WHERE THE FOREST MEETS THE PRAIRIE

Todd County

MINNESOTA • EST. 1855

BOARD OF COMMISSIONERS

Work Session Agenda

Tuesday, June 2, 2026

10:45 AM

or immediately following the regular board meeting

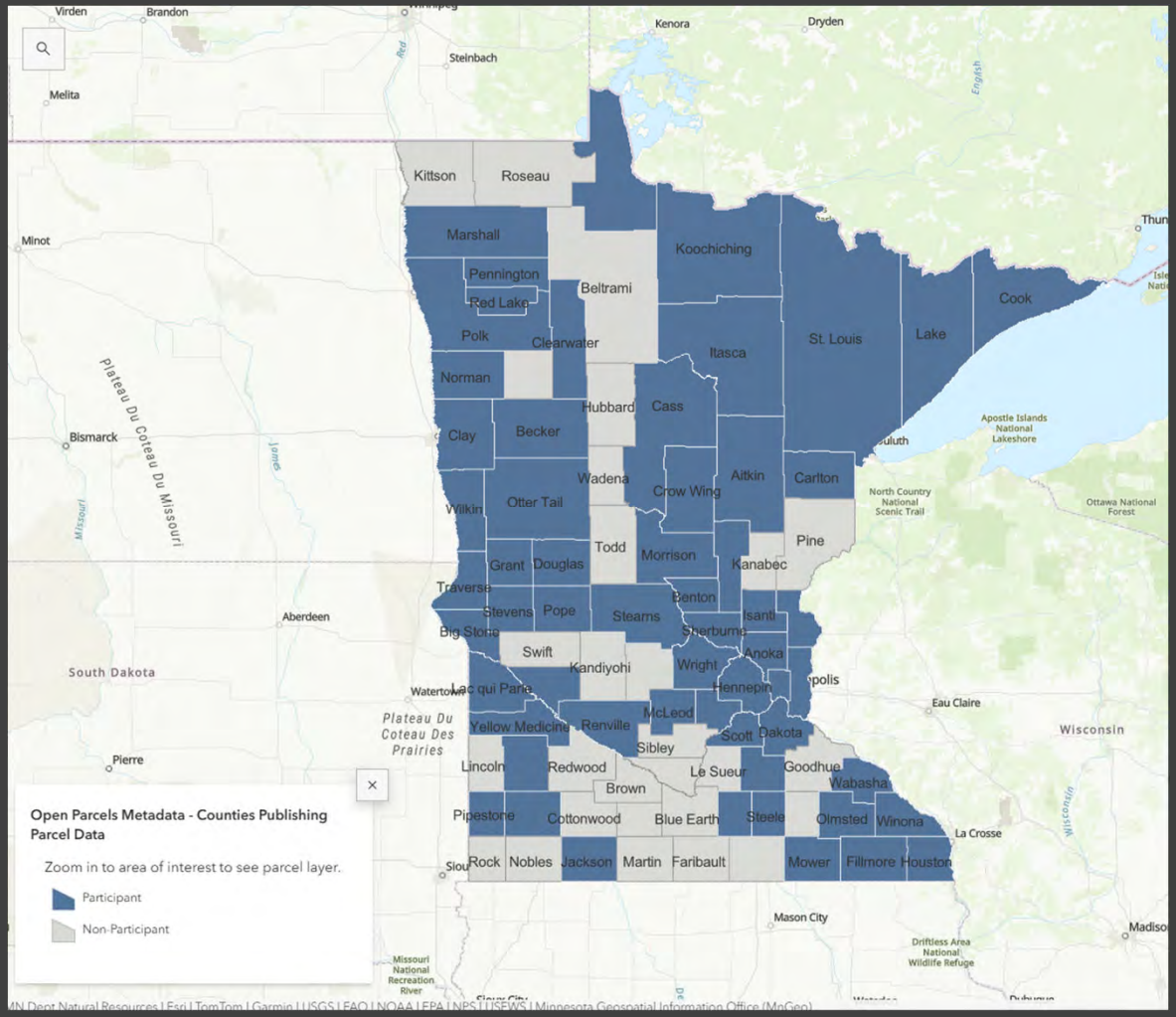
Meeting to be held in the County Board Room
at the Historic Courthouse, 215 1st Ave S, Long Prairie, MN.

MEETING WILL BE LIVE-STREAMED AT: HTTPS://WWW.TODDCOUNTYMN.GOV

Agenda Item #		***Agenda Time:***
1	**Open Data Sharing with the State of MN - NG911** ***Kim Bosl & Thomas Krivanek, GIS***	10:45
2	**Todd County Expo Building, Energy Efficiency and Solar Potential Study** ***University of Minnesota Graduate Student Claire Nemmers***	10:55
3	**Data Practices/Data Request Web Page** ***Jackie Bauer, Coordinator & Policies Committee***	11:15

Commissioners may be in the Commissioner's Board Room prior to the board meeting proceedings.
The County Board will open the meeting at the posted time and reserves the right to alter the agenda schedule for business needs.

Minnesota Counties with open



Sharing of county address points, road centerlines, and emergency services zones requires no additional effort on our counties part. The data is already being submitted to the state for NextGen 911. The Geospatial Advisory Council (GAC) is simply requesting your permission to reuse that data to the benefit of all Minnesotans for various purposes.

Todd County Expo Building

County Savings, Energy Efficiency, and Solar Potential

Introduction

Me: Graduate Student at the University of Minnesota in the Science, Technology, and Environmental Policy program

The Project: Provide recommendations on alternative usage of the Expo building, energy efficiency, and solar potential to save money and generate additional revenue to Todd County during the two off seasons between hockey season and the fair

Stakeholder Interviews

- Hockey Association
  - Adam Knoblauch
- Agricultural Society
  - Mike Wielenberg
- Both organizations and the County would benefit from upgrades and increased events hosted at the Expo Building

Building Usage

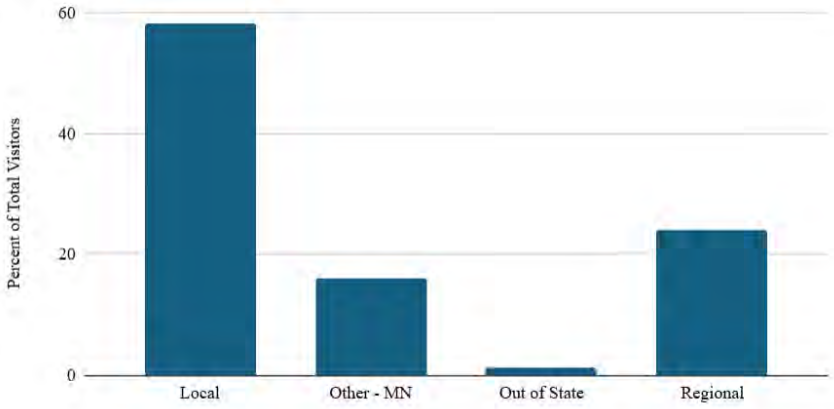
- Current rate to rent: $425 on first day, $125 each additional day
  - Approximate O&M and electricity costs = $528 per day
    - Similar buildings in communities in Minnesota
  - Prices range from $75-$170 an hour and $200-$500 a day

- Communities
  - Le Sueur
  - Luverne
  - Red Wing
  - Itasca County
  - Sherburne County
  - Lake County

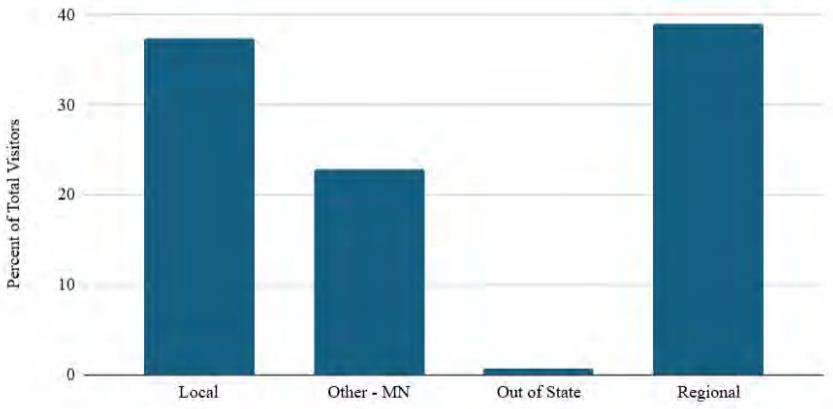
- Events hosted
  - Auctions
  - Car shows
  - Festivals
  - Markets
  - Student events

Mobile Data

- Tracked December 2024-summer of 2025
- 92% of visitors are considered local or regional
- Visits peak during the fair to around 2,000 people in a day
- Steady traffic of 500 visitors per week during hockey season



Todd County Fair



Hockey Season

Comprehensive Plans

Long Prairie

- Centers energy and environment
- Energy efficiency as 2nd project goal
- Solar panels in the community as 5th project goal

Todd County

- Environmental section
  - Encompasses energy efficiency
- Mentions establishing an approach for renewable energy projects

Energy Efficiency

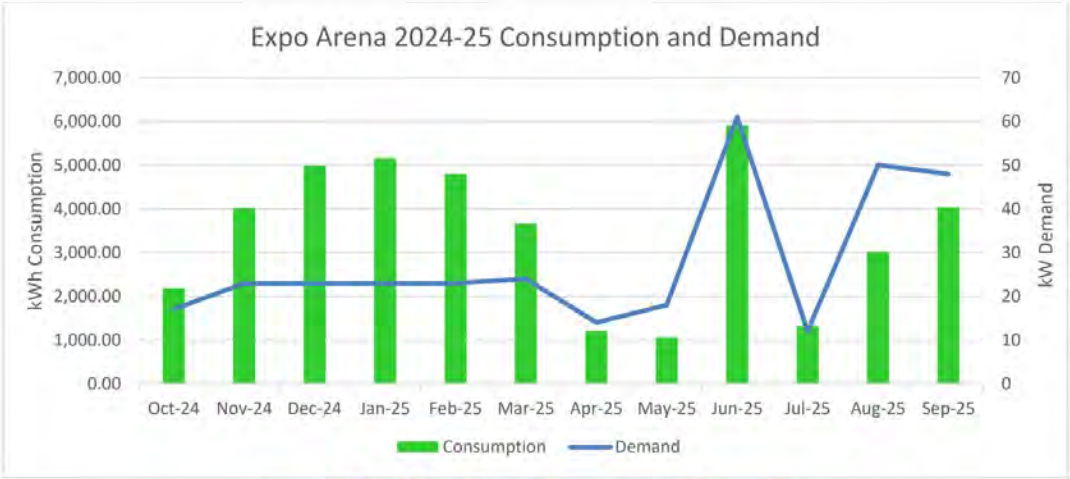


Figure 1: 2024-25 Expo Arena Consumption and Demand Data

- Minnesota Power Todd County Expo Arena Electric Energy Analysis
  - Power factor correction: save $2,059 annually, payback in 1.9 years
  - Variable frequency drivers: save $2,497 annually, payback in 3.8 years
  - LED lighting: save $1,057 annually, payback in 6.7 years

Refrigeration

- Todd County Ice Arena Refrigeration Study
  - Tune-up: save $541 annually, payback in 0.5 years
  - Controls: save $885 annually, payback in 3.0 years
  - Leaks: save $43 annually, payback in 4.6 years
  - Brine Pump VFD: save $206 annually, payback in 5.9 years

Refrigeration and Expo Arena Consumption Chart

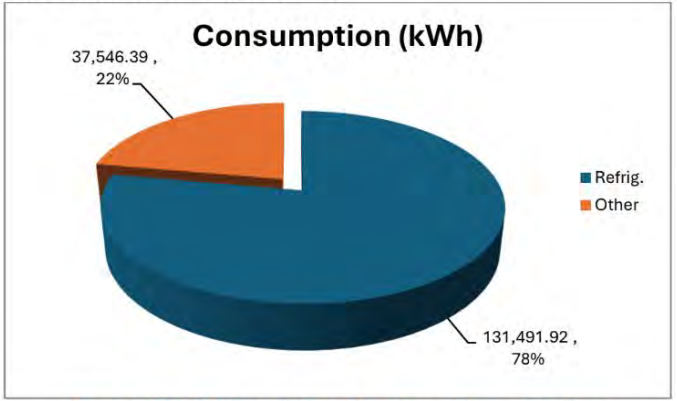


Figure 4: 2024-25 Refrigeration and Expo Arena Consumption Chart

Refrigeration and Expo Arena Demand Chart

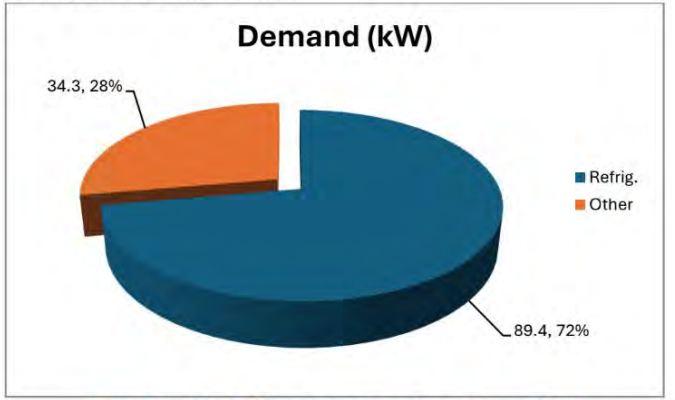
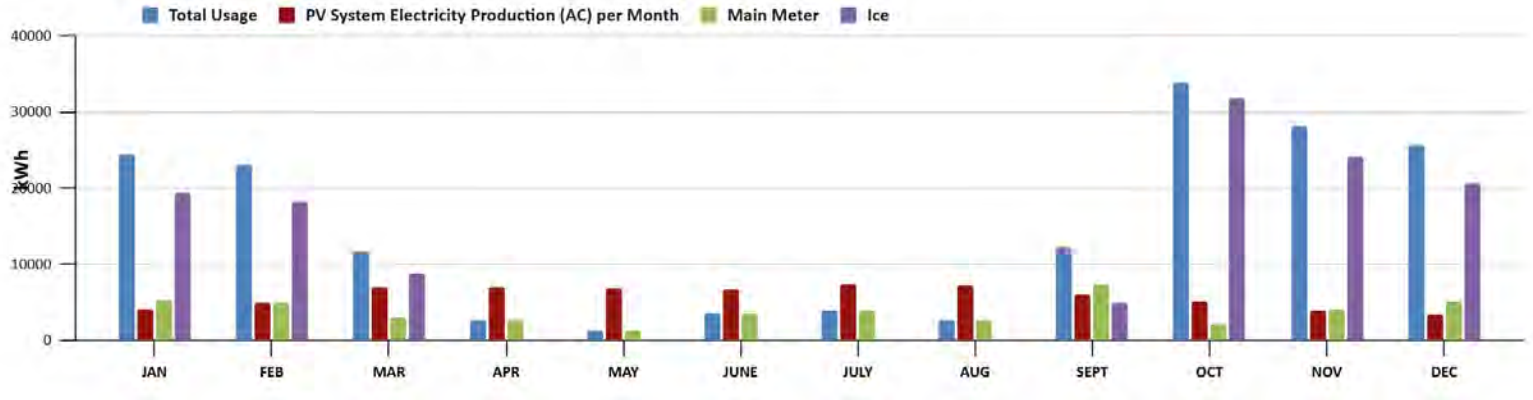


