PRIORITY CLIMATE ACTION PLAN:

Shakopee Mdewakanton Sioux Community

April 1, 2024

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Prepared by:
Shakopee Mdewakanton Sioux Community

Contents

SMSC Priority Climate Action Plan

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Tribe: Shakopee Mdewakanton Sioux Community

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Introduction

This Priority Climate Action Plan (PCAP) was developed by the Shakopee Mdewakanton Sioux Community (SMSC). The PCAP was created under the Climate Pollution Reduction Grant (CPRG) program, authorized under the Inflation Reduction Act. Within the guidelines of this program, the SMSC has completed this PCAP to identify priority greenhouse gas reduction measures in preparation for implementation. This PCAP builds upon the SMSC's existing Sustainability Plan that seeks to achieve carbon neutrality by 2035 and work toward a sustainable future that meets the needs of future generations.

CPRG OVERVIEW

The 2022 Inflation Reduction Act (IRA) established the Climate Pollution Reduction Grants program within the Environmental Protection Agency. The program provides up to $5 billion in grants over two distinct but related phases:

1. **Planning grants:** $250 million was made available for states, U.S. territories, municipalities, air pollution control agencies, and tribes to develop plans that identify priority measures to reduce greenhouse gas emissions.
2. **Implementation grants:** $4.6 billion is available for competitive grants to eligible applicants to implement GHG reduction measures identified under a PCAP developed in the first phase of this program. Funding is available under a general competition and a tribes and territories competition.

The CPRG implementation grants represent the largest investment in state, local, and tribal efforts to reduce greenhouse gas emissions, prioritizing those most at risk from air pollution and the increasingly harmful impacts of climate change. As global warming accelerates and disrupts the Earth's natural systems, communities across the country are facing more deadly wildfires, damaging storms, extreme drought, and water scarcity, among other impacts. Like many other areas of the country, Minnesota is experiencing the effects of a changing climate. Warmer winters disrupt ecosystems, allowing the establishment of invasive species. Poor air quality and more frequent heat waves threaten health and outdoor activities. These changes also threaten the traditional practices of SMSC Community Members, including the impact on the health of maple trees for tapping and rice fields for harvesting.

The EPA is committed to its responsibility to protect human health and the environment. Accordingly, the CPRG implementation grant competitions are designed to enable states, municipalities, tribes, and territories to achieve the following goals:

1. Implement ambitious measures to achieve significant cumulative GHG reductions by 2030 and beyond;
2. Pursue measures that will achieve substantial community benefits, particularly in low-income and disadvantaged communities;
3. Complement other funding sources to maximize these GHG reductions and community benefits; and,
4. Pursue innovative policies and programs that are replicable and can be scaled up across multiple jurisdictions.

SMSC chose to participate in the CPRG program because of the opportunities offered to 1) complete a more detailed assessment of priority actions to meet GHG reduction goals, and 2) to access available federal funding for the implementation of priority actions. This PCAP details the selected priority GHG reduction measures that the SMSC intends to implement in the near-term and how those measures will affect the Community's climate goals.

PCAP OVERVIEW AND DEFINITIONS

This PCAP identifies priority carbon reduction measures that were developed based on the greatest opportunities from emissions that are generated within the Community. A greenhouse gas inventory for the Community was originally completed as part of the SMSC 2022 Sustainability Plan. The inventory illustrates the breakdown of emissions in the Community. While emissions are highest in the transportation sector, the Community has greater control over its Gaming Enterprise and Tribal Operations' buildings and fleets. For that reason, this PCAP primarily focuses on achieving GHG reductions in commercial buildings. These measures focus primarily on clean energy, electrification and efficiency, and the restoration of woodlands to increase the Community's ability to remove and sequester more carbon dioxide.

SCOPE OF THE PCAP

The Shakopee Mdewakanton Sioux Community is a federally recognized sovereign Native American Tribe located in Scott County, Minnesota, approximately 20 miles south of Minneapolis. As part of its commitment to environmental stewardship, the Shakopee Mdewakanton Sioux Community (SMSC) recently developed a comprehensive Sustainability Plan that aims to achieve carbon neutrality by 2035 and considers what it means to be sustainable, meeting the needs of the Community seven generations into the future. The work of the Priority Climate Action Plan (PCAP) builds on the stakeholder engagement, building energy analysis, greenhouse gas (GHG) inventory, and GHG reduction scenario planning conducted during development of SMSC's Sustainability Plan.

The geographic scope of SMSC's Priority Climate Action Plan (PCAP) includes sources and activities within the land area that SMSC owns and manages. Land uses include natural habitat, agriculture, residential, gaming enterprises, and other commercial businesses that SMSC owns and operates. SMSC has conducted emissions inventories for the years 2018 through 2021. SMSC's GHG inventory has been updated to include 2022 and 2023 emissions for the PCAP. The PCAP targets reductions in carbon dioxide, methane, and nitrous oxide emissions from sources and activities associated with the community.

APPROACH TO DEVELOPING THE PCAP

The PCAP was developed on the foundation of the SMSC 2222 Sustainability Plan, which was completed in the spring of 2023. The Sustainability Plan aims to achieve carbon neutrality by 2035 and consider what it means to be sustainable, meeting the needs of the Community seven generations into the future. The Plan is grounded in traditional Dakota knowledge and values and informed by innovative practices and technologies.

The Sustainability Plan is the result of a collaborative process that included conversations with Community Members, Tribal Operations employees, and Gaming Enterprise Team Members over the course of three listening sessions. The first listening session focused on the development of the SMSC's vision for sustainability; the second session discussed prioritization of greenhouse gas emissions reductions and offsets; and the third session included broader conversations on climate adaptation and sustainability within and beyond the Community.

These conversations were centered around an existing conditions analysis that included a greenhouse gas inventory and assessment of climate hazards. Community Members expressed a desire to reduce emissions as quickly as possible, prioritize local action, and support other tribal communities. The primary sources of GHG emissions in the SMSC come from transportation and commercial energy use. Transportation emissions are

largely driven by visitors to the Community, followed by employee travel, then Community Member travel. Buildings used for Gaming Enterprises and Tribal Operations contribute 35% of total emissions. Because the Community has greater control over its building emissions and they make up a significant share of community-wide emissions, this PCAP is focused on measures to reduce emissions in that sector.

Listening session participants shared that it was important to prioritize emissions reductions over offsets. This would require a steep drop in emissions over the next twelve years, while slowly ramping up offsets. Community Members were clear that any offsets would need to be local, and the authenticity verified. Ultimately, the Community aims to achieve a carbon balance where any remaining anthropogenic emissions are offset by the natural sequestration within the Community.

As part of the development of this PCAP, an additional workshop was held to create a space for Community Members to hear updates on the Sustainability Plan, learn more about CPRG, and weigh in on priority actions to be included in the PCAP. At that meeting, there was strong support for new solar in the community, a desire for more accessible energy programs for residents, additional EV infrastructure, and prairie and woodland restoration with a job training element. The Community has a job training element for Community adults and youth. Tribal youth under 18 years of age participate in an intern program in any area of the Community where they have an interest. The Land department has had SMSC youth as interns nearly every year since 2005. Once youth turn 18, they can join the Community member workforce development program. The Land department has occasional unskilled Community members assisting in various tasks. In 2023 the Land department also had 3 semi-skilled Community members that worked on natural resources and sustainability type work during the summer when they are on break from school. Most recently, one of those semi-skilled Community members graduated from college and joined the Land department as a permanent part-time employee working on energy, efficiency and sustainability related tasks.

In order to determine the priority actions, two studies were completed to identify where opportunities exist in building energy use to maximize GHG reductions. A solar site assessment was completed that analyzed the potential for rooftop and ground-mount installations. A building analysis was completed to identify the highest impact efficiency and electrification measures in Gaming Enterprise and Tribal Operations buildings. Each study is summarized below.

Solar Analysis

The solar analysis looked at installations on buildings as well as ground mount systems to determine where solar is feasible, the optimal system size, the annual kWh generated, the percent of building load covered by generation, the amount of CO_2e reduced, and the financial costs and savings of each installation. The analysis looked at 22 potential sites; SMSC has included 21 of those sites as priorities for this plan. The Community now has the information to rank sites based on a wide variety of factors described above. The preference is to reduce the import of electricity by increasing efficiency and on-site generation, and therefore reduce the purchase of RECs. Solar installations on SMSC buildings will be the first step towards energy sovereignty. The long-term plan is to create a microgrid by combining solar generation and battery storage.

Buildings Analysis

A building analysis was recently conducted to create a plan for SMSC to decarbonize by reducing electricity and gas consumption, increase efficiency, and electrify heating equipment in commercial buildings over the next decade. The analysis looked at high GHG-impact measures in several buildings. Priority measures will be implemented based on feasibility, availability of funding, carbon reduction potential, and cost. The recommendation of the building analysis is to focus on two reduction measures. The first identifies opportunities to improve efficiency of all buildings. The second focuses on the installation of thermal energy networks in two locations within the SMSC.

Woodland Restoration

In addition to these studies, the SMSC has a goal to re-establish 260 acres (5% of total land area) of woodlands that would sequester carbon and support resilience of the community through improved ecological conditions. The SMSC has identified three parcels to restore the land back to the oak-basswood forests that existing prior to European settlement. This will provide many resilience and cultural benefits to the community in addition to the carbon benefits.

The PCAP includes carbon reduction measures that can be implemented immediately and achieve the greatest reductions between 2025 and 2030 with ongoing reductions longer-term. This plan will be used to make recommendations to the Business Council and Gaming Enterprise leadership to approve for implementation. SMSC will pursue state and federal funding to support implementation and include any remaining costs in its budget to ensure successful completion of these projects.

These measures are described in detail under the Priority GHG Reduction Measures section.

Tribal Organization and Considerations

Caring for Unci Maka (Grandmother Earth) is at the heart of what the Shakopee Mdewakanton Sioux Community (SMSC) strives to do – now and for future generations. The SMSC is fully dedicated to serving our Community members, supporting other tribes and organizations across the globe, creating strong partnerships, and protecting natural resources for the benefit of everyone.

As part of its commitment to environmental stewardship, the Shakopee Mdewakanton Sioux Community (SMSC) has a Sustainability Plan that aims to achieve carbon neutrality by 2035 and considers what it means to be sustainable, meeting the needs of the Community seven generations in the future.

The PCAP/CCAP development team is taking the next step in sustainability by identifying implementation strategies to meet the objectives and goals in the Sustainability Plan by developing specific action items to reduce the SMSC carbon footprint.

