TOC](#)

“ Ricing and hunting are important to my family.
- White Earth Tribal Youth

There are many definitions used to describe Food sovereignty. Here we use the definition created by *La Via Campesina*, a global movement of farmers who first coined the term in 1996: Food sovereignty is the right of Peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems.

Climate Change Impacts on Food Security

Climate change has serious implications for agricultural resilience and food security. Anticipated climate changes in this region, such as altered precipitation patterns and increased extreme weather and temperatures, pose serious challenges to crop growth, irrigation, and water management. These impacts can lead to inconsistent crop yields and price volatility, making access to nutritious food challenging for many

Meanwhile, our personal food choices can both contribute to and be impacted by climate change. The demand for animal-based products, which have a higher environmental footprint due to their methane emissions and land requirements, accelerates global warming. In turn, the changes in climate affect the production of these very food sources.

Where our food comes from also has direct relationships to climate change. Transporting food across long distances burns fossil fuels and emits greenhouse gases. The extended period of time of long-distance transport increases the need for refrigeration. Refrigeration is carbon-intensive. The less transportation and refrigeration needed to supply us our food, the more sustainable it becomes.

Agriculture Impacts on Climate Change

Climate change is exacerbated by agricultural practices, including synthetic fertilizers, livestock methane, and machinery, which emit greenhouse gases. Sustainable farming practices offer mitigation possibilities. Techniques like cover cropping, reduced tillage, precision nutrient management improve soil health and boost carbon sequestration, helping to decrease atmospheric CO₂. Other methods like organic farming, agroforestry, and regenerative farming enhance soil health, biodiversity, and resource conservation, concurrently reducing greenhouse gas emissions. Thus, sustainable farming can help combat climate change impacts.

Economic Potential of Local Food Purchases

Buying food from local sources can reduce the carbon intensity of our diet, reducing our food's supply chain and curbing greenhouse gas emissions associated with food transportation - while also supporting your small business local economy. Studies have indicated that nearly 32 jobs are created for every \$1 million in revenue generated by produce farms involved in a local food market, compared to only 10.5 jobs for those involved in wholesale channels exclusively.

Meanwhile, the outdoor and social activity supported by community gardens and increased gardening in neighborhoods have social and community benefits like increasing social cohesion, providing multi-generational activity, supporting outdoor low-impact exercise, and support of plant/animal/pollinator habitat.



Food Sovereignty on White Earth

The Ag Department has also been tasked to improve food sovereignty and security throughout the reservation. The White Earth Food Sovereignty Initiative helps bring together and organize community driven efforts that aid in establishing a secure and sustainable sovereign food system based in traditional methods of planting, gathering, harvesting, and modern food preservation. The sovereign harvesting of game and fish continues to be regulated and protected by tribal policy. It is the position of the Ag Department that a sovereign food system is a healthier food system.

In partnership with the WETCC Extension Program, the White Earth Ag program aids WE Tribal members wishing to garden. This includes tilling, seeds, and plant starts. Multiple NR programs and staff assist with this event.

Partnerships with local Amish to provide fresh produce through the growing season.

A bison heard has been added with plans to develop a breeding heard. Several have been harvested and provided to elders and served at community events.



Above: Four of White Earth's growing bison heard



Above: Community members pick out produce supplied by cooperative agreement with local Amish

Youth education provided by White Earth Natural Resources department aims to connect youth to traditional harvesting methods and teach about environmental impacts of our food choices.



Students learn to ice angle.



Students learn to harvest wild rice.



Students learn to spear suckers



Maple Syrup Camp Sugar Bush (Iskegamizigewin Endazhi-gabeshing)

- In the spring maple trees are tapped and the sap is boiled down to make syrup and sugar.
- This ancient practice continues today with generational teaching.
- Climate change and shifting seasons are noticed by experienced harvesters.
- The time to harvest the sap is when the days are above freezing, and the nights are freezing.
- The winter of 23-24 had above freezing temps several days in February which caused the sap to flow, nearly 2 months sooner than usual.



Photo:
Whiteearth.com/history
Date Unknown

Our Goals

by 2030:



Restore

food sovereignty and traditions



Increase

WEN's food supply's resilience to climate change



50%

reduction in food insecurity community-wide



Increase

adoption of regenerative farming practices

What we've heard from the community

Responses to our community survey, youth and elder stories:



77%

of survey respondents are moderately, very, or extremely concerned about potential impacts on food security.



Promote youth hunting, fishing, ice fishing, trapping.

Better access to fresh food. The amount of gas used to drive as far as we have to for fresh food could be cut down substantially.

We need local food, a grocery store in every village and growing more food locally.

Do greenhouses for families not just neighborhoods.

Stop forcing our people to shop off reservation for healthy foods.

No corn and soybeans were grown back in the day, only wheat, potatoes, and hay for dairy & beef cows. So there is that huge change in land use.

We need to reduce eating of beef.

Keeping Farmers from polluting the land and water.



How We Get There

On the following pages:



Strategies guide how we achieve our climate action goals.



Actions outline steps White Earth Nation can take to support strategies.



Photo: Youth Spearing



Increase White Earth Nation Food Sovereignty and restored traditions through increased traditional food gathering and food production within the reservation.

Increasing food sovereignty and restoring traditional food practices are crucial for White Earth Nation to enhance climate resilience. By reclaiming control over food systems, White Earth can ensure access to culturally appropriate, nutritious foods, which helps combat food insecurity and diet-related health issues. Traditional food gathering and production methods, such as hunting, fishing, and farming, not only preserve cultural heritage but also promote environmental sustainability.

ACTIONS

- FS 1-1 Explore the development of a reservation-wide community supported agriculture (CSA) program focused on increasing affordable access to fresh fruits and vegetables for food insecure and low income community members. CSA program to prioritize and incentivize local farmers using or transitioning to regenerative agriculture practices.

- FS 1-2 Create a regional mobile fresh food market to bring locally-produced fresh produce and perishable items to communities within the White Earth Reservation without farmer's markets or without a grocery store year-round, particularly during winter months.

- FS 1-3 Establishing clear in-town agriculture ordinances clearly defining the allowability of in-town agriculture including crops, front-yard food gardens, community gardens, in-town farms, local food markets, apiaries, and livestock such as chickens, sheep, and goats. Establish an example ordinance toolkit and promote within the White Earth Reservation.

- FS 1-4 Establishing a seed keeping bank to support local growers and traditional values.

- FS 1-5 Encourage local food vendors to use locally produced fresh and/or prepared food for farmers' markets, festivals, and other community events. Increase opportunities for local food producers to sell and distribute food locally.



Increase the reservation's food system's resilience to climate shocks, including traditional hunting and gathering activities.

Enhancing the resilience of White Earth's traditional hunting and gathering practices to climate shocks is vital for preserving cultural heritage, ensuring food security, and maintaining ecological balance. These activities offer sustenance and deepen connections to the land, yet extreme weather and shifting ecosystems threaten resource availability. Strengthening these practices enables White Earth Nation to adapt to climate impacts, protect its way of life, and promote biodiversity while passing traditional knowledge to future generations, fostering a sustainable bond with the environment.

ACTIONS

- FS 2-1 Develop and implement a curriculum around local food, climate change, and food security for tribal and local public schools.

- FS 2-2 Develop the Agriculture Resource Management Plan and consider climate change in production goals and objectives.

- FS 2-3 Expand distributed solar PV energy supporting WEN Reservation infrastructure and systems, particularly food system components. Explore establishment of micro-grid and energy storage installations.

Strategy
FS 3

Reduce food waste and hunger, achieve a 50% reduction in food insecurity community-wide by 2030.

In the US, food waste accounts for 30-40% of the supply. In the White Earth region, annual food waste reaches 40-45,000 tons, contributing to greenhouse gas emissions and costing over \$50 million annually, according to ReFed. This wasted food could support families in need. As climate change disrupts food security by affecting production, local availability, and prices, reducing food waste is crucial. It aligns with the region's Climate Action Plan goals, boosts sustainability, and helps address food insecurity.



ACTIONS

-
- FS 3-1 Collaborate with local people, entities, and businesses to develop a widely known map of the food resources.

 - FS 3-2 Conduct a detailed Food Security Assessment to determine food insecurity conditions within the White Earth Reservation and areas with limited access to full service grocery stores and markets (particularly within communities of higher vulnerable populations). Identify areas within the reservation for improvement, and establish detailed strategies to increase food security.

 - FS 3-3 Explore potential of collaborating with low cost produce providers, convenience stores, and food pantries to increase the distribution and availability of affordable, fresh foods within local food markets serving low income, vulnerable, and food insecure communities while addressing retail and commercial food waste.

 - FS 3-4 Create Food Forest / "edible walk to school" routes by planting edible trees, shrubs, and planting regionally native vegetables to existing public landscaping (apple, pears, plums, blueberries, strawberries, service berries, etc.) that eventually will allow students walking to school and other community members to pick fresh local food. Select an existing property for a pilot project.
-

Strategy
FS 4

Increase adoption of regenerative agriculture practices, achieving 25% adoption by 2030.

(Regenerative agriculture includes carbon positive soil and crop management practices)

Farm practices influence greenhouse gas emissions through soil management. Emissions arise from fertilizers, specific crops, and changes to soil caused by irrigation. Regenerative farming techniques, such as rotational grazing, crop rotation, cover cropping, and no-till farming, can reduce emissions and restore soil health. No-till farming, in particular, helps sequester carbon by pressing crop residues into the soil during planting.



ACTIONS

-
- FS 4-1 Explore funding to advance adoption of regenerative agriculture practice and to fund an agricultural land buy-back on the reservation.

 - FS 4-2 Collaborate with partners to work with local farmers to promote the use of regenerative agriculture systems (e.g., no-till practices, perennial groundcover, alley cropping, silvopasture, succession planting, rotational grazing practices, etc.) through incentives, workshops, and demonstration projects in order to increase carbon sequestration on farmland while also improving soil health and increasing resilience to climate impacts such as drought and flooding.

 - FS 4-3 Collaborate with partners to establish a White Earth Nation Continuous Cover Program to expand perennial native plantings and promote regenerative agriculture practices including continuous cover, prairie strips, and riparian buffers.

 - FS 4-4 Conduct an Anaerobic Digester Master Plan study to identify the current manure volume community wide available for use in new Anaerobic Digesters (single farm or shared facilities), identify financially viable Anaerobic Digester installations to serve the unmet need while maximizing manure volume handled, identify financing mechanisms and ownership scenarios, and establish an implementation plan.
-

What You Can Do

You can support the goals of the Food Sovereignty section of this climate action plan as an individual, household, or a business. Here are just a few things you can do:

1. Rent a plot at your local community gardens and grow your own.
2. Eat a plant-rich diet. Animal products are extremely GHG-intensive to produce compared to plants. Eating less meat and dairy will reduce emissions associated with food consumption. Eating regionally-grown food that is suitable for the Minnesota climate will also make a difference through [reduced transportation-related emissions](#). A great place to start is with “Meatless Mondays” or one meat-free meal a day.
3. Buy food directly from a local grower on an ongoing basis by joining a Community Sponsored Agriculture (CSA) group or frequenting the farmer’s market.
4. Plant fruit or nut bearing trees or shrubs that are well suited for our hardiness zone on your property. Examples include: Trees: Apple, Pear, Plum, Black walnut, Shrub: Serviceberry, Currant.
5. Support restaurants and grocery stores that use and sell locally-grown food.
6. Buy food that is in season, minimizing the distance food must travel.
7. Support your local farmers markets.
8. Buy ethically grown and harvested food, like fair-trade coffee and chocolate.



Photo: WE First Bison 2024



Greenspace and Trees

 [Click here to return to TOC](#)

“ Plant more trees , more pollination resources expand on turtle pollination gardens.