Figure 5: 2024-25 Refrigeration and Expo Arena Demand Chart

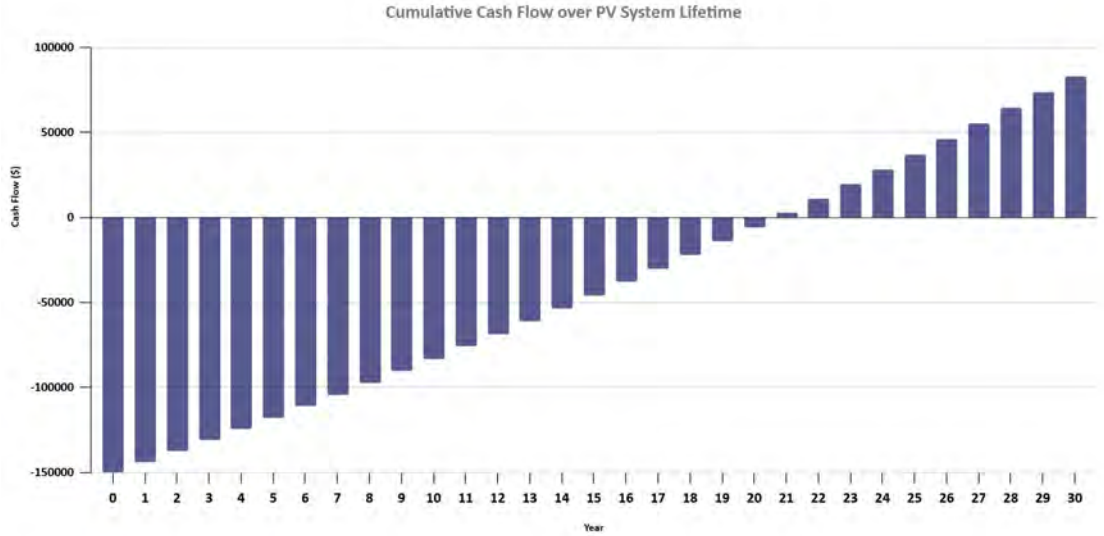
Solar Potential

- Expo Building is the best suited county building for solar generation
- Solar Site Assessment
- Assumptions
  - $3/Watt
  - 50 kW (DC) system
- Electricity usage is compared to potential solar production
  - 50 kW system produces 40% of annual usage



Solar Financials

- Net metering rate
- 21.0 year cost recovery
- Payback of 25.7 years
- ROI of 3.9%
- Energy efficiency upgrades will decrease payback time



Conclusion

- Marketing the Expo Building and hosting more events could provide revenue to Todd County
  - Todd County Chamber of Commerce
- The three energy efficiency upgrades provide significant cost savings and fast payback periods
- Solar installation would be valuable, however has a long payback period

Reflection

- New skills I gained
- Skills I improved
- What I learned
- How the project impacted me

Thank you!

Questions?

Todd County Expo Building

Energy Efficiency and Solar Potential

Author: Principal Author, Claire Nemmers, Graduate Student

Contributors:
Jan Jackola, Outreach Specialist, Central Regional Sustainable Development Partnership
Heidi Auel, Regional Coordinator, Clean Energy Resource Teams
Jackie Bauer, Todd County Coordinator

This report was created by a University of Minnesota graduate student, serving as a graduate research assistant on a community-based research project, in which Extension's Regional Sustainable Development Partnerships collaborate with community partners. Funding for this project was provided by the University of Minnesota Extension Central Regional Sustainable Development Partnership

Central Regional Sustainable Development Partnership
University of Minnesota Extension

CERTs Clean Energy Resource Teams

Where the Forest Meets the Prairie
Todd County
Minnesota Est. 1855

TABLE OF CONTENTS

INTRODUCTION

The Todd County Expo Building located in Long Prairie, Minnesota 56347 is a 26,529 square foot (3) facility that doubles as a hockey arena. The building functions as an ice arena from September 15th through March 30th. It is comprised of three main sections; the ice sheet and viewing bleachers, the concession stands and a second floor viewing area, and an area that houses locker rooms and bathrooms. During hockey arena season, the building is leased to the Long Prairie Hockey Association. Their rent payment covers the use of the building and parking lot, utilities including water, sewer, gas, and electricity, and more (9). The Hockey Association itself is responsible for the cost of snow removal, water heaters, and damages.

During the month of June, the Agricultural Society leases the building to host cows and goats for the Todd County Fair. The livestock are housed on the dry floor where the ice is located during the winter. The second floor viewing area is used for showmanship and judgement of the animals. In the summer, when the Todd County Agricultural Society is a tenant of the building for the fair, they are responsible for paying the utilities including electricity, garbage, and water services for the month (2).

The purpose of this report is to address stakeholder concerns and provide recommendations on alternative usage of the building to save money and generate additional revenue to Todd County during the two off seasons between hockey season and the fair. The report also covers current building usage utilizing data from mobile device tracking (10) and assessing visitors that are coming to the Expo Building. Additionally, this report contains analysis surrounding an Electric Energy Analysis (14) conducted by Minnesota Power and recommendations on energy efficiency upgrades including return on investment figures. Lastly, the report studies the potential for a solar generation installation on the roof of the Expo Building providing a solar site assessment that includes cost estimates and other financials.

DUAL USE

Stakeholder Needs

To assess stakeholder needs, interviews were conducted with the president of the Long Prairie Hockey Association and the president of the Todd County Ag Society. The Agricultural Society pays for electricity

during the fair, so they are hoping that potential energy efficiency upgrades and solar installation would reduce their utility costs. The Hockey Association owns the compressors used to cool the ice, which use large amounts of electricity. The addition of efficiency upgrades on the compressor motors would lower electricity costs. Both the Hockey Association and Agricultural Society are supportive of the upgrades. They also have good partnerships with the county and hope to be able to give back to the community with their respective events. Both stakeholder groups would also like to see the building used more during the off season as it is one of the only buildings of its size in the area and would increase county revenue.

Alternative Building Usage

Currently, the rate to rent the Expo Building is $450 for the first day and $125 each additional day. Approximate annual costs of maintaining and operating the Expo Building are $1,535 for garbage service $4,000 for lawn mowing service, $8,970 for natural gas, and $5,000 for fairgrounds maintenance. The annual electricity cost for 2025 was $173,047. This results in an average daily cost of $527.54. Many similar buildings in communities like Long Prairie host more events to recover these costs.

Other communities that have multi-purpose buildings that house their hockey arena are Le Sueur, Luverne, and Red Wing. In Le Sueur County, the building that they use as their ice arena during the winter is available to rent for dry floor activities. These activities include things such as auctions, business expos, car shows, and more. The dry arena can be rented for $75.00 per hour, not including tax.
In Luverne, the ice arena is used for hockey camps and other events during the summer. The Prairie Island Arena in Red Wing is available to rent during ice and dry floor seasons. The rental rate for their ice season, which runs from November through March, is $170 an hour. During dry floor season, the space can be rented for $31 an hour plus staffing costs. Nonprofit and for-profit organizations are additionally able to rent the building by the day, with those prices being $200 and $500 respectively.

Some other counties, like Todd County, own the fairgrounds property. In Itasca County, the County Fairgrounds Park is used for car shows, horse activities, festivals, student events, and the county fair (1). Sherburne County additionally owns property at the Sherburne County Fairgrounds (8). The Lake County Fairgrounds and Event Center, where the county owns property, hosts antique and flea markets, RV outlet shows, arts and crafts shows, home and garden shows, and more (9). The events that could be hosted at the Expo Building depend on where current visitors are coming from, a more local crowd that is likely to be around for these events, or visitors from further away who would have to travel.

Mobile Data

In order to assess who is currently visiting the Expo Building, a mobile data study was conducted. The study was originally done for tourism and economic development purposes. This information is valuable to this report because it identifies who the Expo Building is drawing to Long Prairie; where they are

coming from, and where they stop before and after their visit to the Expo Building. Starting December 2024 and through the summer of 2025, mobile data was tracked to determine where visitors to the Todd County Expo Building were coming from. Locations are tracked on mobile device apps. The data does not include minors or people without a mobile device. The study discovered that most visitors come from the regional area, within 50 miles of the Expo Building or closer.

Nearly 92% of visitors are considered local or regional (10). Visits peak during the fair to around two-thousand visitors. There is steady traffic in the winter when the building is used as an ice arena with an approximate average of 500 visitors per week. Most visitors spend over 150 minutes at the building. 6.2% of visitors stop at fast food restaurants after visiting the Expo Building and 4.9% stop at gas stations. This suggests that Long Prairie is getting additional business from people who visit the Expo Building.

In further analysis, the mobile data was split into two time frames: one of when the building functions as a livestock area for the fair, and the other when the building functions as a hockey arena. The time frames for visitor counts were May 5th, 2025 to July 7th, 2025 for the fair, and October 1st 2024 to March 31st 2025 for the hockey audience. Both time frames further analyzed visitors who were coming to the Expo Building. Local visitors are considered visitors within the county, regional visitors are visitors that come from counties within 50 miles of the Expo Building, statewide visitors are visitors that come from within the state but outside the 50 mile radius, and out-of-state visitors are visitors who come from outside of Minnesota.

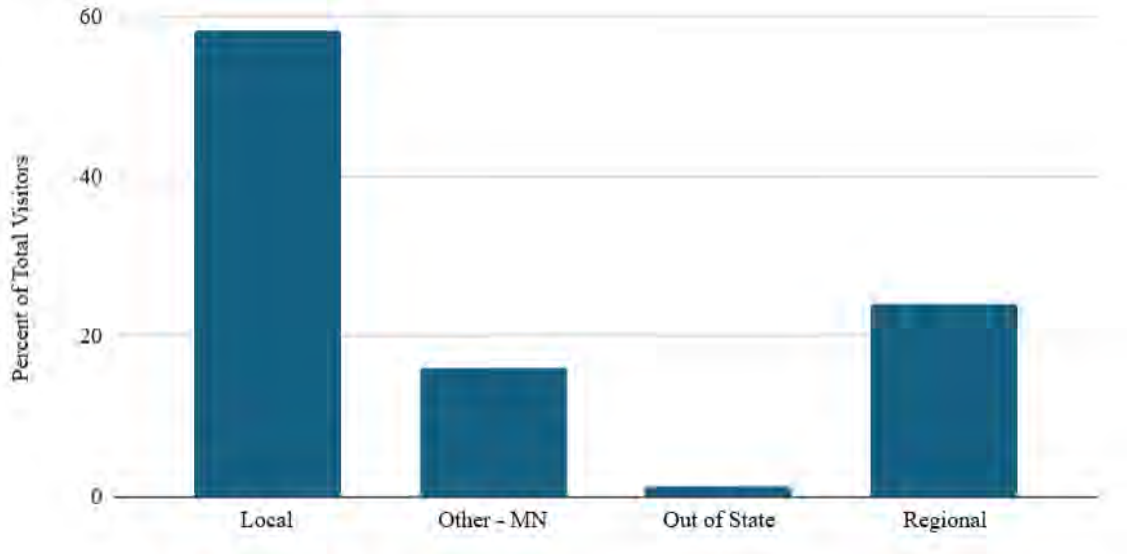


Figure 1: Percentage of total visitors represented by distance traveled during the Todd County Fair (10)