COLLABORATIONS AND PCAP MANAGEMENT TEAM

The SMSC has become a leader in sustainability, energy efficiency, and waste diversion. However, the SMSC could not have gotten to this point without input from Community members and staff from the Tribal government and retail operations. The SMSC Business Council endorsed the Sustainability Plan, supports further expansion of energy efficiency measures and energy development projects, and will make the final decision on PCAP and sustainability initiatives.

The SMSC continues to create new partnerships both through the PCAP process and other avenues. The SMSC is a coalition member within the Minnesota Pollution Control Agency application for residential decarbonization and a member of the Minnesota Tribal Energy Resources Association's application for a Solar for All proposal. The SMSC is also working with the Minnesota Valley Electric Cooperative to explore opportunities for grid improvements.

Because the most effective plans start with community involvement, the PCAP/CCAP development team has engaged Community members on multiple levels. Presentations have been given to the Community member-led Natural Resources and Infrastructure and Economic Development workgroups. A CPRG open house was an opportunity to engage with Community members and find out what excited them about the PCAP work and where they want to see more resources committed in the future.

This PCAP was developed in collaboration with Community members, staff, consultants, and the project team that completed the SMSSC 2222 Sustainability plan. Community members and staff were engaged to provide input on which measures the community should prioritize as well as other measures they are excited about. Consultants were brought in to complete the solar and building analyses. The project team consists of LHB and Local Climate Solutions who provide technical and writing support. The SMSC continues to collaborate with its electric utilities as it seeks funding and projects to decarbonize the community.

Greenhouse Gas (GHG) Inventory

The SMSC has developed a tribal inventory of the major sources of greenhouse gas (GHG) emissions within the Community to use for setting goals, establishing priorities, and estimating the impacts of GHG reduction measures. The inventory is structured based on the U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions (U.S. Community Protocol), though it also references the Local Government Operations Protocol and the EPA's Tribal Greenhouse Gas Inventory Tool to inform its calculation methods and data sources. [1,2,3]

GHG SCOPE

The inventory includes economy-wide anthropogenic emission estimates for the primary GHGs that are emitted from sources and activities within the Community: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and hydrofluorocarbons (HFCs). These are translated into the common metric of metric tons of carbon dioxide equivalent (CO_2e), calculated using the 100-year global warming potentials from the IPCC's Fifth Assessment Report.[4]

In addition to including each of the five basic emissions-generating activities required by the U.S. Community Protocol, the SMSC has prioritized including sectors that are a significant portion of the community's total emissions and addressing sources and activities that it can directly control, impact, or influence, including:

1. Built Environment
2. Transportation and Other Mobile Sources
3. Solid Waste
4. Water and Wastewater
5. Forest Land and Trees

Appendix A – Greenhouse Gas Documentation describes the emissions and sequestration sources within each of these categories and identifies the data sources used. This priority climate action plan focuses on emissions and sinks associated with the built and natural environment.

[1] ICLEI – Local Governments for Sustainability, *U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions*, Version 1.2, July 2019.
[2] California Air Resources Board, California Climate Action Registry, ICLEI – Local Governments for Sustainability, The Climate Registry, *Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories*, Version 1.1, May 2010.
[3] U.S. Environmental Protection Agency (U.S. EPA), *Tribal Greenhouse Gas Inventory Tool*, Version 2023.1.
[4] Myhre, G., D. Shindell, F.-M. Bréon, W. Collins, J. Fuglestvedt, J. Huang, D. Koch, J.-F. Lamarque, D. Lee, B. Mendoza, T. Nakajima, A. Robock, G. Stephens, T. Takemura and H. Zhang, 2013: Anthropogenic and Natural Radiative Forcing. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. Appendix 8.A, Table 8.A.1.

BUILT AND NATURAL ENVIRONMENT

Buildings in the SMSC include both homes and non-residential buildings that are operated by the tribe or the Gaming Enterprise. These buildings generate GHG emissions by using electricity and combusting fossil fuels. Refrigerant leakage from equipment is another source of GHGs. The trees in the SMSC sequester carbon in their trunks and roots.

Key findings:

- The majority (88%) of building emissions are from facilities used for gaming and tribal operations rather than homes.
- Nearly 70% of building emissions are from electricity use.
- Building emissions decreased by 32% from 2018 to 2023, due to improved energy efficiency in non-residential buildings, a cleaner electric grid, and the discontinuation of a biomass drying operation.
- Residential energy use per household is three times higher than the regional average.
- Trees in the SMSC sequester over 40% of the GHGs emitted by homes each year.
- The SMSC purchases renewable energy certificates (RECs) from wind farms in the Dakotas to offset 100% of the community's electricity use.

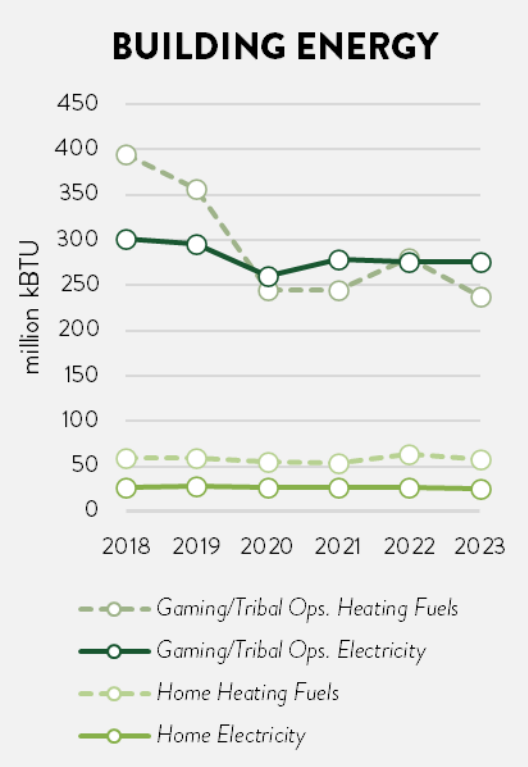

Figure 1. SMSC energy use for 2018-2023

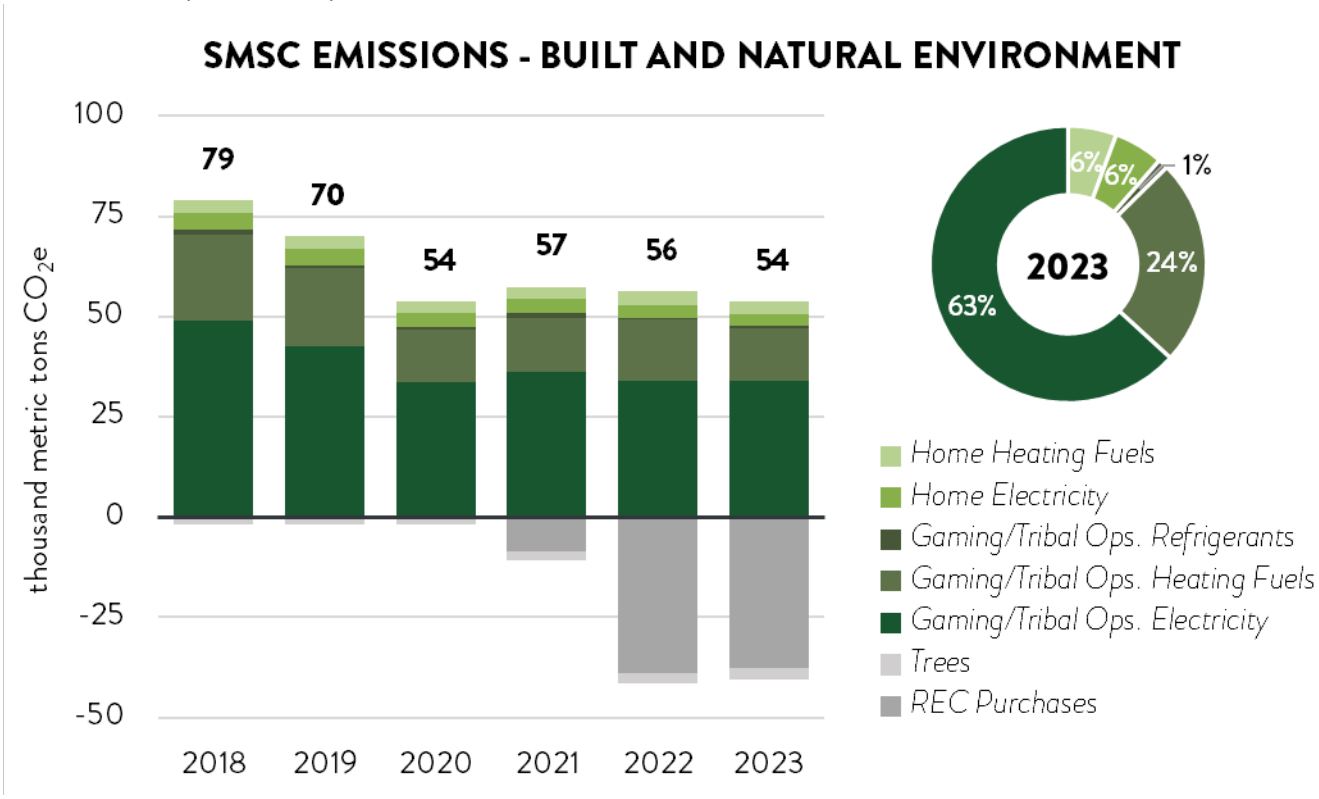

Figure 2. SMSC emissions from the built and natural environment for 2018-2023

Table 1. SMSC greenhouse gas emissions and sinks from the built and natural environment (2018-2023), in metric tons CO_2e

	2018	2019	2020	2021	2022	2023	% change 2018-2023
Built Environment	**79,082**	**70,079**	**53,789**	**57,414**	**56,259**	**53,764**	**-32%**
Gaming Enterprises/Tribal Operations	**71,540**	**62,831**	**47,307**	**51,026**	**49,543**	**47,596**	**-33%**
Electricity	49,122	42,634	33,501	36,203	33,987	33,983	-31%
Market-Based Electricity (RECs)	-	-	-	(8,468)	(38,937)	(37,802)	n/a
Stationary Combustion	21,392	19,378	13,379	13,517	15,233	12,987	-39%
Fossil Gas	20,165	18,000	12,037	11,799	14,166	11,734	-42%
Propane	85	104	72	50	84	61	-28%
Diesel	1,142	1,275	1,270	1,669	982	1,191	4%
Refrigerants	1,025	818	427	1,305	323	626	-39%
Homes	**7,542**	**7,248**	**6,482**	**6,388**	**6,716**	**6,168**	**-18%**
Electricity	4,365	4,069	3,521	3,518	3,336	3,126	-28%
Stationary Combustion	3,177	3,179	2,961	2,871	3,380	3,042	-4%
Forest Land and Trees	**(2,002)**	**(2,002)**	**(2,002)**	**(2,438)**	**(2,500)**	**(2,652)**	**32%**

GHG REDUCTION TARGET

As described in the SMSC's Sustainability Plan, the SMSC is committed to achieving carbon neutrality by 2035. This includes reducing emissions across Tribal Operations, Gaming Enterprises, and Community residences and balancing remaining emissions with offsets.