- White Earth Tribal Elder

Trees and natural ground coverings are instrumental in bolstering regional health, enhancing air and water quality, cutting down energy usage in buildings, and contributing to climate mitigation. Recent research indicates that even simple interactions with nature, like visiting a park or observing a tree, can substantially boost a person's health and reduce stress levels. Consequently, our appreciation of trees has broadened to include their significant mental and physical health benefits. In terms of environmental advantages, trees play an indispensable role in purifying air by extracting harmful pollutants, such as Carbon Monoxide, particulate matter, and Ground-level Ozone. These contaminants can reach toxic levels and trigger asthma and other respiratory issues.

Prairie Grass and Climate Action

Replacing traditional turf lawns with prairie grass, wildflowers, or food gardens serves as an effective climate adaptation strategy. These native species require less water and maintenance, reducing irrigation needs and carbon emissions from lawn care equipment. Their deep root systems improve soil health, enhance water absorption, and increase carbon sequestration, mitigating flood risk and contributing to climate change mitigation. Additionally, they provide habitats for local wildlife, promoting biodiversity. This transformation supports the ecosystem, reduces environmental impact, and fosters resilience against changing climate conditions, making it a sustainable, multifaceted approach to climate adaptation.

The Link Between Impervious Surfaces and Extreme Heat

Impervious surfaces like pavements and buildings in a region contribute to higher "micro heat island" effects, resulting in increased atmospheric and surface temperatures in developed areas compared to rural ones. This rise in temperature, particularly during summer, heightens discomfort and health risks, especially during heat waves. A 2006 study by Minnesota State University and the University of Minnesota elucidated a ratio illustrating the correlation between a community's impervious surface percentage and the corresponding heat island temperature increase.



Greenspace and Trees in White Earth Reservation

- White Earth Natural Resources department Forestry division is tasked with the management of forested lands on the reservation. This includes timber harvests and wildland fire management. Reduced snow pack in the winter can lead to earlier fire danger seasons.
- The forestry department uses public education on fire prevention and tree planting to spread the message of the importance of green spaces and trees. This includes sapling give aways.
- The Natural Resource department also has pollinator garden spaces located through the reservation



Photo: Shuckhart Lake

Our Goals

by 2030:



5%

more tree canopy cover (by 2040)



2.5%

less turf to be replaced with native plantings



Increase

resilience of forests, prairies, and wetlands

What we've heard from the community

Responses to our community survey, youth and elder stories:



82%

of survey respondents are moderately, very, or extremely concerned about tree and ecosystem loss from climate change.



Plant more trees, more pollination resources and expand on turtle pollination gardens with extension offices.

Storms and drought can mess with our lakes. Keep our lakes clean.

Migratory bird patterns have changed significantly. Several species you always use to see are not around.

Stricter laws about polluting.

Decrease logging, let our forests recover.

Educate our community.



How We Get There

On the following pages:



Strategies guide how we achieve our climate action goals.



Actions outline steps White Earth Nation can take to support strategies.



Photo: Norris Forest Area



Increase tree cover, particularly in areas of increased vulnerable population shares 5% by 2040.

Our tree canopy reduces stormwater runoff, provides clean drinking water, mitigates micro-heat islands, lowers building energy use, sequesters carbon, and supports economic growth. Expanding canopy coverage enhances climate adaptation for ecosystems and communities. Prioritizing these increases should balance expanding canopy potential with improving equitable access to canopy benefits, maximizing household impact, and supporting ecosystem resilience.

 **ACTIONS**

- GT 1-1 Promote the expansion of tree canopy in micro-heat islands or areas that need air conditioning such as schools.
- GT 1-2 Explore the planting of "super-sweet" sugar maple seedlings, as a potential adaptive response.
- GT 1-3 Collaborate with local partners and governments to establish a "free" or reduced cost tree program to support increased tree planting by residents, farms, and businesses throughout the White Earth Reservation.
- GT 1-4 Establish a preferred tree species list for use in Tribal Government tree planting efforts to ensure use a diverse selection of native tree and plant species in new plantings, particularly those that will be most resistant to the stresses of climate change. Promote and encourage Tribal members to select from preferred species lists for plantings.



Increase pollinator supportiveness of lawns and grasslands in community and achieve a 2.5% turf replacement with native grasses and wildflowers community-wide by 2030.

Replacing lawns with native grasses and wildflowers creates a more authentic landscape that combats climate change while supporting songbirds and small mammals with food and shelter. Compared to traditional lawns, native grasses enhance water quality, reduce air pollution, restore and protect habitats, and increase carbon sequestration.

 **ACTIONS**

- GT 2-1 Complete White Earth Reservation private land conversion opportunity study. Analyze private property for unused turf and impervious areas and implement an education and outreach campaign. and establish incentives for native prairie grass conversion.
- GT 2-2 Support and encourage farmers within the White Earth Reservation to increase use of native prairie grass and wildflowers. Strategies include contour buffers, wind breaks, edge-of-field buffers, and native grass pastures.
- GT 2-3 Continue Education and incentive programs for native and pollinator friendly plantings on residential lots; Hold annual workshops.
- GT 2-4 Establish a policy to require the use of native plants in landscaping at Tribal government owned properties. Develop a White Earth Reservation park and government facility turf analysis and conversion study to identify lesser maintenance turf and ground cover types, to determine native plant, pollinator restoration, and low / no mow cover opportunities, and help communities establish a conversion master plan.
- GT 2-5 Collaborate with local partners to develop educational and informational resources on benefits of and strategies for reduced and repurposed lawn space including: native plantings, "carbon gardening" strategies for ornamental gardens, and produce gardens, tree profile rebuilding, elimination of synthetic fertilizer and pesticide use, high mow deck settings, use of biochar amendments, polyculture lawn mixture and other beneficial greenspace practices included in this CAP. Include information on incentives including the State of Minnesota's "Lawns to Legumes" grant.



Care for forest, prairie, and wetland ecosystem health, particularly for key species, to enhance their resilience to climate change.

Caring for the health of forests, prairies, and wetlands is essential for White Earth Nation to strengthen ecosystem resilience and adapt to climate change. These ecosystems support key species central to cultural traditions, biodiversity, and food sovereignty. Protecting and restoring habitats for species like wild rice, medicinal plants, and native wildlife enhances the land’s natural resilience, helping ecosystems withstand climate impacts such as shifting weather patterns, invasive species, and extreme events.

ACTIONS

- GE 3-1 Map and protect areas that provide ecosystem services, such as key wildlife corridors and connectivity areas, wetlands, ephemeral ponds and late successional forest habitats, through improved Tribal and public land management and promotion of conservation easements and private open spaces

- GT 3-2 Explore opportunities to increase presence of bison to help promote prairie conversion and restoration.

- GT 3-3 Develop educational program for local community members on:
 - Native plants and grasses and how to grow them.
 - Current invasive species issues and how to prevent the spread of invasive species.
 - Replacing invasives with native plants, remediating disturbed and contaminated soil to native species.
 - Concerns with wood and invasive species (emerald ash borer, etc.) and best practices for wood burning.

- GT 3-4 Gain a better understanding of current conditions to better manage for desired future conditions. Do this by assessing forest conditions to identify which areas are best suited to timber activity, thinning, and the application of fire.

- GT 3-5 Work with other agencies to review, comment, and consult on management activities that could impact sugar maple.

- GT 3-6 Collaborate with partners to evaluate white bark pine genetic stock on the reservation.

- GT 3-7 Manage publicly-owned natural and right of way areas to enhance and maintain diverse native communities (example: mirror lawns to legumes program) Incentive: applications and assistance for community members to convert.

- GT 3-8 Identify multiple biological indicators of climate change sensitivity and response; specifically, identify high risk assets for monitoring or intervention.

- GT 3-9 Identify wetlands that can be restored to provide ecosystem services like flood protection and habitat for key species. Invest in restoring these priority ecosystems.

- GT 3-10 Work with federal and state colleagues to update the National Wetland Inventory for the White Earth Reservation.

What You Can Do

You can support the goals of the Food Sovereignty section of this climate action plan as an individual, household, or a business. Here are just a few things you can do:

1. Plant a rain garden with native plantings to absorb storm water and replenish our aquifers.
2. Plant trees in your yard to provide shade and cooling in summer heat. Select trees suited for the changing climate of [Central Minnesota](#).
3. Replace your lawn and landscape with drought-resistant, native or well-adapted, non-invasive plants.
4. Make your backyard a [Certified Wildlife Habitat](#) with the National Wildlife Federation.
4. Remove pavement and increase permeable surfaces. De-pave areas wherever possible to encourage stormwater infiltration onsite.
5. Install bioswales/rain gardens or rainwater diversion systems to reduce impact on the stormwater system.
6. Install a Green Roof (living roof) to reduce your energy consumption. Decrease heat island impacts, and reduce stormwater runoff.

Photo: Shanzen Lake



Health and Safety

 [Click here to return to TOC](#)

“ I think climate change might affect our cultural practices like round dances and powwows.

- White Earth Tribal Youth

The correlation between human health and environmental health is undeniable and profound. In Minnesota, escalating environmental impacts brought about by climate change are expected to aggravate health problems. This is primarily attributable to increasing temperatures, changing rainfall patterns, and the broadening habitat of disease-carrying vectors.

Rising temperatures bring about more frequent heat waves, a phenomenon that escalates the occurrence of heat-related illnesses. Such health issues pose a particular risk to the more vulnerable groups, including the elderly, infants, and those with pre-existing health conditions.

Changes in precipitation patterns could result in more frequent and intense floods and droughts. Flooding often contaminates water supplies, thereby increasing the risk of waterborne diseases. On the other hand, drought conditions raise the likelihood of wildfires - either locally or in the Western United States and Canada, both of which can significantly degrade air quality and exacerbate respiratory conditions such as asthma and allergies.

Increasing temperatures and general season shift will cause Minnesota's growing season to expand. The habitat and season of disease-transmitting vectors, including mosquitoes and ticks will expand with it. This could lead to an increased prevalence of vector-borne diseases such as West Nile virus and Lyme disease.

Mental health impacts may see a rise due to the social and economic impacts of climate change. Increased anxiety and stress about the future, as well as trauma from climate-related disasters, could lead to an upsurge in mental health disorders.

The Role of Tribal Governments in Climate Health and Safety

The effects of climate change pose significant threats to public health and safety. They influence the air we inhale, our weather conditions, the reliability of our food and water sources, and our engagement with both human-made and natural environments. As the climate change impacts continue to grow, so do the health hazards they induce. Tribal governments and the healthcare industry have long promoted healthy habits like a balanced diet and regular exercise to improve public health. In the same way, it's imperative for tribal governments to recognize and act on the relationship between climate impacts, adaptation and resilience measures, and community health. After all, the state of our environment plays a crucial role in shaping our public health outcomes.