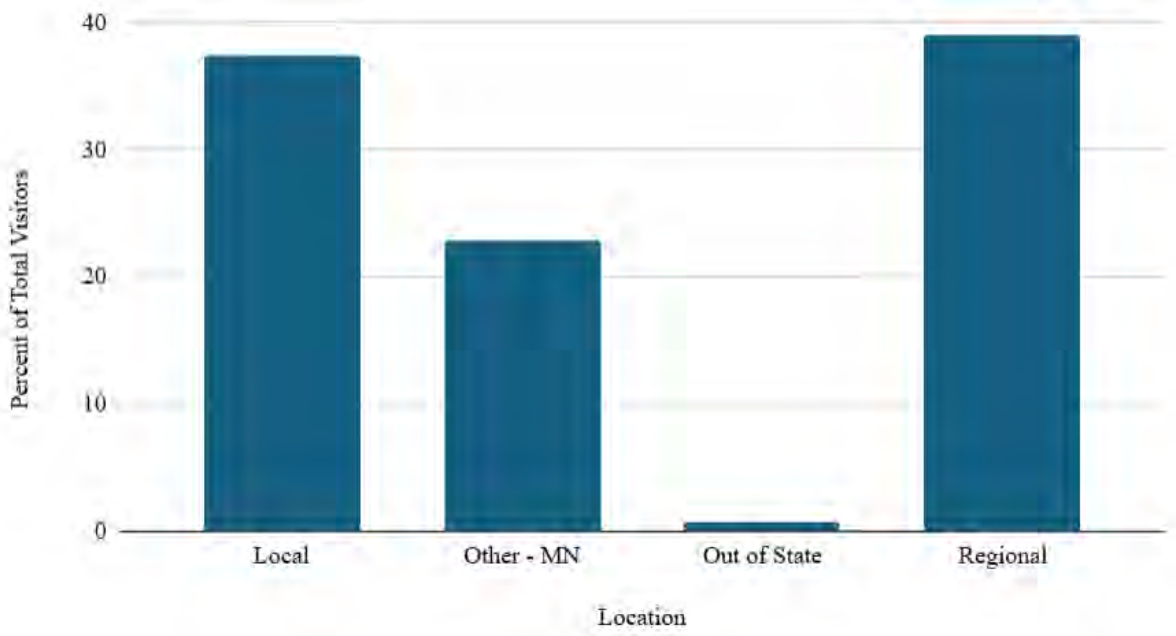


Figure 2: Percentage of total visitors represented by distance traveled during hockey season (10)

As you can see from the charts, the Expo Building mainly pulls visitors from the local region, those who live within the county. During the Todd County Fair, nearly 60% of visitors come from within the county (10). When the Expo Building functions as a hockey arena, 37% of visitors are local, and 39% of visitors are regional (10). This makes sense as the ice arena gets many regional visitors as they are traveling for hockey games. The large number of regional visitors to the hockey arena suggests that the Expo Building may be these regional visitors' only knowledge and impression of the community of Long Prairie. Additionally, it is important to take into consideration the local perspectives as they are going to be most affected by the changes in visitors to the ice arena. Business owners and other employees in Long Prairie will be impacted.

Comprehensive Plans

The Comprehensive Plans of both Long Prairie and Todd County are important to this report because they contain residents' future priorities and wants for their communities. Both energy efficiency and solar energy are mentioned within the plans.

Long Prairie

The draft of the Long Prairie Comprehensive Plan from February 2025 states that the City of Long Prairie wanted to be intentional about creating a plan that centered energy and environment. A community survey conducted for the plan highlighted many areas of environmental concern. These included air quality, odor control, energy efficiency on city-owned properties, regulations within the city for climate resilience, and improvements to public waste management (11).

Energy efficiency is listed as the second project goal that was curated from the survey results. Under the category is promoting transitions to LED lighting in residential and commercial properties, partnering with utilities that provide energy efficiency rebates and incentives, and conducting workshops to spread awareness on the benefits of energy efficiency (11). The fifth project goal is to get solar panels in the community. This section includes identifying grant and funding opportunities, collaborating with power companies on solar installation incentives, and creating educational resources about solar energy (11).

Todd County

In the newest draft of the Todd County Comprehensive Plan, there is an environmental section that encompasses energy efficiency, stormwater management, soil, waste, and parks & recreation (12). The environmental section mentions that the plan considers establishing a balanced county approach for evaluating renewable energy projects, specifically solar farms. This includes developing site evaluation criteria that balance the protection of agricultural land and natural resources with economic development and landowner interest. Additionally, the plan aims to encourage renewable energy development in previously disturbed or developed areas. Coordinating with landowners, developers, and local government early in the planning process for optimal siting options and aligning solar permitting with environmental preservation and county ordinances is also in the plan. To help accomplish these energy and environmental goals, an Electric Energy Analysis was completed.

Energy Efficiency

This summary outlines the energy efficiency recommendations in the Electric Energy Analysis that was conducted by Minnesota Power and the costs associated with the upgrades. The analysis also includes energy savings, cost saved per year, and pay back rates.

Introduction

An Electric Energy Analysis was completed by Minnesota Power. Minnesota Power is the generation and distribution utility that provides electric services to Long Prairie and much of Todd County. An Electric Energy Analysis is done to quantify and understand the way that electricity flows within a system. The examination involves collecting data over a specific time period to create a comprehensive profile of energy usage (13). It discovers consumption patterns and where the most energy is being consumed. This is vital to determine the best ways to save energy resources and use less energy overall.

Energy Analysis

The Todd County Expo Arena Electric Energy Analysis, conducted in September of 2025, contains multiple suggestions to increase the energy efficiency of the Expo Building. The top recommendations for energy use implementations in the building include adding power factor correction capacitors, installing variable frequency drivers on motors, and replacing all lighting with LED options. Other potential improvements are installing occupancy sensors, timer controls to lighting, a heat reclaimer, and purchasing new appliances. More research would be needed to determine costs associated with these other improvements. Outlined below is the breakdown of the top three suggestions from the Energy Analysis.

Adding power factor correction capacitors will improve power factor, decreasing utility charge. A higher power factor means that there is more energy that is doing work rather than being wasted. Installing correction capacitors at the electric meter will increase the power factor. Any power factor that is lower than 90% is charged additional fees by the utility, so increasing the power factor will eliminate these fees. This project is projected to cost $3,816 with annual savings of $2,059, meaning the upgrade will pay back in 1.9 years.

Installing variable frequency drives will optimize the performance and energy consumption of compressors and motors. Variable frequency drivers additionally extend the life of motors and cause them to require less maintenance. This is predicted to reduce electricity usage by 35.3%. The cost of installing the drivers will be $9,479 after an approximated $1,261 rebate from Minnesota Power. The upgrade will save $2,497 annually, leading to a payback of 3.8 years.

LED lighting uses 50% less electricity than fluorescent lights and 85% less than incandescent. LEDs additionally have a longer lifespan than other lighting. Replacing the rest of the lighting in the Expo Arena with LEDs will reduce electricity usage by 4.0%. The cost of this project would be $7,075 after a $980 rebate. The project will save $1,057 a year. The payback period for this upgrade is 6.7 years.

Completing all three of the aforementioned suggestions will reduce electricity use by 39.3%, save $5,614 a year, pay for itself in 3.6 years, and cost $20,370 total after rebates (14).

Rebates

Minnesota Power offers rebates and incentives for projects that help save energy or reduce carbon emissions. The incentives are determined by the amount of energy savings and depend on program funding. Rebates are issued six to eight weeks after the project has been verified and processed. The rebates offered include lighting, HVAC/heat pump, appliance, refrigerator and freezer recycling, and food service equipment rebates. The two rebate categories in the energy analysis for the Expo Building are lighting and HVAC rebates, though there is potential for more energy and cost savings.

Refrigeration Study

In March of 2025, a refrigeration study was conducted. To save on energy consumption used for the refrigeration of the ice sheet in the hockey arena the following recommendations were provided. The Expo Building should add controls for the refrigeration system to maintain the ice at specific temperatures and reduce load during unoccupied times, conduct regular tune-ups on the chiller system to ensure proper operating conditions, fix refrigerant leaks to reduce supply cost and maintenance, and consider full equipment replacement costs and end of life conditions to understand savings on new equipment (17). Adding the VFDs mentioned in the energy analysis section of this report would also result in refrigeration and energy savings.

Completing a tune-up of the refrigeration system, refrigeration controls and leaks, and adding a VFD to the brine pump would result in annual savings of $1,675 and a 12.4% energy consumption reduction. This study is vital to the efficiency of the Expo Building as 78% of energy consumed is used for refrigeration (17).

Gaps in Knowledge

A gap in the analysis is that Minnesota Power stated that it was unclear if the CDD6000M6D ice condensing unit had variable speed capabilities, and that if the unit does not have the capability, it would be valuable to install a variable frequency driver on the compressor to increase savings. The facilities manager for the Expo Building confirmed that the ice condensing unit does not have variable speed capabilities, but the analysis does not include information on savings if a VFD were installed on this condenser as it was unclear at the time of the study. The study also does not encapsulate other energy saving measures such as insulation and the envelope of the building.

SOLAR POTENTIAL

Building Characteristics

The Expo Building would be a good site for a solar system for multiple reasons, including the roof being south facing, newly remodeled, and made of metal. South-facing roofs result in the most efficient solar energy production. This roof orientation is key in determining effectiveness of solar installation. Because of the sun's path in the sky in the Northern Hemisphere, south-facing panels capture the most sunlight (15). South-facing roofs are ideal for aiming to maximize energy produced and return on investment in solar energy.

Metal roofs have emerged as one of the most compatible surfaces for solar panel installations, offering durability, longevity, and efficiency benefits that complement solar technology perfectly. Metal roofs deliver exceptional long-term value when paired with solar panels. Their 40-70 year lifespan outlasts most solar systems (25-30 years), eliminating mid-life reinstallation costs (16). Metal's reflective properties also improve panel efficiency by reducing ambient heat which potentially increases energy production by 5-15% compared to other roof materials (16).

Solar Site Assessment

To determine the solar potential of the Expo Building, some assumptions are made. These assumptions include that the system cost in $/Watt is $3 and the system size will be 50 kW DC. Other roof characteristics and shading parameters were included as well. The initial cost of this system is estimated to be $150,000. Due to the recent loss of federal tax credits, there will not be any federal incentives that will contribute to cost reduction. The annual electricity usage of the Expo Building is 173,047 kWh/year (14). The annual electricity production of a 50 kW system will be 69,350 kWh/year, which accounts for 40% of annual electricity usage. Below is a monthly breakdown of electricity usage and electricity production using data from the Electricity Energy Analysis and production estimates from PVWatts.

Estimated annual kWh consumption:

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
kWh Usage	24,474	23,090	11,666	2,666	1,288	3,463	2,842	2,602	12,257	33,956	28,133	25,610	173,047
kWh Production	4,050	4,850	7,050	7.050	6,900	6,650	7,350	7,150	5,950	5,150	3,850	3,350	69,350

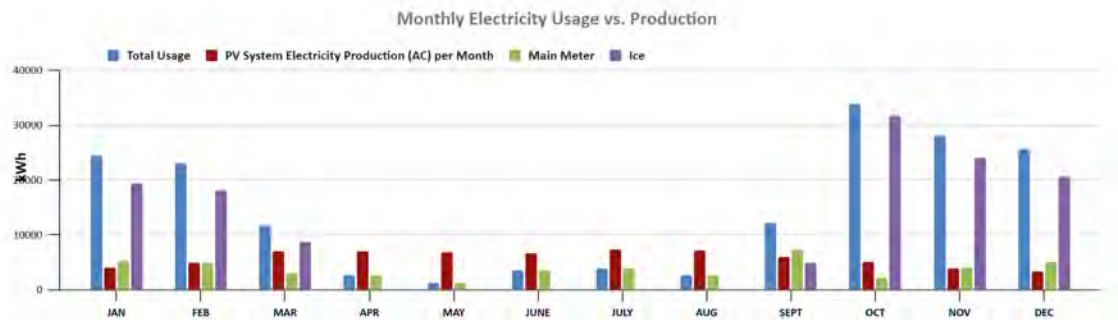


Figure 3: Approximate monthly breakdown of electricity usage and production from Solar Site Assessment

When production exceeds usage, Todd County will be able to sell electricity back to Minnesota Power through net metering. Minnesota Power's current buy back rate is $0.110/kWh. Utility inflation rate percentage is estimated to be 2.50%. These figures will result in 21.0 years until cost recovery paying for the solar array in full. Payback will take 25.7 years. The Return on Investment (ROI) of installing a solar system on the roof of the Expo Building is 3.90%. These values are estimated and will depend on specific developers and bids if Todd County moves forward with the project.

The payback period will likely decrease if energy efficiency upgrades are made as the upgrades will reduce energy consumption. This will allow the Expo Building to be able to sell more of the electricity produced by the solar panels back to Minnesota Power to increase net metering returns. Additionally, these figures could change with varying state and federal policy, like tax credits and incentives.
Below is a graph that details the approximate cash flow over the lifetime of the solar system with the current estimated values.