Priority GHG Reduction Measures

This section includes the SMSC's priority reduction measures to rapidly reduce emissions as the Community works towards its goal to be carbon neutral by 2035. These reduction measures – shown in Table 2 – were selected based on the GHG inventory and are focused on achieving the most significant GHG reductions possible in the near term while establishing the foundation for long-term reductions. The SMSC has full authority to implement these measures and is ready to get started.

Table 2. Priority GHG Reduction Measures

Measure	Description	Annual GHG Reduction (metric tons CO_2e) [5]
Solar PV Systems on Tribal Facilities	2.8 MW AC of new solar photovoltaic systems on tribal lands and rooftops	3,433
Building Efficiency and Electrification	Energy efficiency and electrification at tribal facilities	845
Thermal Energy Networks	Two new thermal energy networks to provide efficient heating and cooling for tribal facilities	7,839
Woodland Restoration	Restoration of 54 acres of forests on tribal lands	61

[5] These represent near-term GHG reductions, before the electric grid has significantly decarbonized. Appendix B – Greenhouse Gas Reduction Documentation describes how the GHG reductions for each measure were calculated. Since estimating the impacts of new measures uses different protocols and methodologies than calculating baseline GHG emissions, these should not be subtracted from the SMSC's baseline emissions to estimate the Community's emissions in future years.

MEASURE 1: SOLAR PV SYSTEMS ON TRIBAL FACILITIES

Sector: Gaming Enterprises/Tribal Operations

Description

Grid-powered electricity currently makes up nearly 70% of emissions from the SMSC's building energy use. Adding solar energy to tribal facilities can decrease emissions from electricity use, reduce demand, lower costs, and put more power in the hands of the tribe. This measure includes the installation of solar PV systems on all tribal facilities that have a good solar resource. The SMSC completed a solar site assessment of all its rooftops to identify the best opportunities to install solar. The assessment includes recommendations for twenty-one PV systems, totaling 2.8 MW AC. These systems, shown in Table 3, are estimated to reduce near-term annual emissions by 3,433 metric tons CO_2e and support the long-term transition to a carbon-free electric grid in Minnesota.[6]

The SMSC has established a prioritized implementation schedule for these projects that considers roof age, maintenance/replacement schedule, return on investment, and available funding. The SMSC will utilize direct pay funds from the Inflation Reduction Act's Investment Tax Credit for solar energy to reduce costs by up to 50%. The SMSC is also pursuing additional federal funding for solar PV and – in partnership with its utilities – grid improvements and microgrids.

Energy sovereignty is increasingly important to tribes across the country. Maximizing clean energy for tribal and gaming buildings not only increases energy independence for the SMSC, but also reinforces the commitment to being good stewards of the Earth. Success at the SMSC will be shared through tribal networks like the Midwest Tribal Energy Resources Association (MTERA) to support other tribes in pursuing clean energy.

Table 3. Solar PV projects

Site Name	Year Complete	AC size (kW)	Year 1 Production (kWh)	Year 1 CO_2e avoided (metric tons)
Little Six Casino	2025	150	253,172	194
Organics Recycling (A)	2025	40	70,521	54
Organics Recycling (B)	2025	1,000	1,687,035	1,290
Water Bottling (A)	2025	100	162,940	125
Water Bottling (B)	2025	100	156,303	120
DSF Link (A)	2026	150	240,899	184
DSF Link (B)	2026	150	261,230	200
DSF Playworks	2026	67	114,299	87
Golf Maintenance	2026	40	62,044	47
Public Works	2026	100	169,227	129
Little Six Pumphouse	2026	17	25,421	19
Public Safety	2026	17	28,902	22

[6] The methods and sources used to estimate the emissions impacts are described in Appendix B – Greenhouse Gas Reduction Documentation.

Site Name	Year Complete	AC size (kW)	Year 1 Production (kWh)	Year 1 CO_2e avoided (metric tons)
Water Reclamation	2026	40	59,868	46
Water Treatment	2026	120	174,026	133
Wozupi House	2026	15	18,499	14
C-Store #1	2027	50	60,721	46
C-Store #2	2027	27	42,818	33
Mystic Lake Casino (A)	2027	150	224,720	172
Mystic Lake Casino (B)	2027	150	213,660	163
Mystic Lake Casino (C)	2027	150	226,348	173
Mystic Lake Casino (D)	2027	150	237,990	182
Totals		**2,783**	**4,490,643**	**3,433**

Transformative impact

The State of Minnesota established a goal to generate 100% of its electricity from carbon-free sources by 2040. The SMSC has both a goal to be carbon neutral and to install at least 16 MW of renewable energy within the Community by 2035. Achieving these goals will require a diverse mix of energy options that prioritize local and sustainable resources.

Local solar energy generation has several advantages compared to large-scale solar development. Generating electricity close to the load reduces lines losses and enhances grid resilience. Further, solar can be tied to battery storage, allowing for islanding through microgrids should there be disruption to the transmission grid. There are multi-year back-logs for the approval of renewable energy projects on the transmission grid, whereas distribution-level solar can happen much faster. Finally, maximizing renewable energy close to load can help to alleviate some of the burden for rural communities where the development of large scale solar and wind often occurs.

Solar energy is a proven technology that is cost effective and reliable. Adding solar to SMSC buildings and underutilized land will not only benefit the Community but will also serve as a case study for other tribal communities to replicate. As more tribal communities add renewable generation, we can begin to take more control of our energy resources while saving money and accelerating the transition to clean energy.

Tasks and milestones

Solar energy installation for these priority projects will occur from 2025 through 2027. Table 4 summarizes the schedule and milestones for each of the solar installations covered by this measure.

Table 4. Solar installation summary

Year	Project	Milestone (kW AC)	Responsible Party
2025	Install PV on Little Six Casino and the Water Bottling Plant	Installed 350kW of new energy generation PV	SMSC Land Department
2025	Install PV ground-based system and on Organic Recycling Facility	Installed 1,040kW of new energy generation PV	SMSC Land Department
2026	Install PV on DSF, Playworks, Public Works, Golf Maintenance, Water Treatment, Wozupi,	Installed 716kW of new energy generation PV	SMSC Land Department

	Public Safety, Little Six Pumphouse, and Water Reclamation.		
2027	Install PV on 2 C-Stores and 4 Mystic Lake Casino Buildings	Installed 677kW of new energy generation PV	SMSC Land Department

The following tasks will be completed for each solar energy installation.

Task 1: Develop the budget

1.1 Utilize the solar energy analysis to create a budget for the solar energy projects included in this measure.

1.2 Include estimated costs based on the solar energy analysis that also considers domestic content and prevailing wages, as well as discounts that are available.

1.3 Account for contingencies that may occur due to unexpected expenses, weather delays, or other risks associated with this project (identified below).

Task 2: Develop a Capital Request for General Council and Business Council Approval

2.1 Prepare a detailed proposal that outlines the benefits and costs of the installation of these solar energy systems.

2.2 Include the budget as detailed in Task 1, including funding from the grant award and ITC direct payment.

2.3 Outline the project scope, schedule, and anticipated outcomes of this project.

2.4 Present the request to the General Council and Business Council for review and approval.

Task 3: Hire a solar PV consultant to provide project oversight

3.1 Develop a request for proposal document that outlines the scope, requirements, and expectations for this project. Ensure any federal grant requirements (e.g., BABA, Davis Bacon, etc.) are clearly stipulated.

3.2 Evaluate proposals from qualified consultants.

3.3 Select the consultant who best meets the needs of the project and can stay within the determined budget and timeline.

3.4 Negotiate terms, scope of work, deliverables, timeline, and compensation for contract execution.

3.5 Complete onboarding of the consultant to help familiarize the project and establish communication channels.

Task 4: Generate project bids

4.1 Develop a detailed bid document that includes all projects under this measure.

4.2 Advertise bids to invite qualified contractors, ensure methods are utilized to solicit disadvantaged businesses.

4.3 Evaluate bids based on the criteria included in the solicitation document.

4.4 Select and award the contractor that offers the best value for the project and can complete it on time and within the budget.

Task 5: Install solar energy systems

5.1 Work with the installer to prepare each of the sites, ensuring proper access for equipment.

5.2 Solar consultant to oversee system installation is completed according to specifications.

5.3 Ensure the installation is completed to ensure compliance with safety standards, building codes, manufacturer guidelines, and requirements of federal awards.

5.4 Test the system to confirm it is functioning correctly and performance is optimized.

Task 6: Monitor the system effectiveness as needed

6.1 Establish and implement a monitoring protocol to regularly monitor the performance of the systems.

6.2 Address any maintenance issues as they arise.

6.3 Provide training for staff members on how to maintain and operate the solar energy systems.

Implementing authority

SMSC has the decision-making authority to implement GHG reduction measures on the lands they own and manage including Tribal Operations and Gaming Enterprise fleets and all non-residential buildings in the Community. SMSC can also provide incentives and education for sectors outside of their direct control such as residential energy use and travel.

The SMSC has the authority to install solar generation anywhere in the SMSC, but the rate of return is not within SMSC control. Even though most systems will not export energy, all systems will be grid connected, albeit prior to the meter for safety reasons. The SMSC relies on two small utilities, Minnesota Valley Electric Co-op (MVEC) and Shakopee Public Utilities (SPU) for electricity and follows their rules for interconnection of solar generation.

Net Metering: The utility measures the net of all energy purchased vs all excess production sold on a monthly basis. Any net-excess solar is purchased by the utility company at the average retail rate.

- Eligibility: Systems must be sized under 40kW AC
- Note: MVEC limits the availability of this to only one system per entity per mile

Time-of-Day Purchase Rates: The utility actively measures the energy consumed vs energy produced. Any solar production not immediately used by the building is sold to the utility company at their Time-of Day rates.