Health and Safety in White Earth Reservation

- White Earth Nation's Health Division consists of several departments that provide services to the people living on the White Earth Reservation.
- White Earth Emergency Management works alongside the Health Division to provide resources under climate related health events including high heat warnings, major storms, power outages, disaster debris removal, and air quality concerns

Our Goals

by 2030:



Vulnerability

reduction



Empower

community members for climate resilience



Infrastructure

What we've heard from the community

Responses to our community survey, youth and elder stories:

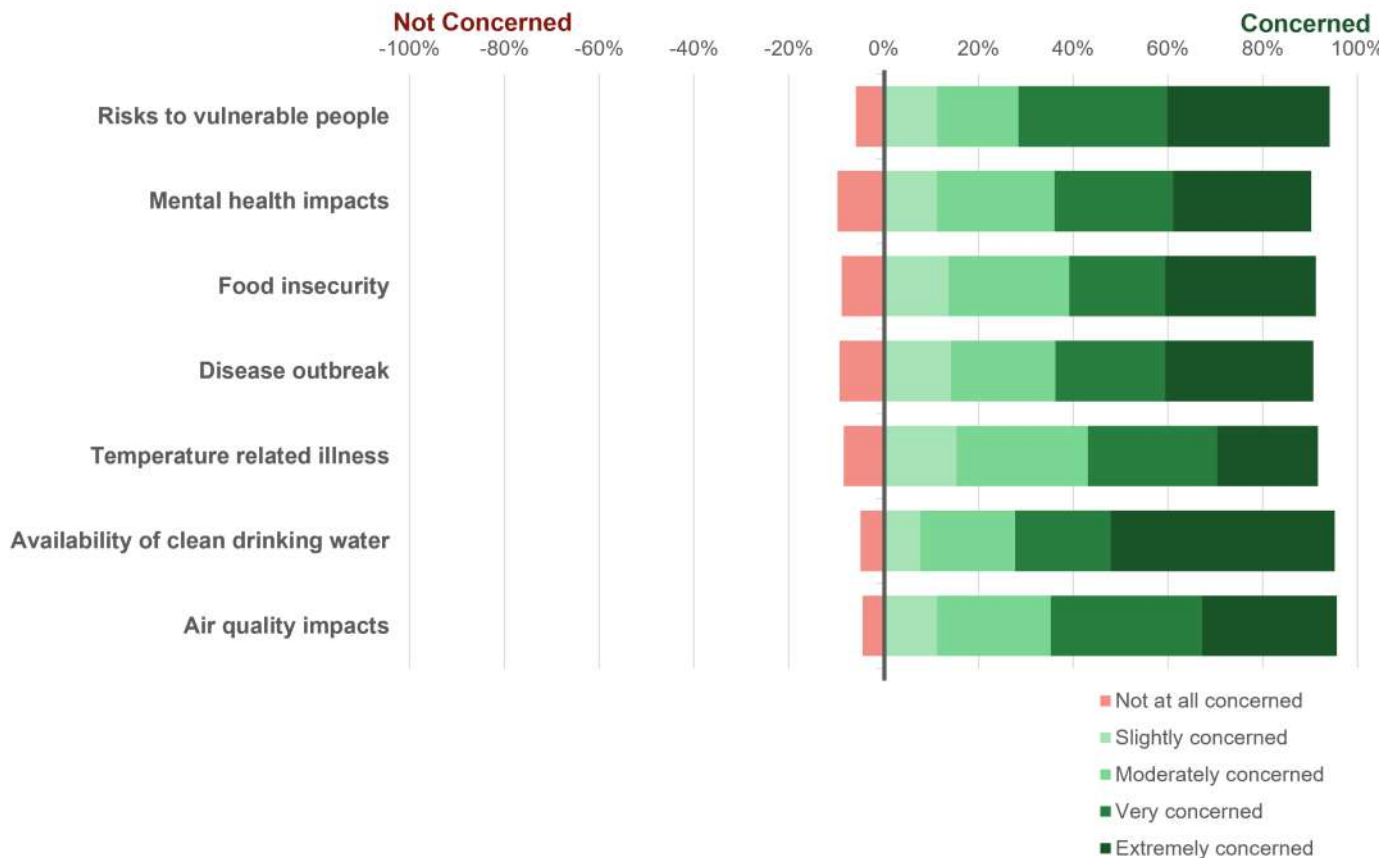


93%

of survey respondents have already been personally impacted by one or more effects of climate change.



How concerned are you about the following possible human health impacts of climate change?



How We Get There

On the following pages:



Strategies guide how we achieve our climate action goals.



Actions outline steps White Earth Nation can take to support strategies.



Assist White Earth Nation’s climate vulnerable populations in preparing for and mitigating climate change impacts.

Tribal governments should support climate-vulnerable populations, who often face disproportionate impacts from climate change without adequate resources for preparation or recovery. By investing in infrastructure, emergency readiness, and climate education, tribes can strengthen resilience for these groups and ensure community stability. According to the Minnesota Region 4 Climate Vulnerability Assessment, priority should go to strategies addressing extreme heat, air quality, infrastructure resilience, and food security. Special focus on seniors, low-income residents, essential workers, and individuals with disabilities will maximize these benefits and foster lasting community sustainability amid climate uncertainties.

ACTIONS

- HS 1-1 Encourage and support local governments in considering populations most vulnerable to weather-related emergencies in emergency response and recovery planning efforts. Considerations include evacuation routes, transportation, shelter in place locations, back-up power operations, extended access to fuel/power sources, drinking water, and ensuring that there are specific plans for populations requiring mobility assistance. Plans should include steps to identify and help populations disproportionately affected by extended power outages/flooding, etc.
- HS 1-2 Increase health messaging to encourage people to stay indoors in a ventilated building when the air quality is poor to reduce exposure to particulate matter.
- HS 1-3 To the extent possible, monitor trends in forest condition and climate to proactively identify areas with high susceptibility to wildfire and conduct studies of specific implications of climate change scenarios on frequency and magnitude of fire. If not possible, work to stay abreast of efforts other agencies or departments are doing in this area.
- HS 1-4 Support air quality programs.



Educate, engage, and empower the public on health and safety risks of climate change impacts.

Education is key to driving climate action. By deepening understanding of climate issues, education equips people with the knowledge, skills, and values needed for change. Studies show that climate education reduces emissions and lessens vulnerability to environmental risks. To address climate change as a public health threat, preventive strategies like education and outreach are essential. These efforts can influence behaviors, helping to reduce climate impacts, particularly for White Earth Nation’s most vulnerable members.

ACTIONS

- HS 2-1 Collaborate with local governments and regional partners to establish a severe weather, air quality, and hazards communication plan to increase awareness of national, state, regional, and other alert systems. Communication plan to include pathways for when community power and communication systems are non-functional.
- HS 2-2 Develop ways to reach out to community to show importance of being climate resilient
- HS 2-3 Ensure that leaders are informed by offering information sessions
- HS 2-4 Create climate resilience document for adoption by programs to show support
- HS 2-5 Educate the public about the potential risk of wildfire, including the release of particulates and how they can impact public health, and what protective measures to take. As part of this campaign, highlight the value of activities such as the use of fire resistant building materials and keeping vegetation and trees a minimum distance from houses



Ensure that the Tribe’s mission critical, emergency services, health care facilities, and infrastructure are prepared for impacts of climate change.

Mission-critical services, emergency facilities, healthcare, and infrastructure are essential to community resilience, yet extreme weather disruptions can be devastating. Preparing these systems for climate impacts allows White Earth Nation to reduce risks, ensure continuity, protect the vulnerable, and save lives. Climate-proofing these services demonstrates proactive governance, strengthens public trust, and encourages community engagement in climate action efforts.

ACTIONS

-
- HS 3- 1 Update White Earth Nation emergency plans with specific climate change-related emergency risks and communications materials. These could include press release templates, information on cooling/heating centers, specific plans for populations requiring mobility assistance, and steps to identify and help populations affected by extended power outages, flooding, etc.

 - HS 3- 2 Establish a network of cooling stations. Do so by Establishing and staffing air-conditioned buildings open to community members during extreme heat events, providing a free shuttle service from areas with identified vulnerable populations or from central public spaces (parks, libraries, etc.) to cooling centers, dispatching teams of mobile nurses or outreach workers to provide water and fans or other cooling equipment to members or areas identified as being especially vulnerable, creating neighborhood-level communication network to inform residents of location and directions to the nearest cooling center, coordinating transportation to those centers for limited-mobility residents during extreme heat events, collaborating with tribal members to identify suitable locations for cooling centers, and developing effective messaging to notify members, conduct outreach, and plan appropriate activities for members at centers.

 - HS 3- 3 Coordinate with Tribal Historic Preservation Office on protecting cultural resources, ruins stabilization, and dwelling protection from impacts of climate change.
-

What You Can Do

You can support the goals of the Health and Safety section of this climate action plan as an individual, household, or a business. Here are just a few things you can do:

1. Put together an emergency preparedness kit for your household.
2. Get involved with your community's Emergency Response Team (CERT) and join your neighbors and receive training to prepare for potential disasters.
3. Prepare your home for the extremes. Understand the risk of extreme weather, extreme temperatures, flooding or wildfire to your home, and take action to safeguard your home.
4. Keep yourself and your family current with physicals, vaccinations and prescribed medications and therapies.
5. Plan and rehearse a fire evacuation plan with everyone who lives in your home or apartment.
6. Have breathing-protection masks available for you and your family for when air quality alerts are declared.
7. Take first-aid and CPR certification training.
8. Notice a person who lives alone. Offer to check on them periodically, especially during extreme weather or a natural disaster.
9. Notice a person who sometimes lacks transportation to their doctor, shopping or other services. Offer to drive them.
10. Notice a person or family who lacks air conditioning in their home or apartment. Offer to have them visit or stay with you during extreme heat events.



Photo: WE Interns Harvest Traditional Medicine



Climate Economy

[Click here to return to TOC](#)

“ White Earth should be starting to look at integration of green jobs right into the action plan.

- White Earth Tribal Youth

Climate change and the economy are inexorably linked. Left unabated, the impacts of human-made climate change through the end of this century will cost the United States billions of dollars. According to a 2019 study by two EPA scientists, the difference in economic impact between the mid-range climate model (RPC6) and the high range climate model (RPC8.5) may account for as much as \$224 billion in economic impact annually by 2090. According to a 2019 World Bank report on trends in carbon pricing, a carbon price range of \$40-\$80 per ton is necessary as of 2020 to reach the goals set by the 2015 Paris Agreement, while other studies have placed the full cost of carbon at \$200-\$400 per ton. Using the calculation outlined in Vulnerability Assessment (Projected localized annual economic impacts of climate change as outlined in the Climate Vulnerability Assessment divided by annual community-wide GHG emissions as outlined in the Greenhouse Gas Inventory Report), an estimate minimum localized cost for carbon for White Earth Nation is \$103 per metric ton.

The economy is also directly linked to climate action as well. One common concern is that climate action damages the economy. However, climate action today avoids the future costs associated with unmitigated climate change.

Seizing Economic Opportunities of Climate Action for White Earth Nation

The climate crisis has garnered global attention, with over 400 major companies committing to achieve net zero emissions by 2050. Ambitious targets have also been set by nations: China aims to achieve net zero emissions by 2060, while former President Biden pledged to reduce US emissions by 50-52% by 2030 and reach net zero by 2050, with support from the Infrastructure Investment and Jobs Act (IIJA) and the Inflation Reduction Act (IRA). Building local capacity for climate-forward businesses, jobs, and projects in White Earth Nation is vital to capitalize on opportunities and actively participate in the transformative economic shift.

Contrary to concerns about detrimental effects on the economy, climate action can actually support economic development. Transitioning away from fossil fuels, improving public transportation systems, and fostering local food industries involve a shift toward local energy and labor sources. This presents communities with opportunities to create wealth by reducing reliance on imported resources and creating local jobs.



Our Goals

by 2030:



Develop

economic potential of “green” economy for WEN



Train

community members for green jobs



Prepare

tribal businesses for climate change resilience

What we’ve heard from the community

Responses to our community survey, youth and elder stories:

“

The tribe should invest in solar panels, it would create a job for someone, maintenance wise.

We could be training out people in different aspects of green jobs and pay for that training.

”

How We Get There

On the following pages:



Strategies guide how we achieve our climate action goals.



Actions outline steps White Earth Nation can take to support strategies.





Capture tribal economic potential of sustainability and climate action such as renewable energy, energy efficiency, and shared mobility businesses and jobs.

Achieving global climate goals requires major investment over the next 15 years to avoid lasting economic damage—but this investment can also drive growth. According to the World Resources Institute, bold climate actions could boost the U.S. economy by \$26 trillion by 2030 compared to a "business-as-usual" path. The UN also notes that every dollar spent on climate action yields an average of \$4 in benefits. Post-COVID-19 research shows that strong climate initiatives help communities "build back better" and support lasting economic prosperity, offering development opportunities for those prepared to plan strategically.