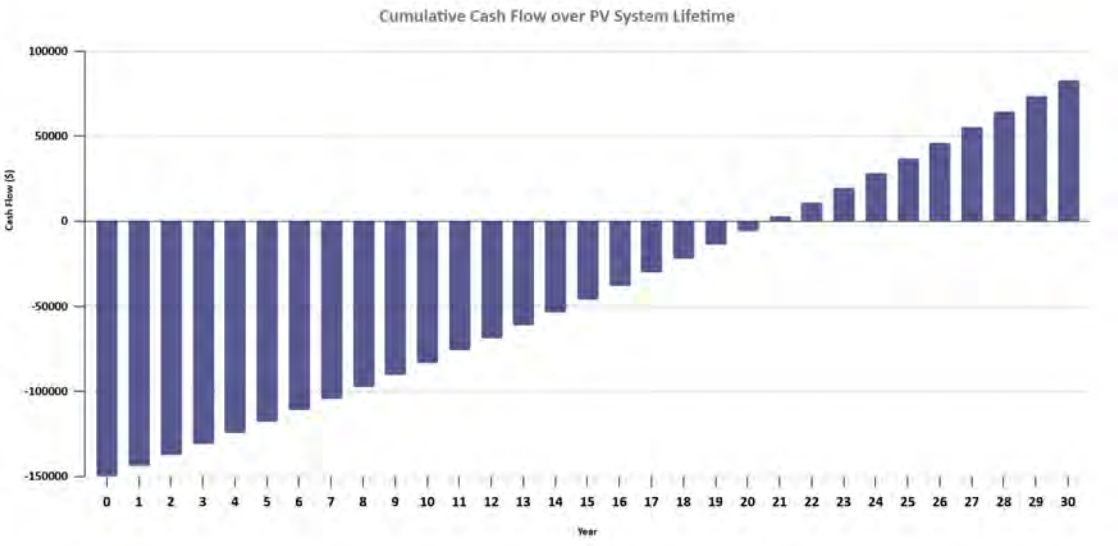


Figure 4: Approximate cash flow over the lifetime of the solar system from the Solar Site Assessment

Along with energy savings, a solar installation can provide other benefits such as an opportunity for education and sustainability. The ability to educate and inform the community about solar will increase knowledge of renewable energy and other important technologies. These types of visual demonstrations can increase interest in science, technology, engineering, and mathematics which can provide vital careers for students and encourage innovation. Solar panels also reduce carbon emissions of energy generation creating many benefits including cleaner air and water. Additionally, since solar energy comes from the sun, there is no fuel necessary to generate electricity. The power from the sun is nearly limitless. Both education and sustainability provide valuable benefits to the community of Long Prairie.

RECOMMENDATION AND CONCLUSIONS

In order for the costs to the county from the Expo building to decrease and for the building to generate county revenue, energy efficiency upgrades are recommended. The best energy efficiency upgrades for the building are adding power factor correction capacitors, installing variable frequency drives on motors, and replacing all lighting with LEDs. The pay back on all of these technologies are less than 10 years with capacitors paying for themselves in 1.9 years, frequency drivers in 4.7 years, and LED lighting in 7.4 years. Additionally looking into refrigeration tune-ups or replacement would be valuable. These upgrades will decrease electricity consumption and cause a decrease in costs for the county.

The solar installation could be valuable, but there is currently a lack of federal funding and incentives that cause the pay back period to be long. The average life cycle of a solar system is 25 years, with the current lack of grants this means that the 50 kW solar system if installed now will lose efficiency, producing between 80-90% of its original output four years after the 21.0 year cost recovery. Solar panels would be helpful to the county if federal incentives were to return in the coming years. The previous federal tax credits reduced the pay back period for solar panels by nearly 10 years. As mentioned in the building characteristics section, the Expo building would be a great candidate for solar installation compared to other county buildings.

Hosting more events and promoting the ability to rent out the Expo building will generate revenue for Todd County. This could be done in collaboration with the Todd County Chamber of Commerce. Residents and leadership can learn from neighboring, similar communities throughout the state how they use a spacious building like the Expo. Some of my personal favorite events that could gain traction in Todd County include auctions, car, garden, and craft shows, and antique markets. By hosting these events in the Expo building the county will be able to collect the renting fee income.

There are many opportunities encompassed in this report that will save costs and generate revenue for Todd County by further developing the Expo Building.

REFERENCES

(1) | Itasca County, MN. Accessed March 31, 2026. https://www.itascacountymn.gov/284/Fairgrounds-Park-and-Campground.
(2) Gaida, Denise. Ag Society Invoice. September 23, 2025. https://drive.google.com/file/d/11YZNV_yJ5vAeMaCUC6EGjY6kzysVMFqf/view?usp=sharing
(3) Ringdahl Architects, Inc.. EXPO BUILDING PLANS AND SPECS FOR BIDDING-File0001.Pdf. February 4, 2020. https://drive.google.com/file/u/1/d/1xm4ZOF2K4YT8PLb8PyA30TFXW4nd-kaN/view?usp=sharing&usp=embed_facebook.
(4) *Ice Arena | Le Sueur, MN - Official Website*. Accessed March 31, 2026. https://www.cityoflesueur.com/169/Ice-Arena.
(5) Lake County Fairgrounds & Event Center. *Event Calendar*. April 11, 2026. https://www.lcfairgrounds.com/events.
(6) Luverne Hockey Club. *Blue Mound Ice Arena*. Accessed March 31, 2026. http://luvernehockey.sportngin.com/page/show/697557-blue-mound-ice-arena.
(7) Prairie Island Arena | Red Wing Public Schools (MN). Accessed March 31, 2026. https://www.redwing.k12.mn.us/community-education-homepage/community-recreation/prairie-island-arena/.
(8) Sherburne County Fair. Accessed March 31, 2026. https://www.sherburnecountyfair.org/.
(9) Lease Agreement Between Todd County and the Long Prairie Hockey Association. September 15, 2024. https://drive.google.com/file/d/1F67xUQAybPtxYw-V7P-9-6RIjCkm7Wy-/view?usp=sharing
(10) LeMier, DeeDee. Mobile Data Findings Todd County Expo. December 16, 2025. https://drive.google.com/file/d/1OSr_Dq77HczC1P6RKNYt8IwDFMBixDYF/view?usp=sharing
(11) Bruder, Candace et. al. City of Long Prairie – Comprehensive Plan. February 2025. longprairie_compplandraft_publicreview.pdf
(12) Ossefoort, Adam et. al. Todd County Comprehensive Plan Update. March 2026. https://drive.google.com/file/d/184gq_V-3JtmKsA6wpzbEDzvpqMn8klCF/view?usp=sharing
(13) Engineer Fix. What Is Energy Analysis and How Does It Work? October 9, 2025. https://engineerfix.com/what-is-energy-analysis-and-how-does-it-work/.
(14) Bjerke, Jeremy. ELECTRIC ENERGY ANALYSIS. September 24, 2025. https://drive.google.com/file/d/1ZNVuwxgT7PomUZheNMw40oquE2YHKTIV/view?usp=sharing
(15) Advanced Energy Systems. Roof Orientation Solar Efficiency: Does It Affect Solar Panel Performance? Accessed March 31, 2026. https://aesrenew.com/knowledge-base/roof-orientation-solar-efficiency-does-it-affect-solar-panel-performance/.
(16) EcoRoof Systems. 7 Best Roof Structures for Solar Panel Installation That Maximize Energy Output. Solar Integration. April 22, 2025. https://www.ecoroofsystems.com/125/7-best-roof-structures-for-solar-panel-installation/.
(17) Bjerke, Jeremy. Todd County Ice Arena Refrigeration Study. March 5th, 2026. https://drive.google.com/file/d/1u4CPOH-8KBQkOB6qJtIAgcVkYad2a3Fu/view?usp=sharing

APPENDIX

A. Electric Energy Analysis

Todd County Expo Arena

827–859 2nd Ave NE
Long Prairie, MN 56347

ELECTRIC ENERGY ANALYSIS
09/24/2025

Prepared By: Jeremy Bjerke
Frontier Energy, Inc.
jbjerke@Frontierenergy.com
(262) 422-7340

Disclaimer of Warranties and Limitation of Liability

The suggestions in this Energy Analysis ("Analysis") are provided as a service to Minnesota Power customers and are based on a visual analysis of conditions observed at the time of the survey, information provided by the customer, Minnesota Power, and costs based on the energy assessor's experience on similar projects. The performance guidelines provided in the Analysis are for informational purposes only and are not to be construed as a design document. Minnesota Power will not benefit in any way from a customer's decision to select a particular contractor or vendor to supply or install the products and measures suggested by the energy assessor. Furthermore, any reference to a particular product or brand is strictly intended to illustrate a particular product category and Minnesota Power does not recommend any one product over the other.

Minnesota Power and the energy assessor do not guarantee that any specific level of energy or cost savings will result from implementing any energy conservation measures described in this Analysis. Minnesota Power and the energy assessor shall not, under any circumstances, be liable to the customer if potential energy savings are not achieved.

Minnesota Power advises that customers check with their Minnesota Power representatives to determine the estimated value of their rebates (if any) and to verify that the equipment qualifies for rebates prior to implementation of any conservation measures. Custom Rebate projects require pre-approval prior to purchase and installation to qualify for a rebate. The customer is responsible for submitting project information to Minnesota Power to obtain pre-approval for rebates and to determine the eligible rebate amount.

Customers are encouraged to ask for the opinion of contractors and suppliers they have worked with in the past for further information on suggested recommendations. Disturbance, removal or replacement of building materials, equipment, insulation systems, ductwork, piping, boilers, and other potentially hazardous components that contain asbestos, mercury or PCB's will require proper handling and disposal in accordance with the applicable federal and state laws and regulations. In addition, installations shall follow all applicable energy codes, fire codes, building codes, safety codes, ventilation codes, heating codes, plumbing codes, and mechanical codes. The customer is responsible for ensuring that the contractor follows such guidelines in implementing the recommendations in this report.

MINNESOTA POWER IS PROVIDING THIS INFORMATION AS A SERVICE TO YOU, OUR CUSTOMER. THE INFORMATION AND SUGGESTIONS IN THIS ASSESSMENT ARE PROVIDED ON AN "AS IS" BASIS ONLY, AND MINNESOTA POWER MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WITH RESPECT TO THIS ASSESSMENT. MINNESOTA POWER DISCLAIMS ALL SUCH REPRESENTATIONS AND WARRANTIES, INCLUDING BUT NOT LIMITED TO, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Neither Minnesota Power, nor any of its directors, employees or other representatives will be liable for damages arising out of or in connection with the use of this Analysis, and you, the customer, knowingly and voluntarily release Minnesota Power from any such liability in connection with this Analysis. This is a comprehensive limitation of liability that applies to all damages of any kind, including (without limitation) compensatory, direct, indirect, or consequential damages, loss of data, income or profit, loss or of damage to property and claims of third parties.

Customer Information

Facility Information:

Business Name: Todd County Expo Ice Arena Service Address:
827–859 2nd Ave NE, Long Prairie, MN 56347 Account(s):
1187117431
Premise ID: 1180072078
Customer Contact: Mitch Johnson
Customer Phone #: 320-874-1226
Customer Email: mitch.johnson@co.todd.mn.us

Date of Analysis: 09/24/2025
Date of Report: 01/16/2026
Annual Energy Usage: 169,038 kWh
Annual Peak Demand: 166 kW
Price Per Energy Unit: $0.069/kWh
Price Per Energy Unit: $10.53/kW
Building/Business Type: Commercial/Arena

Consultant Contact:
Name: Jeremy Bjerke
Email: jbjerke@frontierenergy.com
Phone: 262-422-7340

Consulting Firm: Frontier Energy, Inc.
7935 Stone Creek Drive, Suite 140
Chanhassen, MN 55317
Phone: 952-767-7455

Minnesota Power Contact:
Name: Maggie Wiederin
Email: mwiederin@mnpower.com
Phone: 218-355-316

Executive Summary

Todd County Expo Ice Arena is an Expo/Ice Arena located in Long Prairie. The site owners

are interested in understanding more about their site's energy consumption for future energy saving projects and possible grant applications. On September 24th, representatives from Minnesota Power and Frontier Energy, Maggie Wiederin (Minnesota Power) and Jeremy Bjerke (Frontier Energy), visited Todd County Expo Ice Arena. A visual energy analysis was conducted to collect data on existing electrical components and applications.

An Energy Analysis is the first step toward identifying opportunities to keep operating costs low, remain competitive in the marketplace, and start saving energy and money. This report contains specific recommendations to reduce energy usage, many of which are low to no cost opportunities. Some of these recommendations may qualify for a rebate to help reduce your initial equipment costs and provide a faster payback on your energy investment.

Safety Issues:

- None identified

The following is a summary of the top electric recommendations for Todd County Expo-Ice Arena to implement:

- Considering adding power factor correction capacitors to improve your power factor, reducing the utility charge.
- Consider installing variable frequency drives on any or all motors, specifically the ice making compressor.
- Considering replacing the rest of the lighting with LED options.
- Consider installing occupancy sensors in areas with infrequent usage such as bathrooms, hallways, and utility areas.
- Consider installing a heat reclaimer to capture exhaust energy from the refrigeration systems to use for heating the rest of the facility.
- Consider purchasing newer appliances for the concessions area that are more efficient.

The following is a summary of the things Todd County Expo-Ice Arena is doing well:

Todd County Expo-Ice Arena is already practicing some energy savings methods. They have replaced some old lighting with new LED lights, reducing their electrical load for lighting. Many hallways, locker rooms, and utility areas have been updated. The facility only operates during very specific times throughout the year. The operators are doing a good job of shutting the facility down while it is not in use. This includes achieving little to no energy consumption during the summer months.