- Eligibility:
    - SPU: Systems must be sized under 100 kW AC
    - MVEC: Sytems must be sized under 100 kW AC
        - Note: MVEC will approve of Time-of-Day Rate metering for systems up to 150 kW on a case-by-case basis. Sites that will export little to no energy will likely be approved

Negotiated Contracts: The utility and customer may negotiate a contract on the sale rate of solar production

- Eligibility: Systems must be sized over 10 kW AC
- Note: This option may make a customer ineligible for special billing rates such as load-control rate pricing.

The following details specific roles and responsibilities for each party involved in the implementation of this measure.

SMSC: As grant recipient, the SMSC will undertake grant management and project oversight to ensure each of these measures is implemented and completed successfully. The SMSC will complete all reporting obligations,

ensure tracking and measuring of outputs and outcomes, and will oversee all contractual agreements for the design and construction of these clean energy systems. The Land Department is the lead department representing the SMSC and will engage the managers of the buildings affected by these measures.

Solar PV Consultant: The solar PV consultant will work closely with the SMSC and provide project oversight ensuring the projects proceed smoothly and are successfully completed. This will include developing the RFP, reviewing applications, and managing the construction contract and process.

Solar Developer: Will be responsible for the construction and performance of the solar energy systems.

Expected outputs and outcome and performance measures

The expected outputs for solar installations include the number of solar energy systems installed and the total generation capacity for these new systems. We anticipate that Measure 1 will reduce GHG emissions and criteria air pollutants while increasing clean electricity generation and jobs created.

Table 5. Solar PV outputs and outcomes

Output	Outcome	Metric
Number of Solar Installations Capacity (kW AC)	GHG reductions	3,433 metric tons CO_2e/year
	CAP reductions	4,526 kg/year
	Electricity generation	4,490,643 kWh/year
	Jobs created	#/installation

The SMSC utilizes the B3 Benchmarking tool provided by the State of Minnesota to track energy use, emissions, and renewable energy generation of its buildings and facilities. This tool enables the SMSC to track the success of investments made in buildings including solar energy generation and geothermal. Using B3, the SMSC can generate sophisticated reports to analyze energy use and the impact of projects such as those included in this application.

Quantification of annual avoided criteria air pollutants (CAPs)—sulfur dioxide (SO_2), nitrous oxides (NO_X), and particulate matter 2.5 ($PM_{2.5}$) were calculated based on avoided electricity purchases and avoided gas combusted on site in 2030, using electricity emissions rates calculated for distributed PV in the Midwest region by the U.S. Environmental Protection Agency (EPA) using the EPA's AVoided Emissions and geneRation Tool (AVERT) and rates from the EPA's National Emissions Inventory for gas.

As part of the Comprehensive Climate Action Plan (CCAP), the SMSC is creating a tool to track, measure, and report progress toward its carbon neutrality goal. We will utilize a database tool (Airtable or similar) with enhanced functionality to output reports that can be used for federal reporting requirements, reports to the Business Council, and updates for Community members. The SMSC will include updates in its annual sustainability report that is completed through the Native Green program. Reports will include the disclosure of GHG emissions CAPs reductions, energy savings, project completion, and job creation.

Risks

There are inherent risks with any project and solar installation is no different. Potential risks include:

- The Tribal Business Council is new and supportive of solar energy, but should an unanticipated changeover of the Council occur, a new administration may decline to install solar.
- Federal government administration change. Should the 2024 federal elections result in an administration change to an administration that creates policies unfavorable to climate action and solar energy, solar projects may not proceed at the desired pace.
- Supply change disruption. Should solar panels, invertors or other equipment become limited in supply, projects may not proceed at the desired pace.
- Abrupt cost increases, through supply shortages or other reasons, will result in higher prices and fewer projects completed. This is also true if rebates and tax incentives are reduced or eliminated.
- Labor availability. For some occupations labor shortages exist and finding qualified workers can be difficult. If skilled labor is difficult to obtain, delays in ECM completion may occur.

MEASURE 2: BUILDING EFFICIENCY AND ELECTRIFICATION

Sector: Gaming Enterprises/Tribal Operations

Description

To achieve its building decarbonization goals, the SMSC must maximize efficiency and electrification across all buildings on its campus. To map out a pathway toward achieving this goal, the SMSC commissioned a building energy analysis, which identified 150 measures that could be implemented. The measures were further analyzed to identify priority measures that replace end-of-life equipment, have short payback periods, and/or can achieve low-cost GHG reductions. In addition to removing measures that have already been completed, measures were prioritized for inclusion in the SMSC's PCAP based on the practicality of near-term implementation, the acceptability to the facility managers, and the savings potential. The final list of measures is included herein.

Transformative impact

Increasingly, tribal communities are looking to achieve net zero greenhouse gas emissions and work toward sustainability. The SMSC is leading these efforts in many ways and continues to look for opportunities to accelerate its efforts. The approach the SMSC is taking to decarbonize its buildings is one that can be replicated across tribes and communities throughout the country. The building analysis takes a whole-community approach to identify the biggest opportunities to reduce emissions and put together bundles of measures that make projects more cost-effective. This approach can help contribute to market transformation in the space of existing building energy improvements by demonstrating how to plan and execute a building energy roadmap.

Tasks and milestones

Individual projects have been prioritized based on their GHG reduction potential and bundled into groups based on location to reduce the number of individual disruptions. Table 6 identifies the schedule and key tasks for each project.

Table 6. Building efficiency and electrification projects

Facility	Description	Annual tCO_2e Savings	Months to complete/ year done	Key tasks
Water Bottling	Replace air compressor	55	2/2025	Existing air compressor reliability issues. New air compressor with heat recovery for boiler loop will be more energy efficient. Complete in coordination with Laundry compressor replacement. Mechanical design-build contractor will integrate the energy recovery on the new compressor into the existing boiler loop.
Laundry	Air compressor replacement (Shop compressor is at end of life)	43	2/2025	New air compressor with heat recovery for boiler loop will be more energy efficient. Complete in coordination with Bottling compressor replacement. Mechanical design-build contractor will integrate

				the energy recovery on the new compressor into the existing boiler loop.
Tiowakan	Adjust HVAC setpoints to set back during unoccupied hours	21	2/2025	Review current schedule for operations. Program the control system to set back the temperature setpoints during unoccupied hours, while maintaining required temperature, humidity and airflow requirements for museum spaces. Review controls trending and monitoring/alerts for critical spaces. Suggest temperature/humidity trending at 15-minute intervals, saved for a minimum of 1 year, preferably 3-years.
Fire Station	Vehicle exhaust in bays	12	2/2025	Add a vehicle exhaust source capture system that allows door bays to be kept closed while engines are running.
Mazopiya	Mazopia Envelope improvements	12	2/2025	Investigate insulation and air barrier in existing conditions for Mazopiya exterior walls. Develop recommendations to add insulation/air barrier above ceiling at walls and roof. Seek to reduce thermal bridging and improve comfort and energy efficiency.
Public Works	Overhead Insulated Garage Doors for Public Works	150	3/2025	Install Overhead Insulated Garage Doors for Public Works (13 doors) -14ft x 16ft) https://www.overheaddoor.com/thermacore-sectional-steel-doors-592
Playworks	Increase roof insulation to R22	53	4/2025	Roof replacement is planned for 2024/2025. Require contractor to Increase roof insulation to R22 as part of roof replacement.
Credit Union	Recommission Ground Source Heat Pump (GSHP) system	21	6/2025	Review controls and trending for existing GSHP system. Analyze observed ground loop temperatures and test heat pumps to verify hydronic flow. Review operations and setpoints for rooftop Makeup Air Unit (MAU) and make adjustments to improve comfort and energy efficiency.
Mazopiya	Recommission Ground Source Heat Pump (GSHP) system	19	6/2025	Review controls and trending for existing GSHP system. Analyze observed ground loop temperatures and test heat pumps to verify hydronic flow. Review operations and setpoints for rooftop Makeup Air Unit (MAU) and make adjustments to improve comfort and energy efficiency.

Dakotah Sport and Fitness	Add low emissivity sheet to underside or roof deck for one Rink	176	6/2025	Contract with installer to add an R-6 barrier to reduce the heat transmitted from the roof (radiation and conduction). Area is approximately 300 feet x 150 feet, or 45,000 sq ft. Coordinate with Ice Rink operator to identify time for installation.
Laundry	Rebuild steam traps, add heat recovery on steam boiler stacks	159	10/2026	Identify steam traps that are leaking or blocked and repair/replace. Repair or replace stack economizers.
Dakotah Sport and Fitness	Install REALICE deaerator system	125	3/2026	Verify 45 PSI at water supply (add booster pump if < 45 psi). Remove Reverse Osmosis (RO) system. Install REALice Wall unit (deaerator system) for all rink water, including ice refinishing machine and ice nozzles.

Implementing authority

SMSC Business Council has decision-making authority to create and implement GHG reduction measures on the lands they own and manage including Tribal Operations and Enterprise non-residential buildings in the Community. SMSC has the potential to provide incentives and education for areas outside of their direct control such as residential energy use and travel.

In most cases, project concepts are developed at the staff level. A consultant is brought in if the complexity is greater than staff capability or time permits. Once the concept and the budget are drafted the project is brought to the Business Council for approval. The project will proceed to the final design stage if the Business Council approves. In some cases, usually for a large funding amount, the project needs to go before the General Council (the entirety of the Tribal membership age 18 or greater) for approval.

Expected outputs and outcomes

This measure's outputs include the quantification and tracking of efficiency upgrades. We anticipate outcomes to include reductions in electricity use, utility gas use, GHG emissions, and criteria air pollutants, as well as job creation. The outputs and outcomes are summarized in Table 7.

Table 7. Building efficiency and electrification outputs and outcomes

Output	Outcome	Metric
Efficiency upgrades	GHG reductions	845 metric tons of CO2e/year
	CAP reductions	33,769 kg/year
	Electricity reductions	630,791 kWh/year
	Utility gas reductions	68,176 therm/year
	Jobs created	#/installation

Performance measures and plan

Performance for Measure 2 will follow the process included in Measure 1.

Risks

There are inherent risks with any project. Potential risks include:

- The Tribal Business Council is new and supportive of electrification and energy efficiency projects, but should an unanticipated changeover of the Council occur, a new administration may decline to implement.
- Federal government administration change. Should the 2024 federal elections result in an administration change to an administration that creates policies unfavorable to climate change and electrification, electrification and energy efficiency project may not proceed at the desired pace.
- Supply change disruption. Should electrification or energy efficiency equipment become limited in supply, projects may not proceed at the desired pace.
- Abrupt cost increases, through supply shortages, or other reasons will result in higher prices and fewer projects completed. This is also true if rebates and tax incentives are reduced or eliminated.
- Labor availability. For some occupations labor shortages exist and finding qualified workers can be difficult. If skilled labor is difficult to obtain, delays in ECM completion may occur.