ACTIONS

-
- CE 1-1 Conduct a Climate Economy Economic Development Assessment to identify economic opportunities possible through the successful implementation of the Climate Action Plan and achievement of its goals, especially those which can provide opportunity for the White Earth Reservation's vulnerable populations. Establish a campaign to communicate findings, job creation potential of the strategies included in the CAP, and promote action.
-
- CE 1-2 Collaborate with local partners to explore opportunities for:
 - Solar panel and battery recycling business development for the White Earth Reservation and establish a pilot project
 - Growing, harvesting, marketing and preparing local produce and animal products in support of Food section CAP goals.
 - Fostering small business and green business development, particularly those which increase renewable energy, climate mitigation and adaptation resources within the community.
-
- CE 1-3 Partner with State and County waste management and local and regional recycling centers to establish a program to encourage and promote new entrepreneurial businesses advancing the use of recycled material feed stock, the utilization of organics composting, bio char, hempcrete, and "Circular Economy" concepts which further the goals of the CAP.
-
- CE 1-4 Support the creation of a market for locally generated Biochar, explore business partnership with Forestry Division with Emerald Ash Borer
Build local market for valuable product
 - Add to compost to boost value
 - Utilization as soil amendment
 - Utilize to bond contaminants in soil (positive cation exchange)
 - Establish ordinance requiring Biochar soil amendment for all new construction
-
- CE 1-5 Promote alternatives to traditional building demolition such as relocation, deconstruction and salvage. Establish a jobs training program focused on building workforce with deconstruction skills and capacities. Job training program should focus on establishing job skills and placement for low income individuals.
-



Support tribal members ability to thrive through advancing workforce development aligned with the needs of the “Green Economy.”

Local climate initiatives like distributed solar and building weatherization create quality 'green' jobs, keeping investments in communities. According to the Brookings Institute, these jobs, key to a carbon-free economy, offer higher, more equitable wages than the national average. With lower education barriers, green jobs pay better for high school graduates compared to other sectors. They also build valuable technical skills, strengthening the local workforce long-term. By focusing on green job workforce development, White Earth Nation will not only boost economic opportunities but also help open doors for community members, increasing overall resilience.

ACTIONS

- CE 2-1 Fund and organize the establishment of a ReStore Facility for reusable furnishings and salvage including construction/demolition.

- CE 2-2 Work with local unions and businesses to ensure that apprenticeship program includes solar training.

- CE 2-3 Develop job training programs focused on building resiliency- solar construction, weatherization, etc. Partner with the White Earth Tribal College, State of Minnesota, and other partners to develop the training and workforce development to achieve 500 "green careers" by 2030.

- CE 2-4 Collaborate with local educational institutions such as universities, community colleges, and adult education programs to create more curricula that provide tribal members with the skills and knowledge to work for competitive green businesses. Explore creation of a paid Green Jobs apprenticeship and internship program.

- CE 2-5 Create an Affordable Housing Master Plan to identify current and potential future need for affordable housing including scenarios anticipating climate immigration and migration potentials. Master plan should identify priority affordable housing locations which meet the Buildings and Energy, Transportation and Land Use, Climate Adaptation, Health and Safety, and other goals of this CAP plan.



Ensure tribal commercial properties and businesses are resilient in the face of climate change.

COVID-19 revealed the domino effect of disruptions, shrinking the global economy by 4.3% (\$3.5 trillion) in 2020. A Swiss Re study warns that climate change could have an even greater economic impact, potentially quadrupling losses in the worst case. Nearly half of top companies report almost \$1 trillion in climate-related risks. Strengthening climate resilience for White Earth Nation’s economic interests is essential in building long-term community resilience to global climate shocks.

ACTIONS

-
- CE 3-1 Strengthen public-private economic communications in support of climate resilience, climate economic opportunities, and the goals of this plan. Effort should focus particularly on communications with disadvantaged group businesses (minority-owned, veteran-owned, economically-disadvantaged, etc.) and small businesses.

 - CE 3-2 Collaborate with regional Chamber of Commerce, West Central Minnesota Ag Producers, economic development directors, and local businesses to identify industry specific economic impacts to White Earth Reservation businesses (particularly farmers, small businesses and disadvantaged group businesses) face based on the climate change based on risks and hazards identified in this report, the Climate and Vulnerability Assessment, and emergency management plans in the White Earth Reservation. Collaborate with businesses to identify economic resilience strategies in response to those economic vulnerabilities and conduct outreach to industry groups and public-private partnerships to promote private sector investment addressing them.

 - CE 3-3 Collaborate with partners to ensure redundancy in telecommunications and broadband networks to protect jobs, commerce and public safety in the event of natural or manmade disasters.

 - CE 3-4 Conduct a planning effort focused on identifying economic vulnerabilities and opportunities, especially those affecting the Tribe's vulnerable populations. Identify economic resilience strategies and strengthen public-private economic communications, especially with targeted group businesses (minority-owned, veteran owned, economically disadvantaged, etc.).
-

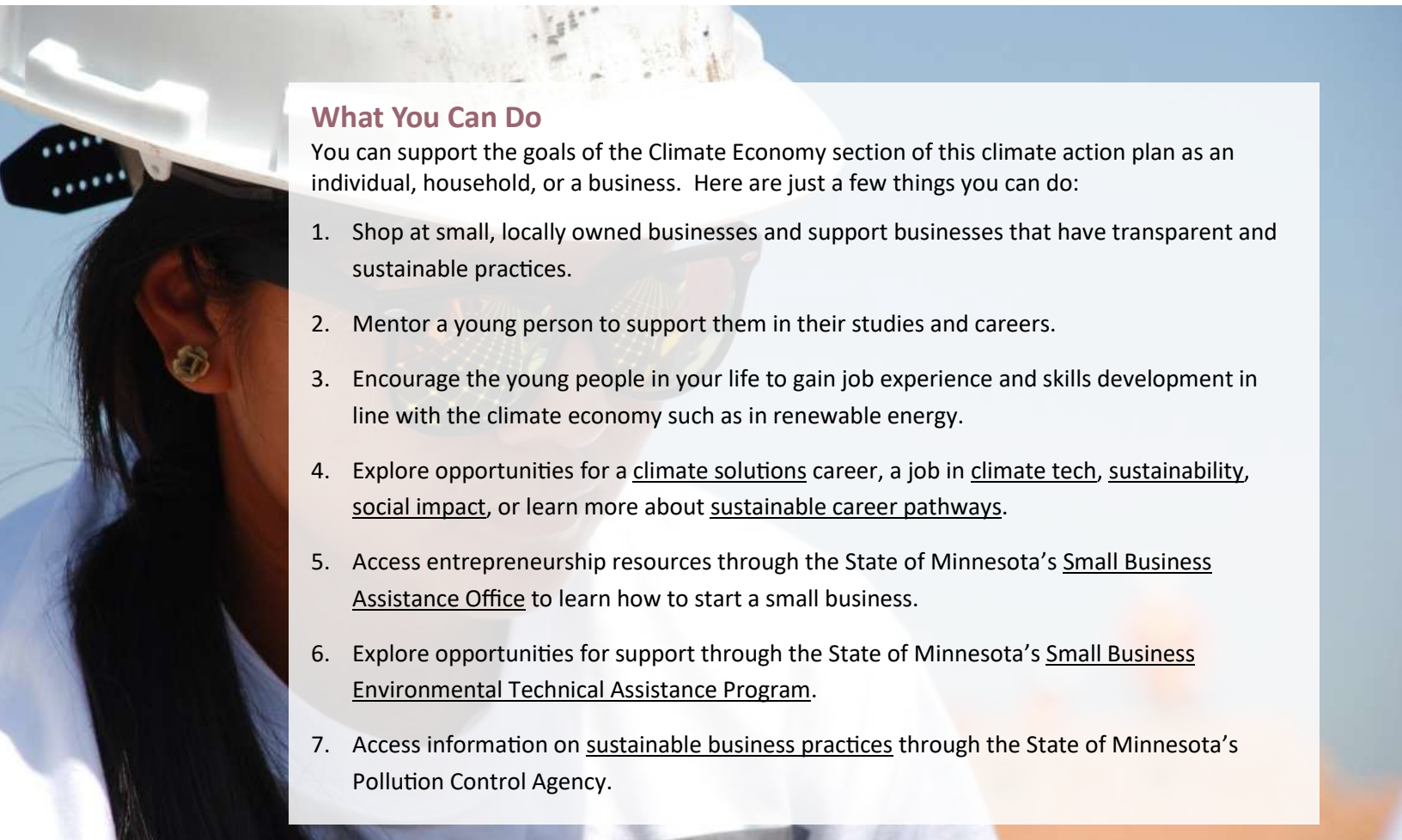


Establish sustainable financing for the implementation of the White Earth Nation’s Climate Action Plan.

Current state and federal subsidies, along White Earth revenues, may not fully support the upfront costs of resilience and adaptation investments. These investments typically involve short-term costs with long-term benefits or prevent future climate damage without immediate returns. To bridge this gap, communities are turning to innovative financing alternatives.

ACTIONS

- CE 4-1 Utilize state and federal funding, incentives, and grants available to support local government climate action implementation resulting from the Inflation Reduction Act (IRA), Infrastructure Investment and Jobs Act (IIJA) and others.
- CE 4-2 Explore the potential of collaborations with donors, philanthropists, and non-profit foundations to develop a Climate Action and Equity Fund for White Earth Nation.
- CE 4-3 Explore creation of a Forest Credit program to fund local tree canopy increases, in-town and rural tree maintenance, and provide carbon offset credits. Explore collaboration with others in the Minnesota Region 4 area.
- CE 4-4 Explore adopting a financing mechanism such as a "resilience dime" fee on tribal hotel and casino charges and dedicate additional funds for climate mitigation and climate adaptation strategies. Funds may be used directly, or may be used as a repayment source for a bond issue.
- CE 4-5 Explore potential of establishing Utility Franchise Fees.



What You Can Do

You can support the goals of the Climate Economy section of this climate action plan as an individual, household, or a business. Here are just a few things you can do:

1. Shop at small, locally owned businesses and support businesses that have transparent and sustainable practices.
2. Mentor a young person to support them in their studies and careers.
3. Encourage the young people in your life to gain job experience and skills development in line with the climate economy such as in renewable energy.
4. Explore opportunities for a climate solutions career, a job in climate tech, sustainability, social impact, or learn more about sustainable career pathways.
5. Access entrepreneurship resources through the State of Minnesota’s Small Business Assistance Office to learn how to start a small business.
6. Explore opportunities for support through the State of Minnesota’s Small Business Environmental Technical Assistance Program.
7. Access information on sustainable business practices through the State of Minnesota’s Pollution Control Agency.



Implementation and Cross-Pollinating Actions

Click here to return to TOC

“ Every department should share their accomplishments .

- White Earth Tribal Elder

The early years following the adoption of this plan are critical to its success. Establishing roles and securing funding will lay the groundwork for the implementation phase, keeping the community on track to meet its goals. This Climate Action Plan (CAP) sets ambitious targets for reducing greenhouse gas emissions and building climate resilience. Achieving these goals will require integrating the CAP into local government operations and services, with the ongoing support and commitment of White Earth Nation’s community members and businesses.

Implementation is a Collective Effort

The causes and effects of climate change are wide-reaching, and addressing them must be equally comprehensive. Some initiatives will be led by the Tribal Council, tribal departments, and the business sector, while others involve actions that households and individuals can take to make a difference. Achieving the plan's goals will depend not only on the engagement of White Earth Nation’s leadership and staff but also on a shared commitment from the entire community.

Implementing Climate Action is an Ongoing Process

Beginning a long-term Climate Action Plan involves unknowns, especially around future technologies, costs, and regulations, which complicate early cost-benefit analyses. This journey will require ongoing adjustments as White Earth Nation works toward its climate objectives. Tribal Council approval will be needed for actions affecting policies, ordinances, or budgets, ensuring flexibility and fidelity to the plan’s intent.

Cross-Pollinating Actions

The strategies and actions of this section are intended to broadly support the implementation of this Climate Action Plan.

How We Get There

On the following pages:



Strategies guide how we achieve our climate action goals.