Energy Usage

Table 1: Refrigeration Energy Usage

ELECTRIC ENERGY AND DEMAND SUMMARY

Customer:	**Todd County Expo-Ice Arena**
Address:	**9 Expobldg-Ice St Ne, Long Prairie, MN, 56347**
ACCOUNT #:	1187117431
PERIOD:	Oct-24 through Sep-24

Month	Billing Days	Measured Demand	Total kWh	kWh/ Day	Total Cost	$/kWh	Load Factor
Oct-24	30	93	31,771.58	1,059	$4,729.46	$0.149	47%
Nov-24	31	89	24,106.17	778	$3,887.57	$0.161	36%
Dec-24	30	85	20,623.10	687	$3,467.13	$0.168	34%
Jan-25	31	84	19,308.28	623	$3,242.69	$0.168	31%
Feb-25	31	86	18,185.08	587	$3,075.21	$0.169	28%
Mar-25	28	77	8,750.78	313	$1,962.81	$0.224	17%
Apr-25	31	0	0.00	0	$34.01	-	-
May-25	30	0	0.00	0	$34.01	-	-
Jun-25	31	0	0.00	0	$34.01	-	-
Jul-25	30	0	0.00	0	$34.01	-	-
Aug-25	31	0	0.00	0	$32.38	-	-
Sep-25	31	105	4,931.52	159	$1,955.52	$0.397	6%
TOTAL	**365**	**105**	**127,677**		**$22,488.81**		
AVERAGE	**30**	**52**	**10,640**	**350**	**$1,874.07**	**$0.205**	**29%**

Table 1: 2024-25 Refrigeration Usage Data

Table 2: Expo Arena Energy Usage

ELECTRIC ENERGY AND DEMAND SUMMARY

Customer:	**Todd County Expo-Ice Arena**
Address:	**9 Expobldg-Ice St Ne, Long Prairie, MN, 56347**
ACCOUNT #:	1187117431
PERIOD:	Oct-24 through Sep-24

Month	Billing Days	Measured Demand	Total kWh	kWh/ Day	Total Cost	$/kWh	Load Factor
Oct-24	30	17	2,185.80	73	$426.15	$0.195	18%
Nov-24	31	23	4,027.56	130	$702.66	$0.174	24%
Dec-24	30	23	4,987.56	166	$825.48	$0.166	30%
Jan-25	31	23	5,166.96	167	$835.56	$0.162	30%
Feb-25	31	23	4,800.96	155	$780.88	$0.163	28%
Mar-25	28	24	3,667.68	131	$657.75	$0.179	23%
Apr-25	31	14	1,200.60	39	$306.62	$0.255	12%
May-25	30	18	1,059.24	35	$343.98	$0.325	8%
Jun-25	33	61	5,904.60	179	$1,295.56	$0.219	12%
Jul-25	28	12	1,302.84	47	$312.43	$0.240	16%
Aug-25	31	50	3,015.84	97	$956.85	$0.317	8%
Sep-25	31	48	4,041.84	130	$966.22	$0.239	11%
TOTAL	**365**	**61**	**41,361**		**$8,410.14**		
AVERAGE	**30**	**28**	**3,447**	**112**	**$700.85**	**$0.220**	**18%**

Table 2: 2024-25 Expo Arena Usage Data

Consumption and Demand Tables

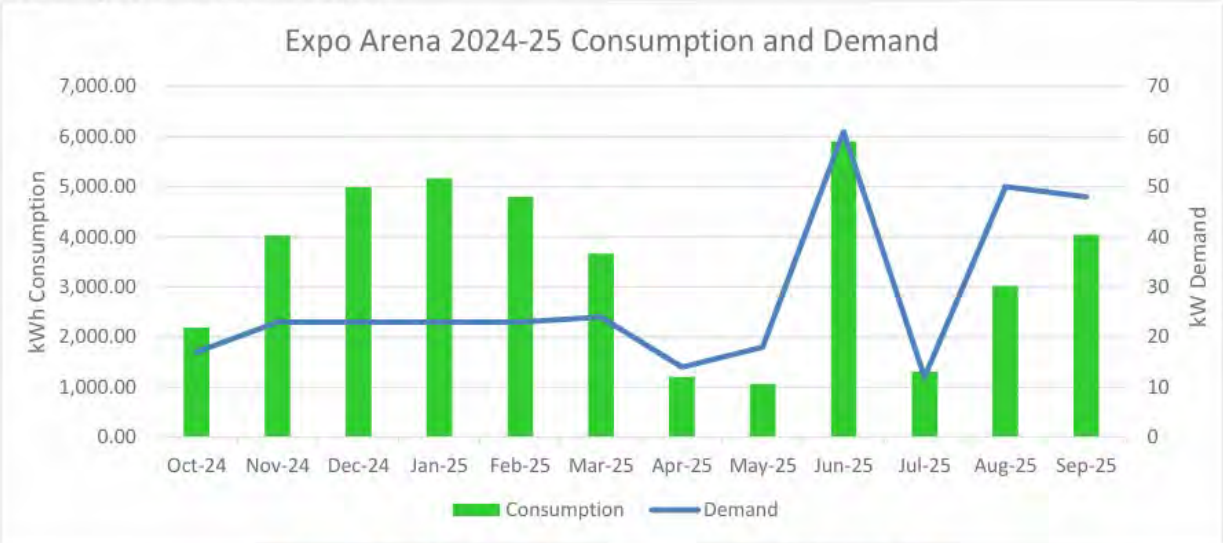


Figure 1: 2024-25 Expo Arena Consumption and Demand Data

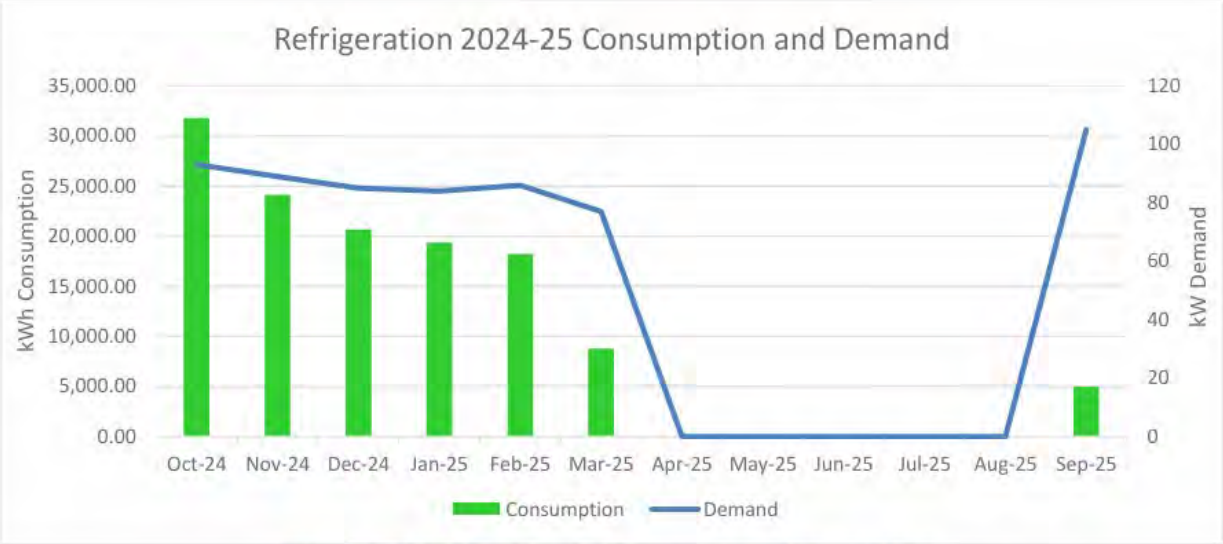


Figure 2: 2024-25 Refrigeration Consumption and Demand Data

Summary of Opportunities

The recommendations in this report are based on an analysis of conditions observed at the time of the survey, information provided to the auditors, and costs based on experience on similar projects. Estimated savings are calculated based on research by government agencies, product literature, and engineering associations. Actual savings will depend on several factors including conservation measures implemented, seasonal weather variations, fuel price increases, and specific energy use practices of the facility's occupants and workers. The performance guidelines provided in the report are for informational purposes only and are not

to be construed as a design document. This report is written for energy saving purposes only and should not be used for bid specifications. Installation costs are estimates only and the customer is responsible for obtaining quoted prices from vendors and contractors.

Recommendations:

Power Factor Correction Capacitors:

- Utilities often charge the customer extra based on low power factor ratings. With an average power factor of about 70%, there is a charge on your utility bill for the degradation of electricity. Consider adding power factor correction capacitors either at your electric meter or near your compressor motors that will help fix your power factor. Achieving a power factor of 90% or higher will eliminate any additional fees on your electric bill. Based on your usage, a 27.5 kVar capacitor will correct your power factor to be at or above 90%, saving an average of $172 per month. Implementing additional VFDs or ECMs will also help correct the power factor.

Variable Frequency/Speed Drives:

- Consider installing variable frequency drives (VFDs) on the 35-HP compressing room unit, the 25-HP compressing room unit, the 5-HP compressing units, and the 3-HP compressing units. VFDs are devices that connect to fans and pumps and vary their speed. This motor control accounts for the demand needed at the time and varies the motor's frequency to meet that demand and nothing more. Instead of full power on/off, the motor never works harder than required. VFDs extend the life of the motor and require less maintenance in the long term because the motor does not need to run at full capacity to meet small demands. In addition, we could not validate if the ice condensing unit (CDD6000M6D) has variable speed capabilities. If it does not, consider adding a VFD to the machine as there are significant savings.

Figure 3: Example of VFDs/VSDs

LED Lighting:

- Consider making the switch to a fully LED facility. When looking for replacement products, look for DLC and ENERGY STAR listed replacements as these

certifications indicate the product is of a higher quality and efficiency level. Seeing these ratings is an easy way to tell you're selecting a tested product. LED lighting uses about 50% less electricity than fluorescents and 85% less than incandescent, making it a great and cost-effective way to bring down energy usage. On average, LEDs have much longer lifespans, ranging from 30,000-50,000 hours. The largest area for replacements is the main arena where there are 38 8-light fluorescent high bays. Please see the attached calculations for recommendations for the remaining standard lighting, we have included a lamp replacement option that does not need a new ballast fixture.

Occupancy Sensors:

- Consider installing occupancy sensor controls to the lighting throughout the facility. Occupancy sensors allow for accurate control of a space's lighting based on patron occupancy at any given time, allowing for a hands-off approach to energy savings. Occupancy controls can be added to LED or standard efficiency lighting as wall mounted sensors, ceiling mounted sensors, or fixture integrated sensors. If not implemented, occupancy sensors can be beneficial in areas such as bathrooms, offices, hallways, or utility areas.

Figure 4: How Occupancy Sensors Work

Lighting Timer Controls:

- Consider installing timer controls to facility lighting that is required to be on during a regular timeframe each day. Timers are a type of lighting control that work well in spaces that are required to be on during facility operating hours regardless of moment-to-moment occupancy. Possible areas for consideration are the main ice arena and outside parking and entry way area. Timer intervals may be changed as necessary, however can be a great hands-off energy savings opportunity when set to the desired length.

Figure 5: Example of Timer Switch

Heat Reclaimer:

- Consider exploring the opportunity to reclaim exhausted heat from your refrigeration process for making and maintaining the ice arena. The refrigeration process takes heat from the area you want to cool and transfers it somewhere else. Instead of expelling this energy outside, you can capture the heat and use it for space heating in other areas of the facility, such as the locker rooms, bathrooms, or offices.

Appliances:

- Consider installing ENERGY STAR rated appliances once the current units reach the end of their operable life. ENERGY STAR rated appliances meet high efficiency requirements, set by this EPA backed program, that ensure you are purchasing the most energy efficient appliances on the market. When looking for replacement refrigerators, freezers, ovens or toasters, microwaves, and even TVs, keep an eye out for the blue ENERGY STAR logo, as seen below. A list of ENERGY STAR rated appliances, easily sortable by appliance type and size, can be found here: Product Finder | EPA ENERGY STAR. Please see calculations below for rebate and savings estimates of recommended equipment. Minnesota Power offers prescriptive rebates for various ENERGY STAR appliances, including refrigerators, freezers, clothes washers, and dehumidifiers; more information on these programs can be found here: Minnesota Power Business Rebates & Savings.
- In addition to higher efficiency appliances, consider unplugging appliances during the off season. Many appliances still use a small amount of energy when plugged in regardless of being turned off.

Figure 6: ENERGY STAR Logo Found on all ENERGY STAR Rated Equipment

Summary by Payback

ECM #	Description	Annual Cost Saved	Peak kW Saved	Annual kWh Saved	Estimated Project Cost	Estimated Rebate	Estimated Cost After Rebate	Simple Payback	% Electric Reduced
1	Power Factor	$2,059	0	0	$3,816	$0	$3,816	1.9	0.0%
2	VFDs	$2,497	0	36,033	$10,740	$1,261	$9,479	3.8	35.3%
3	LED Lighting	$1,057	5	6,728	$8,055	$980	$7,075	6.7	4.0%
Total		**$5,614**	**5**	**42,761**	**$22,611**	**$2,241**	**$20,370**	**3.6**	**39.3%**

Table 3: ECM Summary Payback

Disclaimers:

- All values are estimates based on information provided at the time. These values are not to be taken as fact and proof of installation is needed for rebates to be issued.
- Estimated savings are calculated based on stand-alone conditions, implementing one or more of these measures may change the available savings, estimated rebate, and % electric reduced of other measures.
- Some lines feature incremental cost in the Estimated Project Cost column. These lines have an "*" at the end of the description name. The actual cost may be higher for these energy efficient units. Incremental cost is the difference in cost between high efficiency and standard units.