The result of delays will impact energy savings and GHG emissions. Without funding to implement electrification and efficiency the project completion schedule will be extended into future years.

MEASURE 3: THERMAL ENERGY NETWORKS

Sector: Gaming Enterprises/Tribal Operations

Description

Building energy use is a major source of GHG emissions in the SMSC. Most building emissions are from Tribal Operations and Gaming Enterprise facilities, and heating and cooling these facilities requires a significant amount of energy. This measure focuses on reducing emissions from heating and cooling – specifically by using thermal energy networks to provide more efficient and less carbon-intensive systems at two locations.

1. **SW Campus Geothermal Network:** Conversion from DX RTUs and an air-cooled chiller to a geothermal system to supply heating and cooling for the southwest part of the campus (SW campus).
2. **Mystic Lake Hydronics System Expansion to Little Six Casino:** Enhance the planned centralized hydronics system at the Mystic Lake Casino Hotel complex to take advantage of heat recovery and expand this system to provide heating and cooling for Little Six Casino.

SW Campus Geothermal Network

The SW campus includes the Dakota Sport and Fitness/Ice Arena, Link meeting space, Playworks childcare facility, and golf maintenance facility. The SW campus has two ice rinks, a fitness center, a gym, bowling alley, childcare facility, large meeting space, and a golf course maintenance area. The total approximate area is approximately 300,000 square feet. This measure will increase building efficiency by installing a geothermal system to heat and cool the SW campus.

Currently, the SW campus is fed by a combination of DX RTUs and air-cooled chiller feeding chilled water coils in an indoor air handling unit. The proposal is to drill geothermal exchange wells (traditional or Darcy), install a 6-pipe heat pump in a central mechanical room, and change out AHU/ RTU coils to take chilled water and hot water from the geothermal central plant. This will result in chilled water and hot water supply and return piping distributed throughout the SW campus and revised controls for the entire system.

Mystic Lake Hydronics System Expansion to Little Six Casino

The SMSC has planned a new centralized heating and cooling for the Mystic Lake Casino Hotel complex, which is phased with installations occurring over several years. This measure involves enhancing the planned central plant to take advantage of heat recovery and expanding the system to provide heating and cooling to Little Six Casino.

Little Six Casino is a 48,100 square foot building constructed in 2007. The existing mechanical consists of boilers, unit heaters, rooftop units (RTUs), variable air volume units (VAVs) and make up air units (MAUs). Three boilers serve the heating hot water system for the building. Two boilers, located in the mechanical room, serve the building's mechanical equipment. This measure will convert the current heating system to hydronics technology.

Bringing chilled and heated water to Little Six through an extension of the Mystic hydronics project is an effective way to reduce heating and cooling costs and GHG emissions. Both chilled water and hot water can be delivered underground in plastic pipe, suitable for directional boring. Chilled water will use HDPE piping while the higher temperature hot water system must use some form of PE-RT piping. The run from the Mystic plant to Little Six's air handling units is about 2,000 feet.

Table 8. Thermal energy network projects

Project	Annual CO_2e avoided (metric tons) [7]
SW Campus Thermal Network	1,149
Heat Recovery at Mystic Lake Central Plant	4,965
Connect Little Six Casino to Mystic Lake Central Plant	1,725
Totals	**7,839**

Transformative impact

One of the hardest to abate sectors is building space heating—especially in cold climates like Minnesota. Currently, the SMSC depends on natural gas for heating. Natural gas not only contributes to climate change through combustion and methane leaks, but also poses safety and poor air quality hazards and is susceptible to price volatility. Transitioning to geothermal energy allows the SMSC to decrease GHG emissions, reduce air pollution, and stabilize energy costs.

Minnesota currently relies on the importation of natural gas to meet our energy needs. However, vast thermal energy resources lie beneath our feet ready to be tapped. The technologies to harness that energy have seen incredible innovations in recent years, creating an opportunity for the SMSC to take advantage of this resource and showcase how tribal communities can transition to clean, renewable heat sources. By harnessing geothermal energy, we can pivot from a system that is extractive and exploitative of Uŋcí Maḳa and return to a relationship where we care for and respect what the Earth has to offer. The Dakota people have long considered our relationship with the earth as a kinship—this energy transition moves us toward re-establishing that relationship and building a sustainable energy system for future generations.

Tasks and milestones

The following tasks are needed for heating system conversions:

Task 1: Develop the project budget

1.1 Utilize the building analysis to create a budget for construction and installation of the energy systems included in this measure.

1.2 Include estimated costs based on the building energy analysis that also considers domestic content and prevailing wages, as well as discounts that are available.

1.3 Account for contingencies that may occur due to unexpected expenses, weather delays, or other risks associated with this project.

Task 2: Develop a Capital Request for General Council and Business Council Approval

2.1 Prepare a detailed proposal that outlines the benefits and costs of the installation.

2.2 Include the budget as detailed in Task 1, including funding from the grant award and ITC direct payment.

2.3 Outline the project scope, schedule, and anticipated outcomes of this project.

[7] Pending final calculations

2.4 Present the request to the General Council and Business Council for review and approval.

Task 3: Solicit and hire an engineering consultant to develop plan sets

3.1 Develop a request for proposal document that outlines the scope, requirements, and expectations to develop plans for this project. Ensure any federal grant requirements (e.g., BABA, Davis Bacon, etc.) are clearly stipulated.

3.2 Evaluate proposals from qualified consultants.

3.3 Select the consultant who best meets the needs of the project and can stay within the determined budget and timeline.

3.4 Negotiate terms, scope of work, deliverables, timeline, and compensation for contract execution.

3.5 Work with consultant to develop plan sets that includes a site assessment, drilling plans, equipment specification, system diagrams, control system design, and other details as required by the project.

Task 4: Generate bid documents for plan execution and construction

4.1 Work with engineering consultant to develop a detailed bid document that includes all elements of this measure.

4.2 Advertise bids to invite qualified contractors, ensure methods are utilized to solicit disadvantaged businesses.

4.3 Evaluate bids based on the criteria included in the solicitation document.

4.4 Select and award the contractor that offers the best value for the project and can complete it on time and within the budget.

4.5 Finalize negotiations and execute the contract with selected contractor. Ensure any federal grant requirements are clearly stipulated.

Task 5: Install the energy systems

5.1 Work with the installer to prepare each of the sites and ensure access for equipment and construction materials.

5.2 Construct new energy systems.

5.3 Test the system to confirm it is functioning correctly and performance is optimized.

Task 6: Monitor the system effectiveness as needed

6.1 Establish and implement a monitoring protocol to regularly monitor the performance of the new energy systems and associated equipment.

6.2 Complete regular inspections and address any maintenance issues as they arise.

6.3 Provide training for staff members on how to maintain and operate the new energy systems.

Thermal system plan development will begin in 2024 and take approximately 6 months to complete. Well drilling will commence shortly after the plans are complete.

Table 9. SW Campus Schedule

Month/Year	Project Component	Milestone	Responsible Party
11/2024-6/2025	Develop project plans, complete surveying, meetings with building managers	Contract with MEP engineer to finalize design for new GSHP system, as well as architectural details. Engage Commissioning Agent in design review. Issue bid package to qualified contractor(s) and review with project team.	Engineering consultant, DSF/Playworks, and Golf Building Managers, Land department
10/2025-10/2027	Install geothermal or Darcy aquifer source wellfield under parking lot at DSF; Build a small mechanical building to house geothermal pumps and heat pump chillers; run chilled water and hot water supply and return piping throughout SW campus, and replace gas fired rooftop air handling units with hot water/ chilled water units.	Contract with MEP engineer to finalize design for new GSHP system, as well as architectural details. Engage Commissioning Agent in design review. Issue bid package to qualified contractor(s) and review with project team. Install wellfield & construct small addition to house mechanical equipment including hydronic pumps and heat pump chillers. Install new supply and return piping for Chilled water and Hot water. Install new airside equipment to integrate with existing ductwork. Perform Commissioning with 3rd party contracted directly with SMSC.	Engineering consultant, Geothermal well driller, HVAC contractor DSF/Playworks, and Golf Building Managers, Land department

Table 10. Mystic Lake Hydronics Enhancements and Expansion Schedule

Month/Year	Project Component	Milestone	Responsible Party
11/2024-6/2025	Develop project plans, complete surveying, meetings with building managers	Plans and survey completed	Engineering consultant, Little Six management, Land department
10/2025-10/2027	This project will bring the chilled and heated hot water from the Mystic Hydronics plant to Little Six. Approximately 2000 ft of HDPE DR11 (underground chilled water) and PE-RT DR9 (underground heating hot water) shall be used to provide 10” chilled water and 8” heating hot water to Little Six. New heat recovery chillers (HRCH) shall be provided alongside pumps serving these HRCH. This system shall be installed to increase efficiency of the	2000 feet of HDPE and PE-RT DR9 piping direction drilled from Mystic hydronics plant to Little Six Casino. New heat recovery chillers	Engineering hydronics consultant, HVAC contractor Little Six Management, Land department

	HRCH system by utilizing Full Heat Recovery Engagement (FHRE).	and pumps installed	

Implementing authority

SMSC Business Council has decision-making authority to create and implement GHG reduction measures on the lands they own and manage including Tribal Operations and Enterprise non-residential buildings in the Community. SMSC can also provide incentives and education for areas outside their direct control, such as residential energy use and travel. SMSC's Land and Natural Resources Department will review all elements of the PCAP to confirm their authority to implement.

In most cases, project concepts are developed at the staff level. A consultant is brought in if the complexity is greater than staff capability or time permits. Once the concept and the budget are drafted the project is brought to the Business Council for approval. The project will proceed to the final design stage if the Business Council approves. In some cases, usually for a large funding amount, the project needs to go before the General Council (the entirety of the Tribal membership age 18 or greater) for approval.

Expected outputs and outcomes

This measure's outputs are the new thermal networks and connections Anticipated outcomes include reduced energy use, GHG emissions, and criteria air pollutants, as well as job creation. The outputs and outcomes are summarized in Table 11.

Table 11. Thermal energy networks outputs and outcomes

Output	Outcome	Metric
Network thermal conversion	GHG reductions	7,839 metric tons of CO_2e/year
	CAP reductions	832,612 kg/year
	Energy savings	165,955 MMBtu/year
	Buildings served by systems	6 buildings
	Jobs created	#/installation

Performance measures and plan

Performance for Measure 3 will follow the process included in Measure 1.