Actions outline steps White Earth Nation can take to support strategies.

Implementation Support Tools

To support White Earth Nation in its initial implementation phase, the paleBLUEdot team has created tools to support implementation:

Implementation and Monitoring Matrix:

Excel based tool supporting action implementation and monitoring.

Example Climate Action Policies and Ordinances

The paleBLUEdot team has assembled example policies and ordinances supporting some of the strategies and actions included in the White Earth Nation Climate Action Plan. The examples can be found on the following webpage: <https://palebluedot.llc/white-earth-nation-example-cap-policies>

Example Policy Alignment Memo

For use in reviewing all public White Earth Nation policy items against CAP goals: <https://cutt.ly/weHuivzZ>

Example Internal Implementation Team Agendas

For support in establishing internal White Earth implementation teams: <https://cutt.ly/ieHuoexP>



Continue to Build Internal Capacity for Support of Climate Action Plan Implementation.

Integrating climate actions into daily operations is essential for successfully implementing the plan and achieving long-term climate goals. Creating an implementation team with representatives from all tribal government departments, assigning staff to lead or participate in actions, and establishing a process to review implementation progress will help embed climate action into White Earth Nation operations.

ACTIONS

-
- CP 1-1 WEN staff to develop an annual implementation plan that specifies a work sequence and timeline for implementation tasks for each fiscal year, estimates necessary funding and staffing resources, and outlines an accountability process, to be presented to Tribal leadership for comment and finalization within the Tribe's annual budgeting process.

 - CP 1-2 Establish clear guidance and direction for the participation in and support of the CAP implementation actions by all White Earth Nation tribal government departments. Encourage continuing education of WEN staff relevant to the Climate Action Plan.

 - CP 1-3 Establish a White Earth Nation "CAP Team" comprised of staff representatives from all key tribal government departments. The task of the CAP Team should be to meet regularly to support the initial and on-going prioritization and implementation of annual implementation actions and projects and to support reporting and progress updates. CAP Team to request resources, guidance, or assistance, if needed to make planned progress.

 - CP 1-4 Establish and implement a policy to review existing and future White Earth Nation policy and ordinance changes as well as building and zoning variance requests against the goals, strategies, and actions of this Climate Action Plan to ensure alignment of changes with this plan.

 - CP 1-5 Fund and support sustainability staffing required to:
 - Facilitate discussion among large users to reduce emissions through business and industrial strategies.
 - Participate in technical resource programs as they are available through County, Regional, State, Federal, and non-profit provider partners.
 - Support White Earth Nation tribal government department managers and staff as they implement CAP actions within their service area or area of expertise.
 - Convene the internal WEN CAP Team.
 - Ensure the establishment and maintenance of a WEN Climate Action webpage supporting CAP resources for the community.
 - Coordinate and organize volunteer groups and events.

 - CP 1-6 Review Climate Action Plan implementation progress and impacts on a regular basis (1-2 year cycle). Review should include development of an updated community-wide and municipal operations GHG inventory. Strategies and actions should be reviewed for implementation progress and for continued appropriateness. Based on the review, adjust, add, and remove detailed CAP actions as appropriate.



Facilitate External Support Needed for Climate Action Plan Implementation.

Community-wide Climate Action Plans rely on raising awareness and engaging stakeholders across the community. This approach makes it essential for plan implementation to be a collaborative effort. Coordinated communication campaigns, partnerships with agencies and organizations, and the mobilization of volunteer initiatives are key strategies to extend the reach and amplify the impact of these efforts.



ACTIONS

-
- CP 2-1 Establish a roster of White Earth Nation Climate Action spokespeople comprised of regional celebrities and well regarded regional community members to support building regional awareness of climate action, benefits, and the Tribe's plan.

 - CP 2-2 Establish a coordinated communication and education campaign supporting the communication and educational needs of each of the CAP sections. The campaign should also look to help community members:
 - Understand climate change in general, anticipated impacts, and the function and importance of implementing a Climate Action Plan.
 - Understand why change at the individual, community, City, and business level needs to occur,
 - The role of individuals, households, and businesses in making change
 - How to make those changes correctly, and
 - What the benefit/incentive to them might be; for example, articulating that switching to solar energy and or an electric bus fleet might help reduce bills

 - CP 2-3 Continue and expand sustained outreach and engagement efforts that seek to build and maintain direct relationship with under-resourced, traditionally marginalized, and climate vulnerable communities within the White Earth Reservation.

 - CP 2-4 Establish jurisdictional partnerships that advance CAP strategies to advance and accelerate action. This can include government entities like County, the State of Minnesota; utilities; regional businesses, and community groups.

Appendix A

Abbreviations and Glossary of Terms



The following are abbreviations and terms used in the Climate Action Plan as well as others common to sustainability and climate action concepts.



White Earth Nation Climate Action Plan Abbreviations and Glossary of Terms

Abbreviations

ADU	Accessory Dwelling Unit	NZE	Net-Zero Emissions
BAU	Business as usual forecast	O ₃	Ozone
BEV	Battery electric vehicle	ODS	Ozone Depleting Substances
BIPOC	Black, Indigenous, People of Color	PACE	Property Assessed Clean Energy
C&D	Construction and demolition	PFC	Perfluorocarbons
CAP	Climate Action Plan	PHEV	Plug-in hybrid electric vehicle
CE	Carbon Equivalent	PM2.5	Particulate matter of 2.5 micrometer diameter or less
CDP	Carbon Disclosure Project	POC	People of Color
CFC	Chlorofluorocarbons	PPA	Power Purchase Agreement
CH ₄	Methane	PUB	Public Utilities Board
CHP	Combined Heat and Power	PV	Photovoltaic (solar photovoltaic)
CO ₂	Carbon dioxide	REC	Renewable Energy Credit
CO ₂ e	Carbon dioxide equivalent	RCP	Representative Concentration Pathway
CSG	Community Solar Garden	SO ₂	Sulfur Dioxide
DCFC	Direct Current Fast Charger	SF ₆	Sulfur Hexafluoride
DOE	U.S. Department of Energy	SULEV	Super ultra-low emission vehicle
EMS	Emergency medical services	t	Ton equivalent to 2,000 lbs (United States)
EPA	U.S. Environmental Protection Agency	TOG	Total Organic Gasses
EV	Electric vehicle	USGS	U.S. Geological Survey
EVSE	Electric vehicle supply equipment	VMT	Vehicle miles traveled
FEMA	Federal Emergency Management Agency	VHT	Vehicle hours traveled
FTE	Full-time equivalent	ZEV	Zero emission vehicle
GCoM	Global Covenant of Mayors	ZNEB	Zero Net Energy Building
GDP	Gross Domestic Product		
GHG	Greenhouse gas		
GWP	Global warming potential		
HFC	Hydrofluorocarbons		
HVAC	Heating, Ventilation, and Air Conditioning		
ICE	Internal Combustion Engine vehicle		
IPCC	Intergovernmental Panel on Climate Change		
kWh	Kilowatt-hour		
LEED	Leadership in Energy and Environmental Design		
LEV	Low emission vehicle		
LIDAC	Lower Income and Disadvantaged Community		
MWH	Megawatt hour – 1,000 Kilowatt-hours		
MSW	Municipal Solid Waste		
MT	Metric ton equivalent to 1,000 kg (also known as Metric Tonne)		
MMT	Million Metric tons		
MMBTU	Million British Thermal Units		
MT CO ₂ e	Metric tons of carbon dioxide equivalent		
NGO	Non-Governmental Organization		
N ₂ O	Nitrous Oxide		
NO _x	Nitrogen Oxides		
NOAA	National Oceanic and Atmospheric Administration		



A

Accessory Dwelling Unit (ADU)

A secondary dwelling unit associated with a primary single-family home, which can be located within or attached to the main residence, or in a separate accessory building on the same property.

Action

Specific tasks set out to realize the objectives and methods highlighted in a given plan.

Activity Data

Information regarding the scale of human actions that lead to emissions or removals within a specified timeframe. This includes data like energy consumption, metal production, land coverage, management procedures, and usage of lime, fertilizers, and waste generation.

Adaptation

Refer to "Climate Readiness or Resilience"

Adaptive Capacity

The combination of societal, technological, and monetary abilities that individuals or groups possess to initiate and sustain actions against climate change.

Aerosols

Airborne particles, either solid or liquid, typically ranging between 0.01 and 10 micrometers. These particles, which can be of natural or human-made origin, can persist in the atmosphere for extended periods. They can affect climate by directly interfering with radiation or indirectly by influencing cloud properties.

Afforestation

The process of establishing forests on lands that weren't previously forested.

Air Pollutant

Any substance, either originating from human activities or naturally, present in the atmosphere that might have detrimental impacts on humans, fauna, flora, or materials.

Anthropogenic

In relation to greenhouse gas records, "anthropogenic" denotes emissions and removals

directly stemming from human actions or from natural processes influenced by human activities.

Atmosphere

The layer of gases encasing the Earth. It mainly consists of nitrogen and oxygen, along with trace gases like argon, helium, and certain greenhouse gases like carbon dioxide and ozone. The atmosphere also encompasses varying amounts of water vapor and contains other components like clouds and aerosol particles.

B

Baseline Emissions

A reference point, either through measurement, calculation, or a specific timeframe, for making comparisons. It represents emission levels in scenarios devoid of policy changes or project implementations. Such evaluations are crucial to gauge the impact of emissions-reducing measures.

Base Year

The initial year used for data gathering. Emission-reducing goals are often set with this year as a reference.

Beneficial Electrification

Beneficial electrification is the process of replacing fossil fuels with electricity to reduce energy costs and greenhouse gas emissions. It can be applied to many sectors, including transportation, residential buildings, and commercial buildings.

Biogenic

Derived from the biological activities of living entities. The term "biogenic" exclusively pertains to recently formed biological materials. The IPCC suggests categorizing peat as fossil carbon due to its lengthy replacement cycle.

Biogeochemical Cycle

The continuous transfer of essential chemicals, crucial for life, within Earth's systems, including carbon, nitrogen, oxygen, and phosphorus.

Biomass

Refers either to (1) the combined weight of all living organisms within a designated area or species, usually represented as dry weight or (2) Organic substances originating from or recently derived from



living beings, excluding peat, and encompasses derived products and waste.

Biomass Waste

Biological, non-fossil substances of biological origin that are either residual or discarded. This definition includes biogenic municipal waste, landfill gas, and other forms of biomass but excludes certain fuels and biofuels. EIA's data on "biomass waste" also count energy crops produced specifically for power generation.

BIPOC

Defined as "Black, Indigenous, and People of Color", this U.S.-specific term emphasizes the experiences of Black and Indigenous communities, showcasing or influencing the broader socio-economic dynamics encountered by all non-white individuals.

Black Carbon

A type of aerosol characterized based on its capacity to absorb light, its chemical reactivity, and/or thermal resistance; comprises elements like soot and charcoal.

Blue Carbon

Carbon that's absorbed and retained by coastal ecosystems and wetlands, aiding in countering climate change impacts.

British Thermal Unit (BTU)

A conventional measure of thermal energy, representing the energy needed to elevate the temperature of a pound of water by a single degree Fahrenheit.

Business As Usual Forecast (BAU)

The Intergovernmental Panel on Climate Change (IPCC) describes this as the predicted emission levels if upcoming trends emulate historical ones and no additional policy amendments are enacted. This projection presumes no further emission-curbing actions will be adopted beyond existing or committed measures. BAU forecasts do include anticipated reductions resulting from existing requirements or commitments, such as federal vehicle fuel efficiency standards and electric utility carbon-reduction commitments, which are outside the scope of this plan.

C

Carbon Cycle

The systematic flow and storage of carbon across different reservoirs. This involves four primary carbon storage areas: the atmosphere, the terrestrial environment (including freshwater systems), oceans, and sediments (which encompass fossil fuels). The carbon exchanges between these reservoirs are driven by a mix of chemical, physical, geological, and biological factors. Though the ocean holds a significant amount of near-surface carbon, its exchange with the atmosphere is relatively slow.