Appendix A: End Use Breakdown

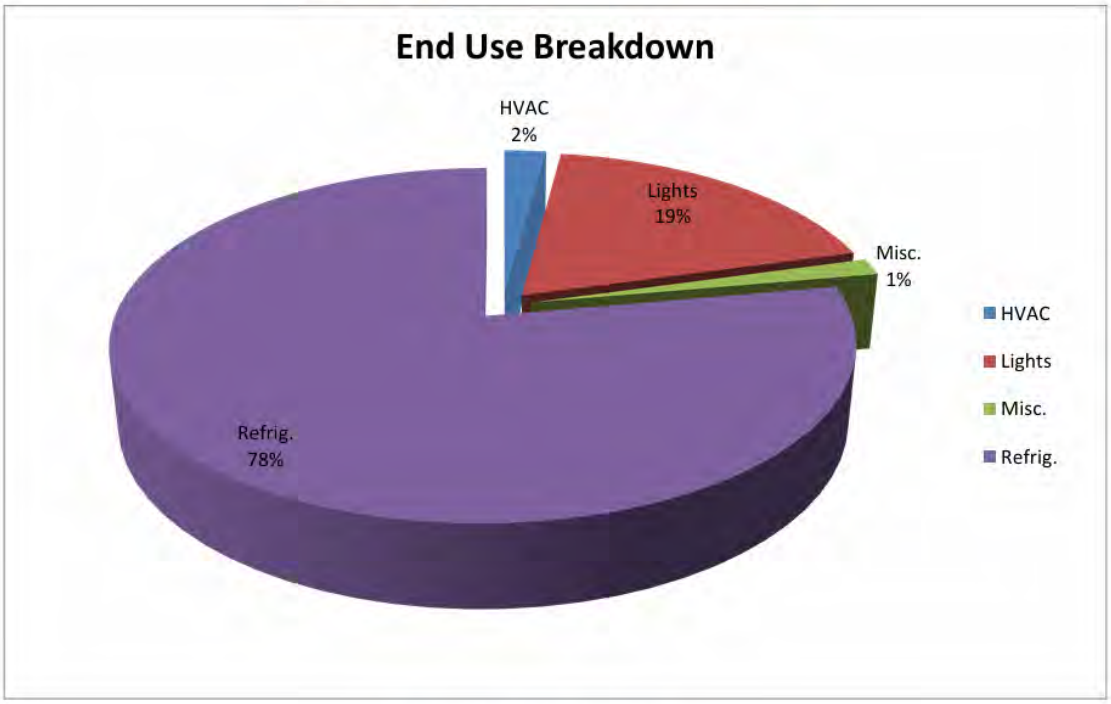


Figure 7: End Use Breakdown

B. Solar Site Assessment

Solar Electric (PV) Virtual Site Assessment: Todd County Expo Building

Name **Heidi Auel**			
Affiliation **Clean Energy Resource Teams, University of MN Extension**			
Mailing address **UMN Extension 322 Laurel St, Ste 21**	*City* **Brainerd**	*State* **MN**	*Zip* **56401**
Email **hauel@umn.edu**	*Phone* **612-626-4869**		

1.0 Client Profile

1.1 Client Information

Client name **Todd County-Jackie Bauer, Mitch Johnson**		*Date of report* **3/37/26**	
Site address **812 2nd Ave**	*City* **Long Prairie**	*State* **MN**	*Zip* **56347**
Jurisdiction/County **Todd**			
Email *Jackie.Bauer@co.todd.mn.us*			
Electric utility **Minnesota Power**			

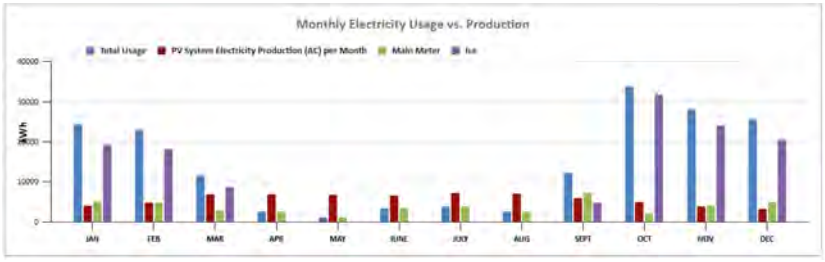
1.2 Load Analysis

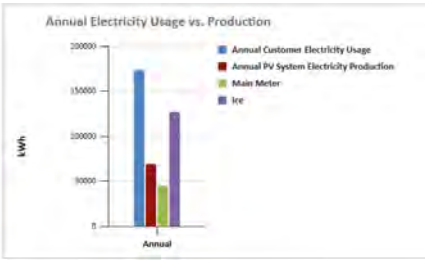
Utility electrical rate(s) **$.07 including fuel surcharge**
Net metering rate: **$.11** *Grid access fee:* *$0*

Estimated annual kWh consumption:

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
kWh Usage	24,474	23,090	11,666	2,666	1,288	3,463	2,842	2,602	12,257	33,956	28,133	25,610	173,047
kWh Production	4,050	4,850	7,050	7.050	6,900	6,650	7,350	7,150	5,950	5,150	3,850	3,350	69,350

According to PVWatts, an unshaded **50 kW system** located at this location will produce **69,350 kWh** per year or an estimated **40%** of the total kWh used.





2.0 Site Solar Resource

2.1 Assumptions

Assumed existing electrical infrastructure is adequate for interconnection. Current going rate for installation costs, this may change with supply of materials or cost adjustments. The cost of the utility electrical rate is assumed to stay the same, you will want to check with Minnesota Power to see if it changes with the addition of a solar array.

2.2 AC Energy Production for 1 kW (DC) of PV

Results from PVWatts for 1 kW of roof-mounted solar in Long Prairie, MN.
Tilt: 30
Orientation: 180

PVWatts Screenshots (System info and results)

RESULTS

Print Results

1,388 kWh/Year*

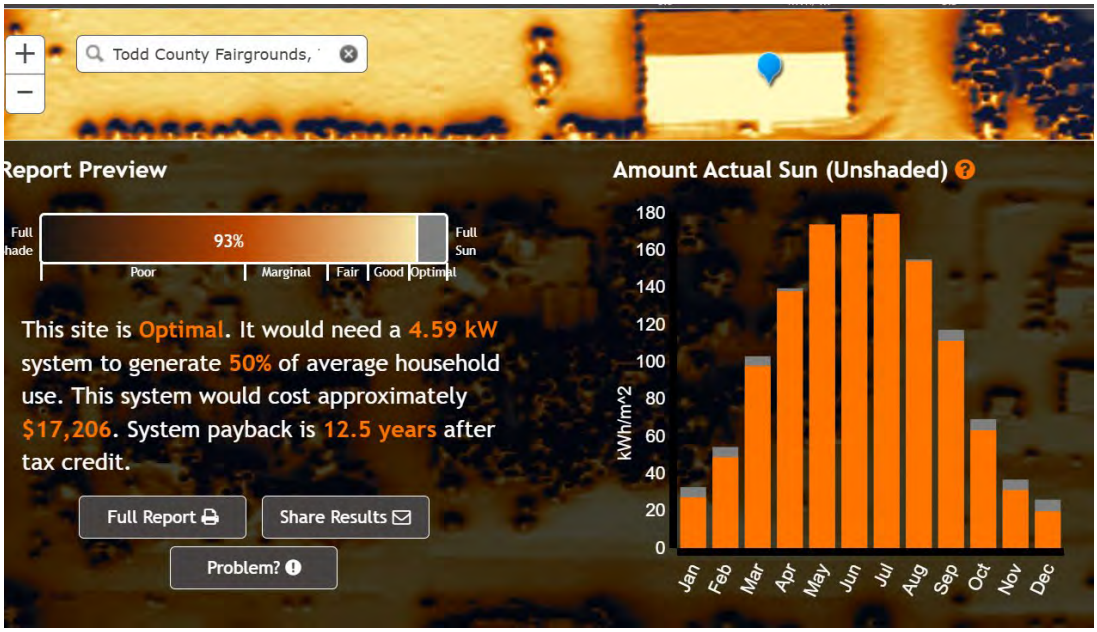
System output may range from 1,303 to 1,432 kWh per year near this location.

Click HERE for more information.

Month	Solar Radiation (kWh / m^2 / day)	AC Energy (kWh)
January	2.97	81
February	3.95	97
March	5.49	141
April	5.92	141
May	5.77	138
June	5.86	133
July	6.39	147
August	6.13	143
September	5.09	119
October	4.05	103
November	2.99	77
December	2.47	67
Annual	4.76	1,387

MN Solar Suitability App Screenshot

The site was estimated to be 100 % unshaded



3.0 Financial Estimates

3.1 Disclaimers and Assumptions

Please note:

- All numerical values in this report are estimates.
- Proper legal counsel, along with IRS guidance, is required to definitively determine the tax ramifications of installing a solar electric system.
- **For a more accurate estimate of total installed cost of a PV system, get at least three bids from qualified PV Installation Professionals.**
- The information provided in this report should NOT be considered legal advice.

The following assumptions apply to the financial estimates:

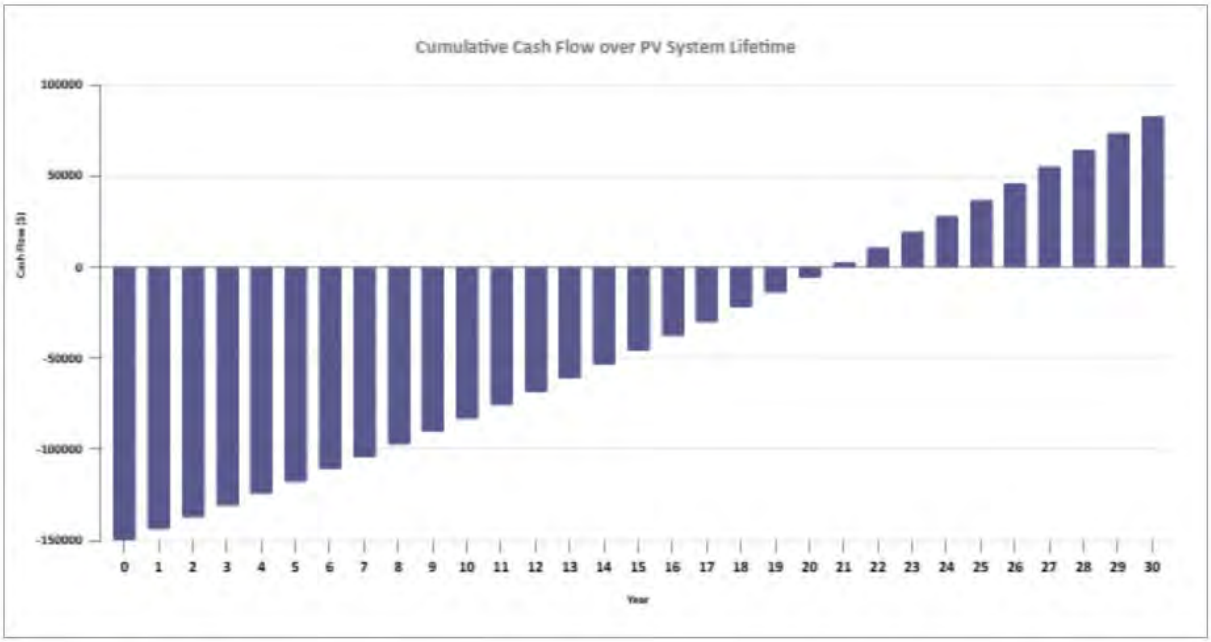
- PV cost of $3.00/watt (installed). Systems may cost more or less than this, depending on the size of the array, difficulties encountered during installation, and other variables.
- Project lifespan: 30 years
- PV module degradation rate: 0.5%/year
- Utility credits excess generation at a rate of $.11/kWh.
- Electricity cost inflation rate: 2.5%
- Assumed cash financed.
- Maintenance is expected to be minimal with PV systems, especially with fixed, non-tracking arrays.

3.2 Financial Estimates: SIZE 57kW System

Production	
PV system size (DC)	50 kW
Estimated annual AC energy output	69,350 kWh
Cost	
Estimated installed system cost	$150,000
Economics	
Years to Cost Recovery	21 years

The following chart shows an estimated cash flow for the 50 kW PV System over the system's lifetime:

CASH FLOW CHART



4.0 Next Steps

1. Energy efficiency is always a cheaper option than installing more energy production capacity. Reviewing priorities and recommendations from your energy assessment first would be beneficial and reduce the need for as much energy production from a solar array.

2. Using a Cold Climate Air Source Heat Pump as the primary heating source may significantly reduce heating energy use (and cost). It would also change your electricity usage patterns, so should be considered before installing solar, if possible. More information at https://www.cleanenergyresourceteams.org/ashp

3. If you haven't done so already, consider visiting some PV installations first-hand and speaking with the owners about their solar experience.

4. Decide if the economics of a PV system work out to your satisfaction based on all the costs, incentives, utility fees, and energy savings provided in this report, as well as your electrical utility rates and policies. Keep in mind that electrical rates will likely continue to increase over time.

5. If you choose to go ahead with a solar energy system installation, contact several qualified installers in your area to get price estimates. You can find a directory of solar installers on the CERTs website: https://www.cleanenergyresourceteams.org/tools-guides/directory.

6. Once you have several quotes for solar at your facility, if you would like assistance evaluating them, please feel free to reach back out—CERTs/UMN Extension can help with that.

7. Check with your insurance agent to make sure your liability coverage will be sufficient to meet the requirements set forth by your electrical utility and their interconnection policies. Typically a minimum of $300,000 in liability coverage is required.

8. Obtain and complete an interconnection application and agreement contract with your electrical utility. The installer you choose should be helpful in filling out such forms and obtaining any other required permits and paperwork.