Risks

There are inherent risks with any project. Potential risks include:

- The Tribal Business Council is new and supportive of geothermal projects because it reduces energy use, saves money, and will assist in the SMSC carbon neutral goal. Should an unanticipated changeover of the Council occur, a new administration may decline to implement.

- Federal government administration change. Should the 2024 federal elections result in an administration change to an administration that creates policies unfavorable to climate change and carbon reduction projects may not proceed at the desired pace.
- Supply change disruption. Should geothermal equipment become limited in supply, projects may not proceed at the desired pace.
- Abrupt cost increases, through supply shortages, or other reasons will result in higher prices and fewer projects completed. This is also true if rebates and tax incentives are reduced or eliminated.
- Labor availability. For some occupations labor shortages exist and finding qualified workers can be difficult. If skilled labor is difficult to obtain, delays in ECM completion may occur.

MEASURE 4: WOODLAND RESTORATION

Sector: Gaming Enterprises/Tribal Operations

Description

The SMSC is committed to being good stewards of the Earth and demonstrates its dedication through efforts to restore and preserve its natural resources. As of 2022, the SMSC owns and manages approximately 5,860 acres. The primary land use on SMSC land is agriculture and is increasingly developing into natural, residential, and commercial land uses.

Prior to European settlement, the region that is now Scott County consisted primarily of large blocks of deciduous forest (especially maple and basswood) and wetlands. Since the 1800s more than 75% of this land has been converted into agricultural land by way of clear-cut logging and wetland draining. Today, major concerns for the woodlands are continued fragmentation and invasive species. The SMSC's Land and Natural Resources Department has been working to address these issues.

Key actions include:

- Re-created and now managing more than 1,000 acres of prairie habitat
- Managing more than 500 acres of wetland habitat and working to restore more wetlands each year
- Integrated species management through prescribed burns, special mowing techniques, localized chemical treatment, and regulation
- Prescribed burns to enhance native ecosystems, enrich soils, and control invasive species
- Plans to restore multiple native forest types by planting more than 25,000 native trees

This carbon reduction measure will build on the past and current efforts of the Land and Natural Resources Department to continue and accelerate tree planting and woodland restoration practices. Currently, the SMSC has a tree canopy coverage of 1,058 acres, estimated to sequester 2,652 metric tons of CO_2 annually. The implementation of this measure will result in an additional 266 metric tons of CO_2 sequestered by 2030 and more than 3,000 metric tons of CO_2 sequestered by 2050.

Tree planting will take place across three major projects, which are summarized below.

Schmitz Oak-Basswood Forest Reconstruction

In 2019, the Natural Resources Community Member working group agreed to restore 66 acres of the Schmitz parcel to an oak-basswood forest. Pre-settlement data indicates that this entire area was once forested and part of the "Big Woods", which would have included species like sugar maple, basswood, oak, and hickory. The goals of this program are to 1) reconstruct a 66-acre oak-basswood forest; 2) establish an understory plant community that is tolerant of various light conditions to adapt as the forest matures; and 3) plant 25,000 tree seedlings over a 5-year period. Planting started in 2021, with 37 acres planted between 2021 and 2023.

GW Land Oak-Basswood Forest Reconstruction

The SMSC purchased the GW land parcel in 2013. Since at least 1937, this land has been primarily utilized for hay. Many of the existing trees are undesirable with many that are invasive species like buckthorn. This project will reconstruct the land back to an oak-basswood forest. The goals are to 1) reconstruct a 12-acre oak-basswood forest; 2) plant 3,600 bareroot tree seedlings over a 3-year period; 3) remove undesirable and non-native trees and shrubs; and 4) establish an understory plant community.

Talon

The SMSC purchased the 42.6-acre Talon parcel (Ṡúŋka Nakpa) in March 2021. There are several opportunities to restore this property to a mix of oak woodland, oak savanna, and oak-basswood forest. Restoration will involve removal of invasive species to open the understory and allow conditions to establish more desirable species. The goals are to 1) reconstruct a 13-acre oak-basswood forest, 2) restore 3 acres of oak savanna, 3) restore 2.5 acres of oak and maple woodland, and 4) plant over 4,000 tree seedlings over two years.

Transformative impact

Land cover impacts how resilient a community is to climate and weather hazards. Impervious surfaces, for example, contribute to higher local temperatures through the urban heat island effect and increase the volume, temperature, and speed of stormwater runoff leading to potential flooding and water quality challenges. Conversely, tree and vegetative land cover provide cooling and stormwater benefits to surrounding areas. Importantly trees also have the capacity to absorb and store carbon emissions as well as filter air pollution, among other benefits.

Forest restoration offers a wide range of benefits for ecological biodiversity and the environment. The conversion of land back to its pre-settlement state will help to mitigate climate change through increased carbon storage. It will also support climate adaptation by improving water retention, reducing flooding and erosion, and providing cooling benefits. Food sovereignty can be increased by planting fruit bearing, culturally significant trees and shrubs such as chokecherry, serviceberry, gooseberry, and elderberry. Restoration efforts will help revive and preserve cultural and spiritual significance to the SMSC.

Tasks and milestones

The SMSC Land Department has developed planting plans for each site (see summary in Table 12) and will be the party responsible for all aspects of this measure.

Table 12. Woodland restoration tasks and milestones

Year	Task	Milestone
2024	• Plant 4 acres oak/basswood forest on GW Land parcel • Plant 14.81 acres oak/basswood forest on Schmitz parcel	• 1,233 trees planted on GW Land parcel • 4,800 trees planted on Schmitz parcel
2025	• Plant 4 acres oak/basswood forest on GW Land parcel • Plant 6.5 acres oak/basswood forest on the Talon parcel • Plant 14.16 acres oak/basswood forest on Schmitz parcel • Inspect sites for survival	• 1,233 trees planted on GW Land parcel • 2,000 trees planted on Talon parcel • 5,500 trees planted on Schmitz parcel
2026	• Plant 4 acres oak/basswood forest on GW Land parcel • Plant 6.5 acres oak/basswood forest on the Talon parcel • Inspect sites for survival	• 1,234 trees planted on GW Land parcel • 2,025 trees planted on Talon parcel

Implementing authority

SMSC Business Council has decision-making authority to create and implement GHG reduction measures on the lands they own and manage including Tribal Operations and Enterprise non-residential buildings in the Community. This project is approved and will move forward as funding is available.

Expected outputs and outcomes

This measure's outputs are the number of acres planted. Anticipated outcomes include removal of carbon dioxide and criteria air pollutants from the air as well as job creation. The outputs and outcomes are summarized in Table 13.

Table 13. Woodland restoration outputs and outcomes

Output	Outcome	Metric
Acres planted	GHG removed	61 metric tons of CO_2e/year
	CAPs removed	261 kg/year
	Jobs created	#/installation
	Trees planted	18,025 trees planted

Performance measures and plan

The SMSC employs two methods to track performance of woodland restoration projects. The Land Department tracks on-the-ground activity and documents removals and plantings. The SMSC will be able to track types of species and quantities planted throughout the duration of this project. Monitoring the change in the tree canopy requires a more sophisticated analysis at a frequency that can capture changes in land cover over several years. The SMSC models land cover classification utilizing ArcGIS Pro's supervised classification process, which includes tree canopy. This model involves acquiring high-resolution aerial imagery of the SMSC from Scott County. Ground-truthing and machine learning enables SMSC staff to accurately assess land cover classification.

The results of this model were used to generate an analysis of SMSC's environmental footprints that includes tree canopy coverage. Future updates employing this model will allow the SMSC to track land cover changes in key project areas over time. These analyses can be used to report and monitor the effectiveness of sustainability initiatives. Because this process is time consuming and these kinds of ecological changes take several years to show significant changes, this method will be utilized every five years. Interim years will rely on planting counts.

Risks

There are inherent risks with any project. Potential risks include:

- The SMSC is unique among urban/suburban entities by supporting forest restorations. Most entities view land to be too valuable for commercial or residential development to consider large scale restoration activities. This is consistent within all levels of Tribal government (e.g workgroups, the Business Council and the General Council). Should a Tribal group oppose forest restoration it may impact the viability of any not already approved project
- The Tribal Business Council is new and supportive of any projects that result in additional green space for hunting and recreational opportunities and provide carbon sequestration. Should an unanticipated changeover of the Council occur, a new administration may decline to implement.
- Supply change disruption. Should bareroot tree stock become limited in supply, projects may not proceed at the desired pace.

- Abrupt cost increases, supply shortages, or other reasons will result in higher prices and fewer trees planted.
- Labor availability. For some occupations labor shortages exist and finding qualified workers can be difficult. If skilled labor is difficult to obtain, delays in ECM completion may occur.

Potential Funding Sources

Potential funding sources for all measures

Table 14. Summary table of state and federal funding opportunities

Funding Source	Availability	Applicability	Considerations
Federal direct pay tax incentives	Available through 2033	SMSC will be taking advantage of these incentives	This will help cover 40-50% of the costs for solar
Utility Rebates	Currently Available	Efficiency measures are eligible	Will work with utilities to process rebates.
DOE 41010d	Received 3 of 5 distributions	Does not apply to these measures but supports solar by providing backup power.	This funding is targeted towards battery backup for critical service buildings in combination with solar installations but does not cover solar installation.
CPRG Tribal Competition	Due May 1	All measures are eligible	SMSC will be applying for separate projects under the tribal application. Funds are insufficient to cover all remaining project costs.
Green Bank Financing	Not yet available	Uncertain	Waiting for program availability to understand how it might support this type of measure.
Clean Energy Deployment on Tribal Lands 2024	Due May 30, 2024	Solar is eligible	20% match, $250K – $5M. SMSC submitting application for non-CPRG solar
Solar for All	Not yet available	Uncertain	Waiting for program availability and parameters to understand how it might support this measure.
State Competitiveness Fund	Closed	Uncertain	Available where match is required for federal grants. Current round is closed; uncertainty regarding future rounds.
Minnesota Climate Action Grants	Open through May 1, 2024	Uncertain	Up to $50,000 available for planning and implementation. Insufficient for this measure.
Minnesota Solar on Public Buildings Grant	Opens April 22, 2024	Solar is eligible	Tribes are eligible for up to 70% of system costs, not to exceed $84,000. SMSC will explore options when funding is available. Only tribal governments facilities will be eligible.