Carbon Dioxide (CO₂)

A gas found naturally in the environment, but also produced from burning fossil fuels, biomass, through land-use alterations, and various industrial activities. As the main human-induced greenhouse gas, it impacts the Earth's ability to reflect heat. Other greenhouse gases are often measured relative to CO₂, which has a Global Warming Potential set at 1.

Carbon Dioxide Equivalent (CO₂ e)

A standard for comparing the emissions from different greenhouse gases based on their potential to warm the planet. It's determined by equating the amount of a gas emitted to the amount of CO₂ that would have the same global warming impact.

Carbon Disclosure Project (CDP)

A global initiative allowing organizations and cities to publicly share their environmental impacts, notably related to climate risks. CDP stands as one of the recognized disclosure platforms endorsed by GCoM.

Carbon Emissions

The process of releasing carbon dioxide into the atmosphere, primarily through human activities like burning fossil fuels for energy.

Carbon Equivalent (CE)

A metric for comparing emissions from various greenhouse gases based on their capacity to influence global warming. Carbon equivalents are derived from carbon dioxide equivalents using a specific conversion factor related to molecular weights.

Carbon Free



Activities, systems, or products that don't emit carbon dioxide or other greenhouse gases. Often associated with sustainable or renewable energy discussions, not every "carbon free" source is renewable. For instance, while both wind and nuclear energy are carbon-free, only wind is renewable.

Carbon Intensity

The ratio of carbon emitted for every unit of energy used. A typical measure of this is the carbon weight per British thermal unit (Btu) of energy. When considering a single fuel type, carbon intensity and the emission coefficient are the same. With multiple fuels, it's an aggregate value.

Carbon Neutral / Carbon Neutrality

Achieving a balance where the amount of CO₂ produced annually is equal to the amount removed or offset, leading to net-zero CO₂ emissions by a specific date. Carbon Neutrality is also sometimes applied to all greenhouse gas emissions. In those instances the term is sometimes used interchangeably with "Net Zero" or "Climate Neutral"

Carbon Offsets

Mechanisms to counterbalance carbon dioxide or other greenhouse gas emissions by funding equivalent reductions elsewhere. They are quantified in metric tonnes of CO₂-equivalent and can be traded to neutralize emissions from an entity's operations.

Carbon Sinks

Natural environments, such as forests or oceans, recognized for their ability to absorb and store carbon dioxide from the atmosphere.

Carbon Sequestration

The process of capturing and storing CO₂, either in oceans, terrestrial environments like forests and soils, or in geological formations underground.

Chlorofluorocarbons (CFCs)

Gases, regulated under the 1987 Montreal Protocol, used in several applications like refrigeration and air conditioning. Since they don't break down in the lower atmosphere, they reach the upper atmosphere and can deplete ozone. Their usage is being phased out in favor of alternative compounds,

some of which are greenhouse gases under the Kyoto Protocol.

Circular Economy

A sustainable economic model that deviates from the traditional linear approach (produce, use, discard) by focusing on reducing resource inputs and waste. It emphasizes durable product design, repair, reuse, and recycling to minimize waste.

Climate

Often described as the "typical weather" of an area, climate is a statistical representation of weather patterns over extended periods, typically 30 years as per World Meteorological Organization (WMO) standards. It encompasses averages and variability of factors like temperature and precipitation. On a broader scale, climate is the comprehensive state of the climate system, including statistics.

Climate Adaptation or Resilience

The ability of ecosystems or communities to anticipate, stand against, respond, and recover from disruptive events. It involves adjusting to changing climate conditions to lessen risks and vulnerabilities.

Climate Action Plan

A comprehensive strategy detailing steps that a municipality, business, or government will take to decrease greenhouse gas emissions and prepare for climate change, fostering sustainable and resilient growth.

Climate Change

Any significant, lasting change in the average or variability of climate conditions over extensive periods. It can stem from natural processes, persistent changes in atmospheric composition due to human activities, or alterations in land use.

Climate Hazard

A climate event or situation that can negatively affect human health, resources, or livelihoods, encompassing sudden shifts in climate systems like heavy rainfall or prolonged droughts.

Climate Migration

The relocation of individuals due to the effects of climate change impacting their way of life or degrading their living conditions. This can result from



changing water supplies, altered agricultural yields, or factors like rising sea levels and increased storm intensity.

Climate Model

A mathematical representation used to simulate the key components of climate, including the atmosphere, oceans, land, and ice. These models are used to forecast potential future climate changes.

Climate Neutral / Climate Neutrality

Achieving a balance where the amount of all GHG emissions produced annually is equal to the amount removed or offset, leading to net-zero GHG emissions by a specific date. "Climate Neutral" is sometimes used interchangeably with "Carbon Neutral", however, "Carbon Neutral" often interpreted as addressing CO₂ emissions only, whereas "Climate Neutral" is intended to address all GHG gases.

Climate Scenario

A structured and logical narrative of potential future climatic conditions, built on a set of assumptions about potential future events.

Climate Risk

The potential negative outcomes due to climatic changes, where valuable assets are at risk. The risk is calculated based on the likelihood of certain climate events or changes happening and the potential impact of those changes. It is a product of the system's vulnerability and the climate hazards faced.

Climate Vulnerability

The extent to which a system is at risk from adverse climate changes, including climate variability and extremes. It depends on how exposed the system is to these changes, its inherent sensitivity, and its ability to adapt. Vulnerability can be described as the potential negative impact minus the system's adaptive capacity.

Climate Vulnerability Assessment

An analysis aiming to pinpoint and categorize the threats posed by climate change. It guides the creation of strategies to address these threats and can cover diverse areas like food security, socio-economic factors, and extreme weather patterns.

Co-Benefit

Additional advantages or benefits (e.g., health, economic, societal) that arise indirectly from climate adaptation and mitigation measures.

Co-generation

A facility or system that simultaneously and efficiently produces multiple forms of energy, usually heat and power, in an integrated manner.

Community Choice Aggregation (CCA)

CCA programs, or sometimes known as "Community Power Aggregation", empower local governments to source power for their citizens, businesses, and municipal facilities from alternative providers, while still utilizing the distribution services of their existing utilities. Setting up a CCA generally needs state-level legislation. For more details, one can visit EPA's dedicated CCA website: [EPA's CCA webpage](<https://www.epa.gov/green-power-markets/community-choice-aggregation>)

Combined Heat and Power (CHP)

A system designed to concurrently generate electricity and useful heat, aiming for optimal energy use. Some utilities might sell the heat produced for public use, while certain industries might sell surplus electricity to other businesses or utility companies.

Community Power Aggregation

Refer to "Community Choice Aggregation"

Community Solar / Community Solar Garden (CSG)

Shared solar installations that allow community members to benefit from solar energy without installing panels on individual properties. Participants receive bill credits based on their share of the generated power. Generally, the electricity from community solar farms is priced lower than traditional utility rates.

Complete Streets

A street design concept that ensures streets are made to accommodate all users safely and efficiently, regardless of their mode of transportation or age.

Consistency

Ensuring that an inventory remains uniform in its methodologies and data over time. If the same



methods and datasets are consistently applied over years, then the inventory is considered consistent.

Continuous Emission Monitor (CEM)

A monitoring system placed within smokestacks or other emission sources that continuously measures and reports air emissions.

Cool Roof

Roofing materials engineered to reflect more sunlight and absorb less heat, thereby reducing the heat transferred to the building or its surroundings.

Cool Pavement

Pavement materials designed to reflect sunlight and decrease heat absorption, minimizing heat transfer to the nearby environment.

Criteria Air Pollutant

Specific air pollutants for which permissible exposure levels are determined, and corresponding air quality standards are established. Examples include carbon monoxide, ozone, and various particulates. The term arises from the U.S. EPA's obligation to define these pollutants and their impacts on health and the environment. Standards can be reviewed and updated based on new scientific information.

D

Decarbonization

The transition towards reducing carbon emissions by adopting cleaner energy sources, enhancing energy efficiency, or capturing and storing released carbon. The ultimate aim is to minimize the climate impact and move towards a carbon-neutral society.

Deforestation

The conversion of forested areas into non-forest uses. Deforestation is often linked to the amplified greenhouse effect for two main reasons: the combustion or decay of wood releases carbon dioxide, and the removed trees no longer absorb atmospheric carbon dioxide through photosynthesis.

Demand Side Management (DSM)

Initiatives designed to modify consumer energy consumption patterns using methods like education and financial incentives. DSM seeks to reduce energy

consumption, particularly during peak demand periods, and shift usage to times when demand is typically lower.

Direct Current Fast Charger (DCFC)

DCFC charging is designed to deliver more power at faster speeds than Level 2 chargers with outputs ranging from 50 kW to 350 kW. They can recharge an EV battery to 80% in anywhere from 15 minutes to 45 minutes, depending on the vehicle's voltage capacity. DCFC is also sometimes known as "Level 3 charging", or "Rapid Charging".

Distillate Fuel Oil

A category of petroleum products obtained through standard distillation processes. This encompasses diesel fuels and fuel oils, including types like No. 1, No. 2, and No. 4 diesel fuel. These products are used in various engines, from road vehicles to trains and agricultural equipment. Additionally, No. 1, No. 2, and No. 4 fuel oils are typically employed for heating spaces and generating electricity.

District Heating

A system that distributes heat, generated at a centralized point, via a network of pipes to provide heating for homes and businesses in a specified area or community.

E

Ecosystem Services

The benefits ecosystems offer to human welfare. These benefits range from tangible resources like water and food to services like air purification, flood control, and climate stabilization.

Electric Vehicle (EV)

A vehicle that can be powered by an electric motor that draws electricity from a battery and is capable of being charged from an external source. An EV includes both a vehicle that can only be powered by an electric motor that draws electricity from a battery (all-electric vehicle) and a vehicle that can be powered by an electric motor that draws electricity from a battery and by an internal combustion engine (plug-in hybrid electric vehicle).

Electric vehicle supply equipment (EVSE)

The infrastructure that allows electric vehicles to charge from an electricity source. It's also known as an EV charging station, EV charger, or charging dock.



EVSE takes electrical power from the grid and transfers it to the vehicle's battery.

Emissions

The act of discharging certain substances, often gases in the context of climate change, into the environment.

Emission Factor

A value that signifies the amount of a gas emitted or removed per unit of activity. This coefficient is usually derived from a collection of measurement data and provides a representative emission rate for a set of specific conditions.

Emission Inventory

A calculation of the total pollutants released into the atmosphere from various significant sources, measured over a defined period, such as daily or annually.

Emission Rate

The quantity of a specific pollutant released over a set duration, commonly expressed in units like tons per year.

Energy Burden

The fraction of a household's total income spent on energy costs. An "high" energy burden is identified when energy costs comprise 6% or more of the household income, while it's deemed "severe" if above 10%.

Energy Savings / Energy Efficiency

Refers to the sustainable reduction in the amount of energy consumed for the same level of output or performance. For instance, a modern heater that requires less energy to provide the same warmth results in energy efficiency improvements.

Energy Tariff

A pricing structure, or utility tariff, that dictates how consumers are charged by energy providers for their electric or gas consumption. Energy tariffs are subject to government approval and review.

Environmental Justice

The equitable treatment and active participation of all individuals, regardless of their race, ethnicity, income, or origin, in the processes related to environmental laws, policies, and regulations.

Equity

Being just and fair in treatment, acknowledging that people have diverse circumstances and providing them with the necessary resources and opportunities to achieve equal outcomes. In terms of climate change, equity encompasses both shielding from environmental hazards and ensuring access to environmental benefits, irrespective of socio-economic factors.

F

Federal Emergency Management Agency (FEMA)

A federal agency that leads the country's response to disasters, including natural disasters, man-made incidents, and terrorist events.

Fluorocarbons

Molecules made up of carbon and fluorine, which can also include elements like hydrogen, chlorine, or bromine. Some well-known types are chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs).