9. Be sure that all utility agreements, financial incentive paperwork, and any other required approvals/permits are submitted prior to purchasing any equipment or signing any contracts.

Educational Resources:

- Find additional information about solar at https://www.cleanenergyresourceteams.org/simple-steps-solar.
- Find additional information about state and federal incentives at www.dsireusa.org.
- The Midwest Renewable Energy Association (MREA) offers online courses and hands-on training in renewable energy systems – www.midwestrenew.org.

C. Refrigeration Study

Todd County Ice Arena

827-859 2nd Ave NE
Long Prairie, MN, 56347

Refrigeration Study
March 5th, 2026

Prepared By:
Jeremy Bjerke
Frontier Energy, Inc.
jbjerke@frontierenergy.com
(262) 422-7340

FRONTIER energy

Disclaimer of Warranties and Limitation of Liability

The suggestions in this Energy Analysis ("Analysis") are provided based on a visual analysis of conditions observed at the time of the survey, information provided by the customer, and costs based on the energy assessor's experience on similar projects. The performance guidelines provided in the Analysis are for informational purposes only and are not to be construed as a design document. Furthermore, any reference to a particular product or brand is strictly intended to illustrate a particular product category and does not recommend any one product over the other.

Energy assessors do not guarantee that any specific level of energy or cost savings will result from implementing any energy conservation measures described in this Analysis. The energy assessor shall not, under any circumstances, be liable to the customer in the event that potential energy savings are not achieved.

Customers are encouraged to ask for the opinion of contractors and suppliers they have worked with in the past for further information on suggested recommendations. Disturbance, removal or replacement of building materials, equipment, insulation systems, ductwork, piping, boilers, and other potentially hazardous components that contain asbestos, mercury or PCB's will require proper handling and disposal in accordance with the applicable federal and state laws and regulations. In addition, installations shall follow all applicable energy codes, fire codes, building codes, safety codes, ventilation codes, heating codes, plumbing codes, and mechanical codes. The customer is responsible for ensuring that the contractor follows such guidelines in implementing the recommendations of this report.

THE INFORMATION AND SUGGESTIONS IN THIS ASSESSMENT ARE PROVIDED ON AN "AS IS" BASIS ONLY AND MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WITH RESPECT TO THIS ASSESSMENT. AUDITORS DISCLAIM ALL SUCH REPRESENTATIONS AND WARRANTIES, INCLUDING BUT NOT LIMITED TO, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Representatives will not be liable for damages arising out of or in connection with the use of this Analysis, and you, the customer, knowingly and voluntarily release the auditors from any such liability in connection with this Analysis. This is a comprehensive limitation of liability that applies to all damages of any kind, including (without limitation) compensatory, direct, indirect, or consequential damages, loss of data, income or profit, loss or of damage to property and claims of third parties.

Customer Information

Facility Information:
Business Name: Todd County Ice Arena
Service Address: 827–859 2nd Ave NE, Long Prairie, MN 56347
Utilities Type: Electric
Utility Provider: Minnesota Power
Account(s): 1187117431
Premise ID: 1180072078

Customer Contact: Mitch Johnson
Customer Phone #: (320) 874-1226
Customer Email: mitch.johnson@co.todd.mn.us

Analysis Type: Refrigeration Study
Date of Analysis: March 5th, 2026
Date of Report: May 12th, 2026
Annual Energy Usage: 169,038 kWh
Annual Peak Demand: 166 kW
Building/Business Type: Commercial/Arena

Consultant Contact
Name: Jeremy Bjerke
Email: jbjerke@frontierenergy.com
Phone: (262) 422-7340

Consulting Firm: Frontier Energy
7935 Stone Creek Drive, Suite 140
Chanhassen, MN 55317
Phone: (952) 767-7455

Minnesota Power Contact
Name: Maggie Wiederin
Email: mwiederin@mnpower.com
Phone: (218) 355-3161

Executive Summary

Todd County Expo Ice Arena is an Expo/Ice Arena located in Long Prairie. The site owners are interested in understanding more about their site's energy consumption, specifically the refrigeration system, for future energy saving projects and possible grant applications. On May 5th, representatives

from Minnesota Power and Frontier Energy, Maggie Wiederin (Minnesota Power), Jeremy Bjerke (Frontier Energy), and Doug Eli (Frontier Energy), visited Todd County Expo Ice Arena. A visual energy analysis was conducted to collect data on existing refrigeration components and applications.
An Energy Analysis is the first step toward identifying opportunities to keep operating costs low, remain competitive in the marketplace, and start saving energy and money. This report contains specific recommendations to reduce energy usage. Some of these recommendations may qualify for a rebate to help reduce your initial equipment costs and provide a faster payback on your energy investment.
Implementing the right solution for the refrigeration system will not only reduce energy costs on site but will improve maintenance costs as the system will operate under expected loads and design conditions. As these or other measures are being pursued, please keep your MN Power Representative up to date as rebates and incentives may be available.

The following is a summary of the top recommendations for Todd County Expo Ice Arena to implement:

1. Add controls for the refrigeration system to maintain the ice at specific temperatures and reduce load during unoccupied times.
2. Conduct regular tune-ups on the chiller system to ensure proper operating conditions.
3. Add a variable speed drive (VFD) to the existing brine pump motor.
4. Fix refrigerant leaks to reduce supply cost and maintenance.
5. Consider full equipment replacement costs and end of life conditions to understand savings on new equipment.

The following is a summary of things Todd County Expo Ice Arena is doing well: **1.** Maintaining full shutdown of equipment and facilities during unoccupied periods. **2.** Ensuring initial demand for season start is isolated to one month to reduce demand charges.

Safety Issues: **N/A**

Facility and Operations Description

Todd County Expo Ice Arena is located in Long Prairie, Minnesota. The expo arena is roughly 25,000 square feet which includes an ice arena, concessions, locker rooms, utility rooms, and others.
The facility operates from September through March and two weeks during the summer for the county fair. The refrigeration is not operating during the summer. Current energy consumption for the refrigeration meter is 127,676 kWh annually with a peak demand of 105 kW while the arena is being set up. The current energy consumption for the rest of the facility (Expo Arena) is

41,361 kWh annually with a peak demand of 61 kW. Although the Expo Arena meter is not affected by the proposed energy saving measures, it is important to compare overall usage with the refrigeration system.
The customer maintains an ice arena for multiple activities and events throughout the year. The refrigeration equipment on site is in various stages of age, with some equipment being 20+ years old.

Figure 1: Birds Eye View of Todd County Expo Ice Arena

Energy Profile

Table 1: Refrigeration Energy Usage

ELECTRIC ENERGY AND DEMAND SUMMARY

Customer:	**Todd County Expo-Ice Arena**		
Address:	**9 Expobldg-Ice St Ne, Long Prairie, MN, 56347**		
ACCOUNT #:	1187117431		
PERIOD:	Oct-24	through	Sep-25

Month	Billing Days	Measured Demand	Total kWh	kWh/ Day	Total Cost	$/kWh	Load Factor
Oct-24	30	93	31,771.58	1,059	$4,729.46	$0.149	47%
Nov-24	31	89	24,106.17	778	$3,887.57	$0.161	36%
Dec-24	30	85	20,623.10	687	$3,467.13	$0.168	34%
Jan-25	31	84	19,308.28	623	$3,242.69	$0.168	31%
Feb-25	31	86	18,185.08	587	$3,075.21	$0.169	28%
Mar-25	28	77	8,750.78	313	$1,962.81	$0.224	17%
Apr-25	31	0	0.00	0	$34.01	-	-
May-25	30	0	0.00	0	$34.01	-	-
Jun-25	31	0	0.00	0	$34.01	-	-
Jul-25	30	0	0.00	0	$34.01	-	-
Aug-25	31	0	0.00	0	$32.38	-	-
Sep-25	31	105	4,931.52	159	$1,955.52	$0.397	6%
TOTAL	**365**	**105**	**127,677**		**$22,488.81**		
AVERAGE	**30**	**52**	**10,640**	**350**	**$1,874.07**	**$0.205**	**29%**

Table 1: 2024-25 Refrigeration Usage Data

Table 2: Expo Arena Energy Usage

ELECTRIC ENERGY AND DEMAND SUMMARY

Customer:	**Todd County Expo-Ice Arena**		
Address:	**9 Expobldg-Ice St Ne, Long Prairie, MN, 56347**		
ACCOUNT #:	1187117431		
PERIOD:	Oct-24	through	Sep-25

Month	Billing Days	Measured Demand	Total kWh	kWh/ Day	Total Cost	$/kWh	Load Factor
Oct-24	30	17	2,185.80	73	$426.15	$0.195	18%
Nov-24	31	23	4,027.56	130	$702.66	$0.174	24%
Dec-24	30	23	4,987.56	166	$825.48	$0.166	30%
Jan-25	31	23	5,166.96	167	$835.56	$0.162	30%
Feb-25	31	23	4,800.96	155	$780.88	$0.163	28%
Mar-25	28	24	3,667.68	131	$657.75	$0.179	23%
Apr-25	31	14	1,200.60	39	$306.62	$0.255	12%
May-25	30	18	1,059.24	35	$343.98	$0.325	8%
Jun-25	33	61	5,904.60	179	$1,295.56	$0.219	12%
Jul-25	28	12	1,302.84	47	$312.43	$0.240	16%
Aug-25	31	50	3,015.84	97	$956.85	$0.317	8%
Sep-25	31	48	4,041.84	130	$966.22	$0.239	11%
TOTAL	**365**	**61**	**41,361**		**$8,410.14**		
AVERAGE	**30**	**28**	**3,447**	**112**	**$700.85**	**$0.220**	**18%**