Urban and Community Forestry grants	Currently closed	Tree planting may be eligible	Uncertainty regarding future funding rounds
Minnesota Department of Natural Resources	2022-2024	Replant young forest stands damaged by 2021 drought	Tree seedling drought relief grants program. Uncertainty regarding future funding.
Minnesota Department of Natural Resources	2022-2024	Preparing and managing ash for EAB	Preparing for emerald ash borer (EAB). Not applicable for new planting.
Minnesota Department of Natural Resources	2023-2027	Encourages inventory, planting, assessment, maintenance, improvement, and restoration	ReLeaf Community Forestry grants. Uncertainty regarding future funding.
U.S. Department of Agriculture - USFS	2023 - ongoing	Address emerging issues associated with climate change	Landscape scale reforestation grant
Bureau of Indian Affairs	Ongoing	Habitat restoration, riparian planting, ecosystem resilience	Tribal Climate Resilience

Benefits Analysis

In addition to reducing greenhouse gas emissions, implementing the priority measures described in this plan will also reduce criteria air pollutants, both through the reduced combustion of fossil fuels and through removals of these pollutants from the air by trees.

While there are no industrial sources of criteria air pollutants or hazardous air pollutants in the SMSC, the generation of electricity and the use of utility gas release pollutants such as sulfur dioxide (SO_2), nitrous oxides (NO_x), and particulate matter ($PM_{2.5}$). The energy used at SMSC's facilities is estimated to have released over 1,150 metric tons of these criteria air pollutants in 2023.

The priority GHG reduction measures in this plan are estimated to reduce annual greenhouse gas emissions by 12,178 metric tons and criteria air pollutants by 871 metric tons (see Table 15).

Table 15. Greenhouse gases and criteria air pollutants estimated to be avoided or removed annually due to priority measures

Measure	CO_2e (metric tons)	SO_2 (kg)	NO_x (kg)	$PM_{2.5}$ (kg)
Solar PV Systems on Tribal Facilities	-3,433	-2,312	-2,008	-207
Building Efficiency and Electrification	-845	-530	-33,069	-171
Thermal Energy Networks [8]	-7,839	-4,056	-825,085	-3,471
Woodland Restoration	-61	-15	-26	-9

[8] Pending final calculations

Appendix A – Greenhouse Gas Documentation

BUILT AND NATURAL ENVIRONMENT

Gaming Enterprises/Tribal Operations

The SMSC owns and operates 34 facilities, totaling 2.5 million square feet. These include commercial functions (such as casinos, a recreation facility, a golf course, an event center, credit unions, and convenience stores), community functions (such as community, cultural, and spiritual centers), and tribal operations (such as water and wastewater treatment, organics recycling, public works, tribal administration, and public safety). There are no commercial, institutional, or industrial buildings within the community that are not owned and operated by the SMSC. This category also includes traffic signals and streetlights that are owned and operated by the community.

SMSC facilities generate emissions by using electricity and combusting fossil fuels (including utility gas at many of the facilities and propane at several). The SMSC also generates emissions from diesel generators used to provide emergency power and peak load control for the electric utility. Refrigerant leakage from equipment within SMSC facilities is another source of emissions. There are no sources of emissions from industrial processes within the SMSC.

Source	Activity Data	Emissions Factors
Electricity	**Unit:** kWh of utility-provided electricity **Source:** monthly utility data for each facility as tracked by the SMSC in B3 Benchmarking	**Unit:** metric tons CO_2, N_2O, and CH_4 per kWh **Source:** US EPA eGRID for Midwest Regional Organization West (annual data)
Market-Based Electricity (RECs)	**Unit:** kWh of market-based electricity **Source:** SMSC staff	**Unit:** metric tons CO_2, N_2O, and CH_4 per kWh **Source:** US EPA Tribal Greenhouse Gas Inventory Tool
Utility Gas	**Unit:** therms of utility gas **Source:** monthly utility data for each facility as tracked by the SMSC in B3 Benchmarking	**Unit:** metric tons CO_2, N_2O, and CH_4 per therm **Source:** The Climate Registry's 2023 Default Emission Factors
Propane	**Unit:** gallons of propane **Source:** monthly propane purchases as tracked by the SMSC in B3 Benchmarking	**Unit:** metric tons CO_2, N_2O, and CH_4 per gallon **Source:** EPA Emissions Factors for GHG Inventories Hub, September 2023
Diesel	**Unit:** gallons of diesel **Source:** monthly diesel purchases as tracked by the SMSC in B3 Benchmarking	**Unit:** metric tons CO_2, N_2O, and CH_4 per gallon **Source:** EPA Emissions Factors for GHG Inventories Hub, September 2023

Refrigerants	**Unit:** pounds of refrigerant by type **Source:** annual refrigerant purchases, as tracked by SMSC staff, minus the amount matched to contaminated refrigerants recycled off-site	**Unit:** global warming potential (CO_2e) of each of the refrigerants used in SMSC **Source:** IPCC AR5 Fifth Assessment Report

Homes

There are over 300 homes in the SMSC for Community members and their families. These homes generate emissions by using electricity and combusting fossil fuels, primarily utility gas. Although there is likely also a small amount of emissions from refrigerant leaks and product use in homes, these have not been estimated.

Source	Activity Data	Emissions Factors
Electricity	**Unit:** kWh of electricity **Source:** calculated from the average monthly household energy use for SMSC households, provided by Minnesota Valley Electric Cooperative	**Unit:** metric tons CO_2, N_2O, and CH_4 per kWh **Source:** US EPA eGRID for Midwest Regional Organization West (annual data)
Utility Gas	**Unit:** therms of utility gas **Source:** aggregated annual residential utility gas use for SMSC households, provided by CenterPoint Energy	**Unit:** metric tons CO_2, N_2O, and CH_4 per therm **Source:** The Climate Registry's 2023 Default Emission Factors

Forest Land and Trees

Trees absorb carbon dioxide from the air and store it as carbon within their roots, trunks, and branches, meaning strategies that increase the amount of biomass within a community contribute to removing carbon dioxide from the atmosphere.

Source	Activity Data	Emissions Factors
Urban Trees	**Unit:** acres of tree canopy **Source:** SMSC staff, supervised classification of land cover from satellite imagery	**Unit:** metric ton C per hectare tree canopy per year **Source:** EPA State Inventory Tool (MN)

Appendix B – Greenhouse Gas Reduction Documentation

The GHG reductions for each measure were calculated by a professional with over a decade of carbon accounting experience based on professional engineering estimates combined with data sources and tools provided by the federal government. Estimates are based on the latest available data and are specific to the upper Midwest region. Multiple sources, tools, and approaches were evaluated to ensure the methods used are high-quality, thorough, reasonable, and comprehensive.

General

Reference scenario

The reference case scenario for this plan is business-as-usual, where no new trees are planted, tribal facilities continue to use the same amount of electricity and fossil fuels as in their baseline period, and no solar PV systems are added within the SMSC. This plan focuses on near-term projections, which do not account for external, anticipated changes to the electric grid mix compared to recent historical data.

Greenhouse gases

The greenhouse gas calculations include estimated reductions for carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride, as relevant to each emissions source. All included greenhouse gases are translated into metric tons of carbon dioxide equivalents (t CO_2e) using global warming potentials from the 2013 IPCC AR5 Fifth Assessment Report.[9]

Electricity emissions rates

Burning fossil fuels to generate electricity emits large amounts of carbon dioxide and smaller amounts of methane and nitrous oxide. A small amount of sulfur hexafluoride – used for insulating transmission and distribution equipment – is also generated; however, since these emissions are less than 1% of the electric power sector's total (and with limited data available), this greenhouse gas is excluded from these calculations.[10]

The emissions impacts of electricity efficiency and on-site generation are calculated using an emissions factor that represents the emissions per MWh that will be avoided due to purchasing less electricity from the grid. As noted in the EPA's Greenhouse Gas Equivalencies Calculator, a marginal emissions factor is most appropriate for estimating the impact of changes in electricity needed from the grid to reflect the displacement of marginal (rather than baseload) power plants.[11]

This plan calculates near-term avoided annual emissions using a carbon dioxide emissions factor of 759.1 kg CO_2/MWh. This is the 2022 average marginal emission rate calculated for distributed PV in the Midwest region by the U.S. Environmental Protection Agency (EPA) using the EPA's AVoided Emissions and geneRation Tool

[9] Greenhouse Gas Protocol, Global Warming Potential Values, GWP values for 100-year time horizon, accessed March 1, 2024. https://www.ghgprotocol.org/sites/default/files/ghgp/Global-Warming-Potential-Values%20%28Feb%2016%202016%29_1.pdf

[10] U.S. EPA, Sources of Greenhouse Gases Emissions, accessed March 5, 2024. https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions#electricity

[11] U.S. EPA, Greenhouse Gases Equivalencies Calculator – Calculations and References, accessed March 1, 2024. https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references

(AVERT), v4.1.[12,13] While this number was calculated specifically for distributed PV, it is within 0.2% of the values calculated for portfolio and uniform energy efficiency projects in the Midwest.

AVERT is intended to be used to evaluate near-term changes in emissions from electric power plants caused by increased energy efficiency and/or renewable energy being added to the system, and the calculations assume that no power plants will be retired in response to the modeled change in load.[14] The AVERT Avoided Emissions Rates were used rather than results from using the AVERT Excel Edition due to the excess "noise" in model runs at the scale of these projects.[15]

Since AVERT does not estimate nitrous oxide or methane emissions, these greenhouse gases were estimated separately using 2022 eGRID data for the MROW region.[16] Non-baseload output emissions rates for all fuels were used to reflect marginal rather than average emissions. These were translated into carbon dioxide equivalents using 100-year AR5 global warming potentials. Overall, this results in a near-term emissions rate for avoided electricity of 764.6 kg CO_2e/MWh.

Uncertainties

This emissions rate has a high level of uncertainty. The primary limitation of the near-term emissions factor from AVERT is that it reflects recent historical marginal emissions rates, not accounting for upcoming changes to the grid. Additionally, this rate is aggregated at the regional scale, causing Minnesota's carbon-free electricity standard to be diluted across the region.[17]

Utility gas emissions factors

Burning utility gas (also known as natural gas) emits carbon dioxide, methane, and nitrous oxide. Since emissions per unit of gas burned does not change significantly over time, estimating avoided emissions from utility gas reductions can use the same emissions factors as the greenhouse gas emissions inventory. The source for this is The Climate Registry's 2023 Default Emission Factors. The carbon dioxide emissions factor is from Table 1.1, based on the "US Weighted Average". The factors for methane and nitrous oxide are from Table 1.10 for Residential and Commercial End-Use Sectors (vs. Industrial or Energy Industry).