Flux

(1) Materials, like limestone and dolomite, used to moderate the heat or energy demands of mineral processing, like metal smelting. They can also function as agents to produce slag. (2) The rate or volume of a liquid or gas moving across a specific area over time, such as the "CO₂ absorption rate by forests".

Fossil Fuel

Deposits of hydrocarbons formed from ancient organic matter, including coal, oil, and natural gas.

Fuel Combustion

The intentional burning of materials in a device designed to provide heat or mechanical energy. This process can be for direct application or use elsewhere.

Fuel Switch (see also "Beneficial Electrification")

The process of transitioning from one energy source to another, commonly from non-renewable sources like fossil fuels to renewable ones like wind or solar, to reduce both costs and emissions.



Fugitive Emissions

Unintentional leaks of gases from surfaces such as seals or underground pipelines due to deterioration or faults.

G

Geologic Carbon Sequestration

The practice of capturing CO₂, often from sources like coal-powered plants, and injecting it deep underground for storage. With careful site selection and management, this approach has potential in reducing atmospheric CO₂ levels.

GHG

Refer to "Greenhouse Gas"

Global Environmental Change

Significant, accelerated alterations to Earth's natural systems, encompassing climate shifts, biodiversity loss, resource depletion, pollution, and other large-scale environmental disruptions.

Global Warming

The average rise in atmospheric temperature near the Earth's surface and within the troposphere, which can lead to shifts in global climate. This warming can arise from both natural phenomena and human activities. Typically, "global warming" is used to refer to the temperature increase resulting from the enhanced emissions of greenhouse gases due to human actions. See also Climate Change.

Global Warming Potential (GWP)

An index that calculates the radiative effects of greenhouse gases, considering their ability to trap heat compared to carbon dioxide over a specified timeframe. The GWP evaluates the cumulative effect of these gases in the atmosphere based on their longevity and their potential to absorb infrared radiation. The Kyoto Protocol uses GWPs derived from 100-year timespan emissions.

GCoM Global Covenant of Mayors

GCoM represents the world's largest alliance dedicated to urban climate leadership. Comprising over 10,000 city and local governments, GCoM's goal is to encourage and support action on climate and energy at the grassroots level globally.

Green Streets

An urban design approach that incorporates plant life, soil, and engineered structures to manage, slow, and purify stormwater runoff from surfaces that don't absorb water.

Greenhouse Effect

A natural process where specific gases in the atmosphere trap heat near the Earth's surface, leading to a warming effect. If concentrations of these greenhouse gases increase, this effect intensifies, leading to a gradual increase in the Earth's temperature.

Global Protocol for Community-Scale Greenhouse Gas Emissions Inventories

A comprehensive and transparent framework adopted globally for cities and local governments to consistently measure, calculate, and report their greenhouse gas emissions.

Greenhouse Gas

A gas that can absorb and emit infrared radiation, contributing to the greenhouse effect. Some common greenhouse gases include water vapor, carbon dioxide, methane, nitrous oxide, and certain industrial gases like hydrofluorocarbons.

Greenhouse Gas Reduction

Efforts aimed at diminishing the amount of greenhouse gases released into the atmosphere, thereby mitigating potential adverse climate impacts.

Green Infrastructure

Green infrastructure encompasses a diverse array of green spaces and features, both in urban and rural areas, that serve to enhance the well-being of communities and provide environmental advantages. It extends beyond traditional open spaces like parks and playing fields to include a range of measures that use plant or soil systems, permeable pavement and surfaces, stormwater harvest and reuse, or landscaping to manage stormwater and reduce flows to sewer systems or to surface waters. This approach helps counter water pollution in urbanized areas caused by stormwater carrying contaminants

Green Roof

A roof that incorporates vegetation over a waterproof layer. Green roofs can be categorized as



White Earth Nation Climate Action Plan Abbreviations and Glossary of Terms

extensive, intensive, or semi-intensive based on the depth of planting medium and amount of maintenance they require. They offer benefits like mitigating the heat island effect, managing stormwater, and enhancing green space in urban areas.

Green Wall

This is a vertical extension of the green roof concept, where vegetation is grown on building exteriors.

Gross Domestic Product (GDP)

The total value of goods and services produced within a country's borders in a specific timeframe, typically a year. It doesn't account for the depreciation of assets or depletion of natural resources.

Groundwater

Water located beneath the Earth's surface, filling the spaces between soils and rocks.

H

Halocarbons

A group of organic compounds composed partially of halogens. They encompass chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), hydrofluorocarbons (HFCs), halons, and more. Many halocarbons have significant Global Warming Potentials and some also contribute to ozone layer depletion.

Hazard

The potential for an event, whether natural or human-induced, to cause harm to people, property, infrastructure, or the environment.

Heat Island

An urban area that exhibits higher temperatures than its surrounding rural areas due to human activities. This phenomenon is attributed to factors like heat-absorbing surfaces and structures. See also "Micro Heat Island".

Heating, Ventilation, and Air Conditioning (HVAC)

a term that refers to systems that regulate and move heated and cooled air throughout buildings. HVAC systems are used to improve air quality and maintain a comfortable indoor climate.

Hydrocarbons

Compounds made up of only hydrogen and carbon atoms. The term can also refer to petroleum compounds which might contain elements like sulfur, nitrogen, or oxygen. Unsaturated hydrocarbons contain either double or triple carbon-carbon bonds.

Hydrofluorocarbons (HFCs)

Molecules made up of hydrogen, fluorine, and carbon. These were developed as replacements for ozone-depleting substances and are used in a variety of industrial processes. While HFCs don't deplete the ozone layer, they are potent greenhouse gases with varying Global Warming Potentials.

I

ICLEI Local Governments for Sustainability:

An association of local governmental entities focused on reducing carbon emissions and fostering sustainable urban growth. ICLEI members, along with a team of specialists, collaborate through capacity building, partnerships, and peer interaction to effect change towards urban sustainability.

Impact

A consequence or effect that arises due to climate change on any system's structure or functioning. Examples include severe heatwaves, sea-level rise, or alterations in rainfall causing floods or droughts.

Indicator

A numerical representation highlighting a specific facet of vulnerability to climate change. For instance, a forecasted alteration in annual average temperature or the count of species at risk.

Internal Combustion Engine Vehicle (ICE)

Vehicles which ignite and combust fuel within an internal combustion engine. Fuels used in ICE vehicles are typically gasoline and diesel.

Intergovernmental Panel on Climate Change (IPCC)

Founded in 1988 by the World Meteorological Organization and the United Nations Environment Programme, the IPCC is tasked with evaluating scientific and technical information related to all aspects of climate change. The IPCC informs governments about the state of knowledge of climate change by examining all the relevant scientific literature on the subject. The IPCC is scientific entity and is not a legislative body.



K

Kilowatt Hour (kWh):

A unit representing electrical energy consumption, equivalent to using 1,000 watts continuously for an hour.

Kyoto Protocol

A supplement to the United Nations Framework Convention on Climate Change (UNFCCC) ratified in Kyoto, Japan, in 1997. This protocol incorporates legally binding obligations to reduce greenhouse gas emissions. Countries listed in the Protocol's Annex B pledged to reduce their emissions of six major greenhouse gases by at least 5% from 1990 levels between 2008 and 2012. The Protocol became effective on February 16, 2005.

L

Land Use and Land Use Change

Land use pertains to the human activities performed on a certain type of land cover. Meanwhile, land use change denotes alterations in how land is managed or utilized by humans, which can influence land cover. Changes in land cover and land use can affect climate properties such as surface albedo and greenhouse gas sources/sinks, potentially influencing climate on various scales.

Leadership in Energy and Environmental Design (LEED)

LEED is a certification system for evaluating and promoting sustainable building and design practices. Developed by the U.S. Green Building Council (USGBC), LEED provides a framework for environmentally responsible construction, aiming to improve energy efficiency, reduce water usage, and decrease greenhouse gas emissions. Buildings can earn LEED certification at different levels (Certified, Silver, Gold, or Platinum) based on their performance across several criteria, including energy use, indoor environmental quality, and sustainable site development.

Level 1 Charger

An electric vehicle charging device that provides charging through a common residential 120-volt (120V) AC outlet. Level 1 chargers can take 40-50+ hours to charge a BEV to 80 percent from empty and 5-6 hours for a PHEV.

Level 2 Charger

An electric vehicle charging device with a higher AC charging capacity than Level 1 chargers. They typically operate at 240V for residential use or 208V for commercial use. Level 2 chargers can charge a BEV to 80 percent from empty in 4-10 hours and a PHEV in 1-2 hours.

LIDAC Communities

Low Income / Disadvantaged Communities (LIDACs): communities where residents have low incomes, limited access to resources, and face disproportionate environmental or climate burdens.

Living Streets

"Living streets" amalgamate the principles of green streets and complete streets while emphasizing the enhancement of residents' life quality in urban areas.

LULUCF

An abbreviation for "Land Use, Land Use Change, and Forestry," a category in greenhouse gas inventory documentation.

M

Megawatt Hour (MWH):

An electrical energy unit denoting the consumption of a million watts over an hour.

Methane (CH₄)

A hydrocarbon that acts as a greenhouse gas with a global warming potential estimated to be 28 times stronger than carbon dioxide. Methane arises from several sources, including decomposition in landfills, flooded rice fields, digestion in animals, and fossil fuel production. The GWP value is sourced from the IPCC's Fifth Assessment Report (AR5).

Metric Ton

Equivalent to a Megagram or 1,000 kilograms, a metric ton, sometimes referred to as a metric tonne, is a standard international unit for mass.

Micro Heat Island

Smaller localized zones within urban environments experiencing elevated temperatures in comparison to surrounding areas. Such hotspots might include asphalt roads, non-green roofs, or barren parking lots. The microclimate and unique built environment



White Earth Nation Climate Action Plan Abbreviations and Glossary of Terms

conditions heavily influence these micro heat islands. Refer also to "Heat Island".

Million Metric Tons (MMT)

A standard measurement often utilized in greenhouse gas documentations, equivalent to a Teragram (Tg).

Mitigation:

Efforts to reduce or curb the extent or speed of long-term climatic warming and its associated effects. Mitigation typically encompasses the reduction of human-induced greenhouse gas emissions.

Mobile Sources

Transportation means that emit pollutants, including cars, motorbikes, trucks, off-road vehicles, boats, and planes.

Mode Share

The proportion of travelers opting for a specific mode of transportation. Mode share serves as a vital metric when shaping sustainable transportation strategies in a city or region, as it highlights the prevalent use of different transport options. This metric showcases the effectiveness of infrastructures, policies, investments, and urban designs in facilitating various transport modes.

Model

A model serves as a numerically-based representation of real-world scenarios, often omitting or simplifying certain details to emphasize core elements.

Municipal Power Aggregation

Refer to "Community Choice Aggregation."

Municipal Solid Waste (MSW)

Waste originating from homes and certain non-hazardous industrial, institutional, and commercial sources. Typically, this waste is directed to municipal disposal sites.

N

National Oceanic and Atmospheric Administration (NOAA)

A US agency responsible for weather forecasting, monitoring oceanic and atmospheric conditions, charting the seas, conducting deep-sea exploration, and managing fishing and protection of marine

mammals and endangered species in the US exclusive economic zone.

Natural Sources

Emission sources that aren't human-induced, including biological, geological sources, wildfires, and dust carried by the wind.

Net Energy Metering (NEM)

Net Energy Metering, commonly referred to as Net Metering, enables residential and business consumers generating their own solar energy to sell their surplus electricity back to the grid. The rate schedule for NEM determines compensation for this electricity. While net metering laws exist in many states, in others, utilities may offer these programs either voluntarily or due to regulatory decisions.

Net Zero Emissions (NZE)

Pertains to a community, business, institution, or building that produces the same amount of energy it consumes through renewable and GHG emission-free sources, resulting in zero net emissions over a year. With a net zero target, only a small portion of residual emissions, no more than 5-10%, should be offset using high-quality carbon removal methods.