Measure 1: solar PV systems on tribal facilities

The foundation for the solar PV estimates is a report called "Phase 3 Final Deliverables" (December 15, 2023) for the Shakopee Mdewakanton Sioux Community Solar Feasibility Project, conducted by WSB Engineers (WSB). This reports the findings from a solar feasibility analysis of 15 sites within the SMSC, including recommended system sizes and layouts, energy generation estimates, an overview of any electrical and structural upgrades

[12] The EPA uses AVERT to estimate annual average marginal emission rates for each region. The version used for this analysis is called "AVERT v4.1 Avoided Emission Rates 2017-2022 (April 2023)," accessed March 1, 2024. https://www.epa.gov/avert/avoided-emission-rates-generated-avert

[13] The published emissions factor was translated from lb CO_2/MWh to kg CO_2/MWh using the standard conversion factor of 1 metric ton = 2,204.6 lbs.

[14] U.S. EPA, AVERT Overview, accessed March 1, 2024. https://www.epa.gov/avert/avert-overview-0

[15] See U.S. EPA, AVERT Questions and Answers, question number nine (Is there a bound on the smallest change that is appropriate to model?) for more information, accessed March 1, 2024. https://www.epa.gov/avert/avert-questions-and-answers#A9

[16] U.S. EPA. Emissions & Generation Resource Integrated Database (eGRID), 2022. Washington DC: Office of Atmospheric Protection, Clean Air Markets Division, 2024. https://www.epa.gov/egrid.

[17] M.S. 216B.1691, subd. 2g. https://www.revisor.mn.gov/statutes/cite/216b.1691

needed, project cost estimates, and cash flow models. The avoided greenhouse gas emissions from each system were estimated by LHB.

System size

The optimal solar system size (kW AC) for each site was recommended by WSB based on the site's available rooftop area (from aerial photography), electricity use, electrical equipment and infrastructure, and structural capacity, along with the electric utility's interconnection requirements and substation and feeder capacity. For some sites, this represents maximizing the available roof area. However, for many others, the optimal size was determined to be the maximum size (100 or 150 kW AC) allowable for participation in standard rate structures that allow excess generation to be sold to the utility provider.

Electricity generation

WSB and partner Apadana Solar Technologies proposed a preliminary layout for each site based on the optimal system size and used this layout to estimate the annual and 30-year solar generation (kWh). Year one generation was estimated within Aurora, an advanced, industry-standard simulation software that uses over 30 years of weather data from local airports (TMY3 dataset) to incorporate the impacts of weather into the production estimate.

The models use specifications from ZNShine's Monocrystalline 550 Watt Bi-Facial Tier 1 Panels for most of the systems and ZNShine's Monocrystalline 410 Watt Tier 1 Panels for several of the smaller systems (<50kW). They incorporate SolarEdge inverters and power optimizers that improve performance in shaded conditions.

Shading was simulated on every PV module using LIDAR data of nearby buildings and trees. Other system losses outside of shading include modules mismatch, connection, wiring, soiling, snow, and other losses. Because of the high snowfalls experienced in Minnesota, WSB has custom tailored snow loss calculations based on real-world solar production data from their systems, resulting in losses of 10% in December and March and 23% in January and February. For the modeled systems, this resulted in a DC capacity factor of 12.1% to 15.2%.[18]

Uncertainties

While there is uncertainty involved in estimating electricity generated from a PV system due to the many variables impacting system losses, these engineering estimates are a conservative best guess. In comparison, using the default values for distributed PV in the Midwest region that are built into EPA's AVERT produce generation estimates that are 9% higher.

Year-to-year variations in solar radiation and snow conditions cause some years to have higher or lower generation than the typical year. Based on 30 years of historical weather data for the nearby Minneapolis, Minnesota, the National Renewable Energy Laboratory has calculated that an open rack PV system has a 90% likelihood of generating at least 95% of a typical year's production and a 10% chance of generating more than 102% of the typical year's output.[19]

[18] Capacity factor is the ratio of the annual average energy production (kWh) of the system divided by the theoretical maximum annual production were it to operate at its peak rated capacity every hour of the year. Formula: Annual Production (kWh per year) / (System Size (kW DC) * 8760 hours per year)

[19] Ryberg, D. S., Freeman, J., Blair, N.; "Quantifying Interannual Variability for Photovoltaic Systems in PVWatts." NREL Technical Report, October 2015. https://www.nrel.gov/docs/fy16osti/64880.pdf

Another factor that can impact generation is system malfunctions. This is planned to be minimized for these systems through module-level monitoring, enabling remote troubleshooting to reduce operation and maintenance costs and system downtime.

Measure 2: Building efficiency and electrification

The priority energy conservation measures for SMSC facilities were developed by engineers from Windward, define sustainability, and TRANE in consultation with SMSC facility managers. The starting point for these measures was a study led by Windward in 2021 and 2022 that evaluated opportunities for energy efficiency, waste heat/energy recovery, ultra-low-GWP refrigerants, electrification, and renewable energy across nearly all of the SMSC's Gaming Enterprise and Tribal Operations buildings. Over 150 measures were identified by analyzing how each building's current energy use compares with a typical (benchmark) building, reviewing building-specific architectural, mechanical, electrical, and plumbing drawings, conducting site assessments, and communicating with facility managers. These were prioritized into a shorter list of measures that replace end-of-life equipment, have short payback periods, and/or can achieve low-cost GHG reductions. The top measures from the 2022 report were re-evaluated in 2023-2024 by Windward, define sustainability, and TRANE during a series of site visits and additional communication with facility managers. In addition to removing measures that have already been completed, measures were prioritized for inclusion in the SMSC's PCAP based on the practicality of near-term implementation, the acceptability to the facility managers, and the savings potential.

Energy savings

Annual electricity and gas savings were estimated by engineers at Windward and TRANE using one of several approaches. Many of the measures were modeled in eQuest, which involved creating a baseline model calibrated to the current energy use of the building (as tracked by the SMSC from utility data in B3 Benchmarking) and then applying the energy conservation measure to the model. Savings were more loosely estimated for several measures by applying a generalized savings percentage for the technology's application in comparable projects to the building's historic energy use. The breakdown between energy used for space conditioning versus baseloads (such as lighting) was estimated as needed based on an analysis of monthly energy data from B3 Benchmarking. These energy savings estimates are based on averages from the time period that data is tracked in B3 Benchmarking (typically about ten years), which helps avoid anomalies due to weather or atypical operations.

Measure 3: Thermal Energy Networks

SW Campus energy savings

The foundation for the GHG reductions for the SW Campus thermal energy network is a report called “SMSC South-West Campus Energy Model Methodology Report” (March 14, 2024), conducted by Windward Engineers.

Annual electricity and gas savings were estimated by engineers at Windward using an IESVE energy model calibrated to historical energy use. IESVE – developed by global climate tech company IES – is an industry-leading software for whole-building performance simulation. This process involved modeling all the facilities included in the SW campus: Dakotah! Sport and Fitness Center (with two NHL ice arenas, a fitness center, an indoor pool, a physical therapy center, a bowling alley, and office and administration areas), the LINK Event Center, PlayWorks Daycare Center, and the Golf Maintenance Facility. The existing mechanical systems were determined for each facility using SMSC’s existing drawings – including all expansions and renovations – in addition to site visits. Zones were combined into similar groups to reduce system complication.

The energy model of the existing systems was calibrated to reflect the baseline monthly electricity and utility gas consumption data for the facilities, which is tracked by the SMSC within Minnesota's B3 Benchmarking program. Due to software limitations in modeling the air-cooled chillers used for ice creation and maintenance in the ice arenas, Windward manually adjusted the model results to incorporate this energy consumption based on typical values for NHL ice arenas.

Once the baseline energy model was fully calibrated, Windward modeled replacing the existing systems with a centralized ground-source heat pump and adding heat recovery to the ice chiller system on the second ice arena, with waste heat sent to the ground-source heat pump loop during the heating season.

This energy modeling estimates that this measure will reduce annual electricity use by 9% and gas use by 59% from the baseline. This equates to a 35% overall reduction in energy use, shifting from a baseline annual energy use intensity for the campus from 169 kBtu per square foot to 110 kBtu per square foot.

Uncertainties

Uncertainties are inherent in energy modeling and results will vary based on factors such as weather and facility management. However, the process used here of calibrating an energy model to the historic energy use helps reduce some of these uncertainties. This approach is much more accurate than assuming energy savings percentages based on typical implementation of this type of strategy – especially for such a complex group of buildings – and is more detailed than using a simple box model.

Gaming Enterprises Central Plant energy savings

Energy savings associated with projects at the Gaming Enterprises Central Plant were estimated by engineers at HGA. Due to limitation of available energy modeling software to simulate the sequences use for full heat recovery engagement, these estimates were conducted using proprietary Excel spreadsheet-based analyses that derive operating curves for chillers, towers, heat recovery chillers, pumps, and boilers. In these tools, each air handling unit's psychometrics are analyzed as the outdoor air is varied to accomplish the energy recovery. Based on historical weather data, the hourly performance for the plant is calculated based on hourly load and weather variations and equations for the varying performance of each piece of equipment. HGA's models have been validated against the energy performance of completed projects and have been reviewed by Xcel Energy for use as the basis for two awarded energy savings rebates.

Measure 4: New Woodlands

Trees absorb carbon dioxide from the air and store it as carbon within their roots, trunks, and branches, meaning strategies that increase the amount of biomass within a community contribute to removing carbon dioxide from the atmosphere.

Carbon dioxide removals

The cumulative amount of carbon dioxide removed from the atmosphere and sequestered in restored woodlands was calculated on a per acre basis using the i-Tree Planting Calculator version 2.7.0 for Prior Lake, MN, based on the tree species and densities specified in the planting plan developed by SMSC's Land and Natural Resources department. All trees are assumed to have a initial diameter at breast height (DBH) of 1 inch, be in excellent condition, and be planted in full sun at a distance of over 60 feet from the nearest building (meaning that the results do not include impacts of new trees on building energy use). The default annual tree mortality rate of 3% was used.

Unlike other measures, the annual impacts of trees on air pollution and carbon dioxide levels vary over time as the trees grow. The annual values were calculated for Year 5 to provide a standard point of comparison to other measures. Since i-Tree provides cumulative - not annual - values, Year 5's annual sequestration/removals were calculated by running the i-Tree model once for a time period of 5 years and once for a time period of 4 years. The difference between these two runs is assumed to be the annual impacts in Year 5.