Nitrogen Fixation

The process where atmospheric nitrogen gas transforms into forms beneficial for plants and other organisms, achieved through lightning, bacteria, and blue-green algae. This process is integral to the nitrogen cycle.

Nitrogen Oxides (NOx)

Gaseous compounds comprising nitrogen and oxygen. These gases emerge from vehicle exhaust and power generation. As they can form photochemical ozone, impact visibility, and harm health, they're deemed pollutants.

Nitrous Oxide (N₂O)

A potent greenhouse gas with a warming potential 265 times greater than carbon dioxide. Key sources encompass soil management practices, fossil fuel burning, and biomass combustion. Its global warming potential is derived from the IPCC's Fifth Assessment Report (AR5).

Non-Governmental Organization (NGO)

a group that works independently of governments to



White Earth Nation Climate Action Plan Abbreviations and Glossary of Terms

improve social conditions. NGOs are often non-profit institutions that are established at the community, national, or international level.

O

Ozone (O₃)

A gaseous compound composed of three oxygen atoms. In the troposphere, ozone forms naturally and through photochemical reactions involving human-produced gases. In the stratosphere, it forms when solar UV radiation interacts with diatomic oxygen. While tropospheric ozone is a greenhouse gas, stratospheric ozone is vital for blocking harmful UV radiation.

Ozone Depleting Substances (ODS)

Compounds causing the depletion of the stratospheric ozone layer. This category includes substances like CFCs, HCFCs, halons, and more. These substances, predominantly stable in the troposphere, degrade in the stratosphere under UV radiation, releasing ozone-depleting chlorine or bromine.

P

Perfluorocarbons (PFCs)

Man-made compounds solely composed of carbon and fluorine. Used as substitutes to ozone-depleting substances and emitted during certain industrial processes. Despite not depleting the ozone, they are formidable greenhouse gases. (IPCC's Fourth Assessment Report (AR4))

Phantom Load

Refers to the power consumed by electronic devices and appliances even when switched off. Devices drawing "phantom loads" constantly utilize electricity.

Photosynthesis

A biological process where plants absorb carbon dioxide to produce carbohydrates, releasing oxygen in the process. The mechanism varies based on different atmospheric carbon dioxide concentrations.

Plug-in hybrid electric vehicle (PHEV)

A type of vehicle that combines features of both gasoline-powered and electric vehicles. PHEVs use batteries to power an electric motor, and another fuel, such as gasoline or diesel, to power an internal

combustion engine or other propulsion source. PHEVs can charge their batteries through charging equipment and regenerative braking

Plug Load

Refers to the energy consumption of devices plugged into electrical outlets. In offices, major plug loads include computers, printers, and copiers. As buildings become more energy efficient, the relative importance of plug loads increases.

POC

An acronym for "People of Color" or "Person of Color", encompassing all non-white demographic groups. See also "BIPOC"

Point Sources

Specific locations emitting pollutants into the atmosphere, like industrial smokestacks.

Power Purchase Agreement (PPA)

A contract where one party, the generator, produces electricity, and the other, the buyer, agrees to purchase it. Individual or grouped customers can forge PPAs with energy developers. PPAs enable long-term renewable energy commitments and can serve as direct renewable energy investments.

Property-Assessed Clean Energy (PACE)

A financial structure allowing property owners to fund renewable energy and energy efficiency improvements. Eligible properties include residential, commercial, and industrial sites. Upgrades can be geared toward energy efficiency, renewable energy, and water conservation.

Process Emissions

These are emissions resulting from chemical transformations in industrial processes that are distinct from burning

R

RCP 8.5

A Representative Concentration Pathway climate model frequently considered the climate model representing "business as usual" forecasts if global GHG emissions are not reduced and fossil fuels are continued to be used.

Radiative Forcing



A shift in equilibrium between incoming sunlight and outgoing infrared radiation. Ordinarily, the Earth's incoming and outgoing radiations are almost balanced. However, the introduction of greenhouse gases captures more infrared radiation, reflecting it back to Earth's surface, leading to a warming effect.

Reforestation

The act of reintroducing forests on lands that once held forests but were later repurposed.

Regeneration

The process of reestablishing young trees, either naturally or through human intervention, typically preserving the existing forest type after the previous forest has been removed.

Renewable Energy

Energy sourced from naturally renewable elements such as the sun, wind, water, and geothermal heat.

Renewable Energy Credits (RECs)

Certificates representing the benefits and attributes of electricity generated from renewable sources. Each REC represents one megawatt-hour (MWh) of renewable electricity dispatched to the grid. The largest reduction in Evanston's emissions is attributed to REC purchases.

Representative Concentration Pathway (RCP)

climate change scenarios to project future greenhouse gas concentrations. These pathways describe future greenhouse gas concentrations and have been formally adopted by the IPCC. There are a range of RCP climate models from RCP 2.6 to RCP 8.5 reflecting a range of potential human-made GHG emission scenarios. The numbers represent the expected change in radiative forcing through the end of the 21st century.

Residence Time

The typical duration a single atom or molecule remains in a particular storage area. In the context of greenhouse gases, it generally refers to the duration a molecule lingers in the atmosphere.

Resilience / Resiliency

The capacity to foresee, ready for, counteract, and promptly bounce back from climate-induced threats, ensuring minimal damage to society, economy, and natural settings.

Resilience Hub

A resilience hub is a community-serving facility that supports residents and communities before, during, and after emergencies. Resilience hubs can also provide resources to support communities in reducing greenhouse gas emissions.

Reservoir

Either (1) a part of the climate system where a greenhouse gas or its precursor is housed; or (2) human-manipulated water bodies where significant variations in water area might occur due to water regulation.

Respiration

A biological process where living entities transform organic substances into carbon dioxide, using up oxygen and releasing energy in the process.

Retro-commissioning

A comprehensive approach to enhance a building's operational efficiency by ensuring its control systems operate optimally and align with the building's intended and actual usage.

Ride-share

A system where individuals share transport means, usually through carpooling or joining a vanpool. Typically facilitated by a platform connecting drivers with potential riders.

S

Scope 1:

Refers to emissions discharged directly within the city's boundaries due to fossil fuel combustion and the decomposition of waste in landfills and wastewater facilities.

Scope 2:

Refers to emissions generated outside the city resulting from the city's consumption of electricity.

Scope 3:

Pertains to emissions linked to local government functions that can be quantified and disclosed but don't fall under Scope 1 or 2. Examples include outsourced activities and commuting of employees.

Short Ton



White Earth Nation Climate Action Plan Abbreviations and Glossary of Terms

A standard ton measurement in the U.S., equivalent to 2,000 lbs or about 0.907 metric tons.

Sink

Any activity, process, or mechanism responsible for removing a greenhouse gas, aerosol, or their precursor from the atmosphere.

Social Cost of Carbon

An estimation of the economic damage due to climate change effects, calculated as the monetary value of total damages arising from emitting a single ton of carbon dioxide.

Solar Radiation

The sun's emitted electromagnetic waves. This radiation, also known as shortwave radiation, has wavelengths mainly in the visible spectrum due to the Sun's temperature.

Solar Photovoltaic (PV)

A system that directly transforms sunlight into electricity using semiconductors, primarily silicon. Suitable for homes, businesses, and large-scale operations, solar PV systems can be roof-mounted, ground-based, or integrated into building structures to produce renewable energy.

Source

Any process or activity that introduces greenhouse gases, aerosols, or their precursors into the atmosphere.

Stationary Sources

Fixed locations like power stations, manufacturing plants, and refineries that emit pollutants into the air.

Strategy / Strategic Goal

Detailed directions built upon the foundation of the sustainability vision and GHG reduction objectives that guide future policy decisions, community investments, and initiatives.

Sulfur Dioxide (SO₂)

A molecule made of one sulfur atom and two oxygen atoms. Released both naturally and by human activity, it can transform into sulfate aerosols in the atmosphere. These aerosols can cool the Earth's

surface, contribute to acid rain, and decrease visibility.

Sulfur Hexafluoride (SF₆)

A colorless gas that mixes well with alcohol and ether but less so with water. It's an extremely potent greenhouse gas, with a global warming potential much higher than carbon dioxide (CO₂). SF₆ is predominantly used in electricity transmission and as an insulator in electronics. Its global warming potential is derived from the IPCC's Fourth Assessment Report (AR4). It is a potent greenhouse gas with a warming potential 23,500 times greater than carbon dioxide.

T

Terrestrial Carbon Sequestration

The process where trees, plants, and crops absorb carbon dioxide (CO₂) from the atmosphere through photosynthesis and store it as carbon in biomass (like tree stems, branches, and roots) and soil. This stored carbon creates "sinks" which counteract emissions when the absorbed carbon is greater than the released carbon over time.

Therm

A unit of energy equivalent to 100,000 British Thermal Units, roughly akin to the energy in 100 cubic feet of natural gas. Commonly used to gauge natural gas consumption for billing.

Total Organic Gases (TOG)

Organic gases that encompass both reactive and relatively non-reactive compounds, such as methane.

Transparency

Clear presentation of methodologies and assumptions used in an inventory so users can easily replicate and evaluate the inventory. Transparency is crucial for effective communication and consideration of information.

Trend

A measure of a quantity's change over time. A positive trend signifies growth, while a negative one indicates a decline. It's expressed in percentage or fractional terms concerning the quantity's initial value.

U



Urban Tree Canopy

The composition and traits of trees in urban settings.

U.S. Department of Energy (DOE)

A federal agency that oversees the nation's nuclear infrastructure, energy policy, and funds scientific research in the field.

U.S. Environmental Protection Agency (EPA)

A federal agency tasked with safeguarding human health and the environment. It offers technical support for recovery planning, long-term cleanup, and environmental surveillance. This includes assistance with public health infrastructure, such as wastewater treatment plants, and addressing threats through monitoring, assessment, and decontamination efforts

V

Vehicle Miles Traveled (VMT):

Represents the distance traveled by vehicles, be it cars, trucks, or motorcycles. Each mile is counted as one vehicle mile, irrespective of the number of passengers.

Vision Zero:

A strategy focused on eliminating severe injuries and fatalities from traffic accidents, aiming to provide safe and equal mobility for all individuals.

Vulnerability

The extent to which a system is exposed to, sensitive to, or unable to handle the adverse impacts of climate change. This encompasses:

- **Exposure:** The presence of assets or organisms in areas potentially adversely impacted by climate change.
- **Sensitivity:** The level at which assets or organisms are impacted by climate change.
- **Adaptive capacity:** The capability of systems, assets, or organisms to adjust to detrimental impacts.

W

Water Vapor

The predominant greenhouse gas present in the form of water in its gaseous state in the atmosphere. Water vapor is a natural part of the greenhouse effect. Its concentration is not significantly altered by human activities, but it amplifies the greenhouse effect due to positive feedback mechanisms. Water

vapor also plays a vital role in climate regulation by forming clouds and precipitation.

Weather

Weather represents the immediate atmospheric conditions at a specific time and place, while climate refers to the long-term average of these conditions in a particular region over an extended period. In simpler terms, weather is what you experience outdoors on any given day, while climate describes the typical weather patterns you'd anticipate for a particular season and location.

Z

Zero Emission Vehicles (ZEV)

A vehicle that doesn't release harmful pollutants during its operation. Examples include electric cars, hydrogen-fueled vehicles, and bicycles. These emissions, when released, can have detrimental effects on both the environment and human health.

Zero Net Energy Building (ZNEB)

Also known as a Net-Zero Energy Building is one that is optimally efficient, and over the course of a year, generates renewable energy onsite equal to or greater than the total amount of energy consumed onsite.

Zero Waste

An approach focusing on the efficient utilization of resources through responsible production, consumption, and recovery. This means products, packaging, and materials are reused and recycled without causing harm to the environment or health, and without resorting to incineration or releases to land, water, or air.

Appendix B

Acknowledgements



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