Table 2: 2024-25 Expo Arena Usage Data

Refrigeration Consumption and Demand

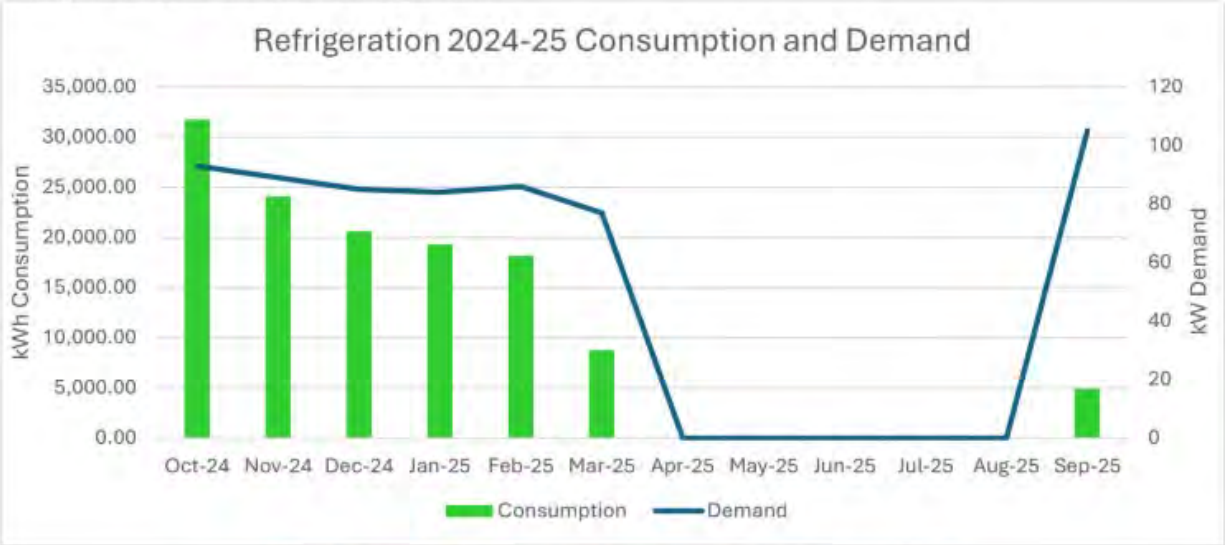


Figure 2: 2024-25 Refrigeration Consumption and Demand Data

Expo Arena Consumption and Demand

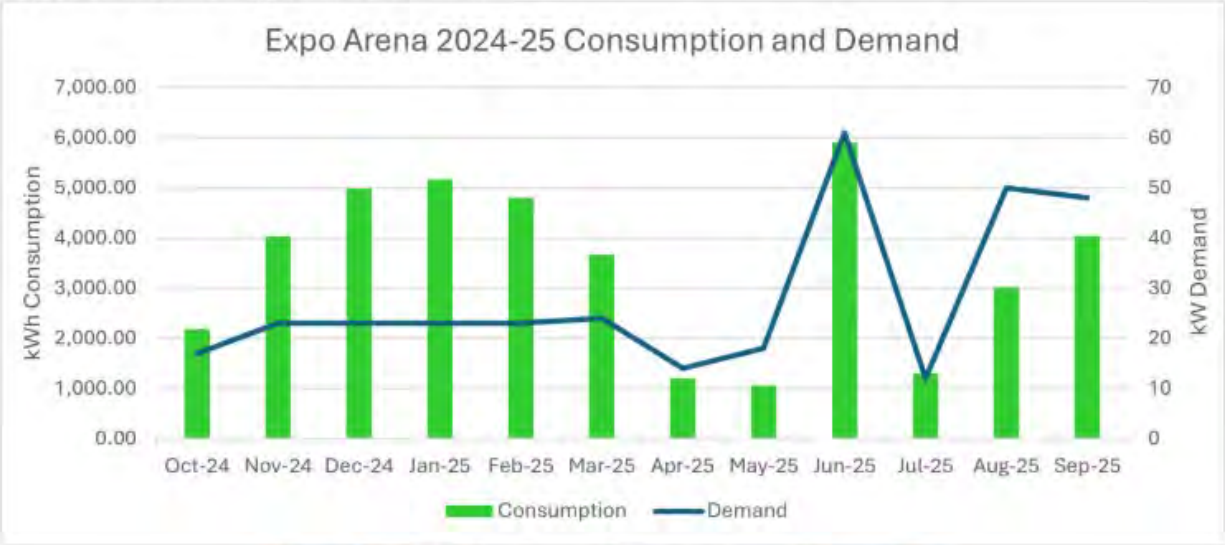


Figure 3: 2024-25 Expo Arena Consumption and Demand Data

Refrigeration and Expo Arena Consumption Chart

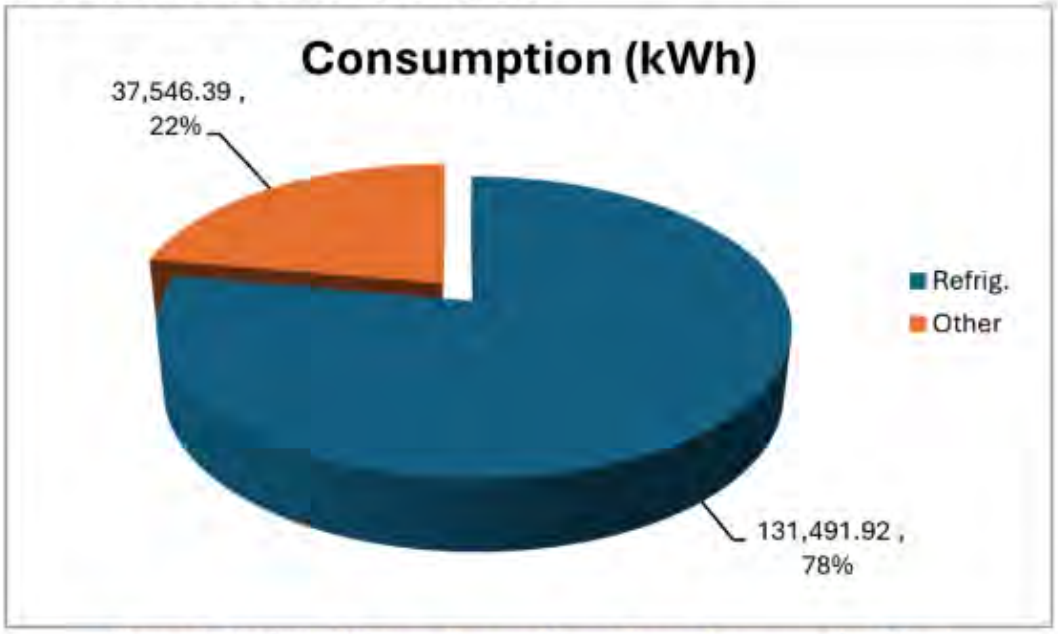


Figure 4: 2024-25 Refrigeration and Expo Arena Consumption Chart

Refrigeration and Expo Arena Demand Chart

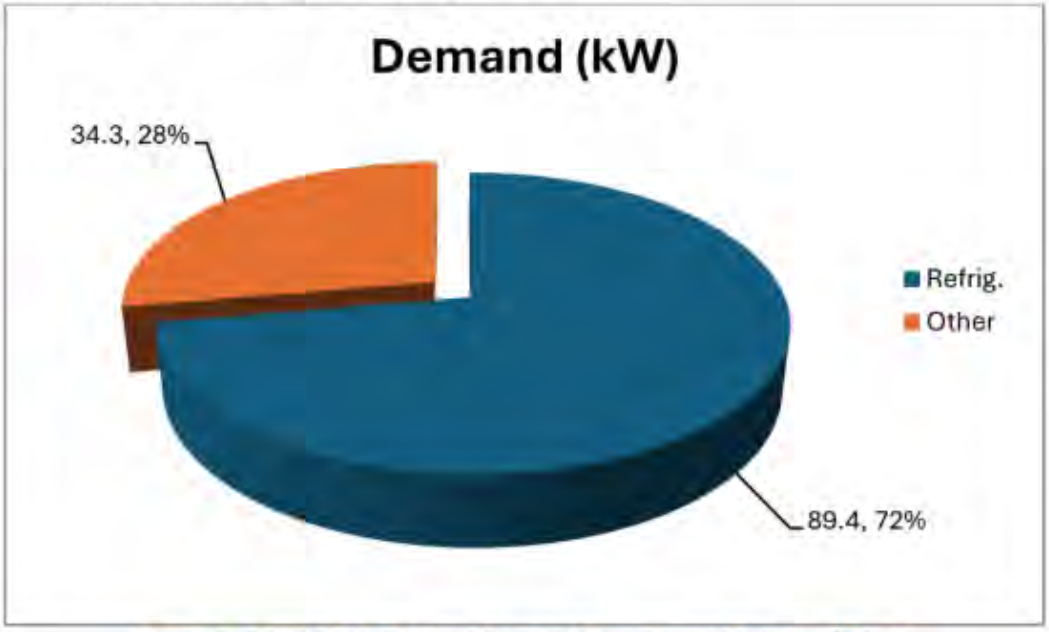


Figure 5: 2024-25 Refrigeration and Expo Arena Demand Chart

Refrigeration System

The refrigeration system uses R-404A/507 refrigerant with a dual compressor and a Heatcraft air cooled condensing unit - CDD6000M6D. The motors in the system are listed below.

Motor HP	Motor Brand	Motor Model	Motor Count
35	Copeland	6RP2-350A-TSK	1
25	Copeland	4RH-2500-TSK	1
5	Marathon	TVC182TTDW16	2
5	Bell & Gossett		1

Table 3: Refrigeration System Motor Equipment Table

Energy Conservation Opportunities

Measures identified were chosen based on potential cost savings and approximate payback from utility expense savings. The next step in the process is to determine real options and alternatives for equipment and controls that could be installed. These specifications and energy efficient upgrade options would allow detailed estimates for energy savings and rebates to be put together. For the recommendations evaluated in this report, the cost of taking energy conservation measures were based on the following calculations:

- Energy Charge of $0.06931/kWh
- Demand Charge of $10.53/kW

Minnesota Power has many incentive opportunities and programs for energy projects. Incentives can help cover the cost of many of the upgrades mentioned in this audit. Some projects must be pre-approved; for more information on the available programs, reach out to your MN Power rep, Maggie Wiederin, whose contact information is on page 3 of this report.

In the following summary of recommendations, with estimated energy savings, cost savings, and rebate amounts for each measure. Please note that all values are estimates based on the information available at this time. Contractors and suppliers should be contacted about the most accurate pricing. If quotes are pursued for these, or any other projects, please reach out to your MN Power representative for updated estimates based on actual specifications and costs.

Summary

ECM #	Description	Annual Cost Saved	Peak kW Saved	Annual kWh Saved	Estimated Project Cost	Estimated Rebate	Estimated Cost After Rebate	Simple Payback	% Electric Reduced
1	Tune-Up	$541	2.4	5,253	$192	$480	($288)	(0.5)	3.1%
2	Refrigeration Controls	$885	0.0	12,76	$3,121	$447	$2,675	3.0	7.6%
3	Refrigerant Leaks	$43	0.0	0	$200	$0	$200	4.6	0.0%
4	Brine Pump VFD	$206	0.0	2,979	$1,330	$104	$1,226	5.9	1.8%
Total		**$1,675**	**2**	**21,000**	**$4,843**	**$1,031**	**$3,812**	**2.3**	**12.4%**

Table 4: Summary of Energy Conservation Measures

Conservation Opportunity Analysis

All energy conservation measures (ECMs) listed below are estimates, and additional engineering analysis is required to evaluate final cost and savings estimates. Additional details for each ECM (e.g. costs, operating assumptions) are provided in the corresponding worksheet in the appendix.

Add Refrigeration Controls (ECM #1)

- Consider adding refrigeration controls to reduce energy consumption during unoccupied times. The brine pump can be reduced to 50% speed while paired with a VFD, and the ice temperatures can be set to ~24 degrees during unoccupied periods. These lower settings will reduce system requirements and energy consumption.

Conduct Regular Tune-Ups (ECM #2)

- Consider routine maintenance on the refrigeration equipment to maintain efficiency, reliability, and catch issues early to reduce maintenance and early failure. This maintenance includes cleaning of the condenser coils/tubes, checking and cleaning the equipment for scale or buildup, and checking other components and controls as needed. Most refrigeration manufacturers have maintenance tips and best practices that best suit your equipment and what issues to pay close attention to.

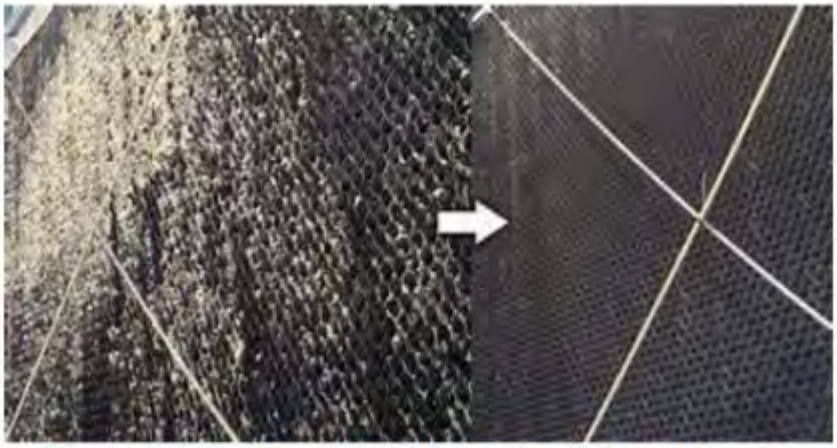


Figure 6: Cooling Tower Build Up Before and After Cleaning

Add a VFD to the Brine Pump (ECM #3)

- Consider installing variable frequency drives (VFDs) on the brine pump motor. VFDs are devices that connect to fans and pumps and vary their speed. The motor controls account for the demand needed at the time and vary the motor's frequency to meet that demand and nothing more. Instead of full power on/off, the motor never works harder than required. VFDs extend the life of the motor and require less maintenance in the long term because the motor does not need to run at full capacity to meet small demands.

Figure 7: Example of VFDs/VSDs

Fix Refrigerant Leaks (ECM #4)

- Consider fixing the existing refrigerant leaks in the compressor room. Any leak will result in additional maintenance and material costs as well as possible system inefficiencies. Fixing the refrigerant leaks will not lead to energy savings or a utility rebate, however, it will reduce annual expenses.

Additional Recommendations

End of Life Equipment Replacement

- Consider opportunities for replacing old and near failure equipment. Some equipment found on site was around 20 years old. Depending on the condition of the equipment, operating efficiencies could be affected. Replacing equipment as needed with new, higher efficiency equipment can lead to additional savings and less maintenance. Ensure the new equipment is compatible with existing refrigerant.
- Consider the option of replacing the current system with a new higher efficiency system. Although the initial cost and payback of a full system replacement is not ideal, it is important to understand new technologies and standards for future projects. The current system operates with a coefficient of performance (COP) of 2.1-2.5. This means that for each unit of input energy, the system outputs 2.5 units of energy. A new ammonia system can have a COP of 3.0-3.5, leading to additional energy savings. The COP increase could lead to a 25% increase in energy savings. For a more accurate estimate on costing and energy usage for a new system, contact your local commercial refrigeration contractor.

Additional Considerations

Dehumidification

- Consider the addition of a dehumidification system. A dehumidification system can lead to higher quality ice and refrigeration savings, ultimately reducing the load on the refrigeration system. The energy consumption savings are rarely more than the energy consumption of the dehumidification system. Rebates are available for high efficiency dehumidifiers to reduce the initial investment costs. Contact your local commercial refrigeration contractor to see if a dehumidification system should be considered for the facility.

Start of Season Demand Charge Awareness

- Based on the last two years of electrical data, the initial demand of freezing the ice rink for the start of the season was mostly isolated to September. The peak demand each year was in September with demand lowering in October, and lower in November. If the freezing process extends into October, consider starting the freezing process slightly early to ensure all start up peaks are in a single billing cycle. Demand charges are based on the peak electricity draw for a given period. Continue avoiding additional demand charges by checking peak demand usage each season.

Regional Sustainable Development Partnerships

UNIVERSITY OF MINNESOTA EXTENSION

Building a stronger Minnesota

University of Minnesota Extension discovers science-based solutions, delivers practical education, and engages Minnesotans to build a better future.

Support future student projects: z.umn.edu/MaryPageFund

218-726-7555 | rsdp@umn.edu | Facebook: @UofMNExtRSDP | X: @RSDPMN

Todd County Data Practices Policy

Guide for Members of the Public Requesting Information

This document is required by Minnesota Statutes, section 13.03, subdivision 2(b).
Approved: _____
Revised: _____

Right to Access Public Data

The Government Data Practices Act (Minnesota Statutes, Chapter 13) presumes that all government data are public unless a state or federal law classifies the data otherwise. Government data means all recorded information maintained by Todd County, regardless of physical form, storage media, or conditions of use, including paper records, emails, photographs, videos, electronic files, and other recorded information.

The Government Data Practices Act also provides that Todd County must keep government data in a way that makes it accessible for convenient public use. You have the right to inspect public data, free of charge, that Todd County maintains. You also have the right to obtain copies of public data. Todd County may charge for copies as authorized by Minnesota law. You have the right to inspect data before deciding whether to request copies.

How to Make a Data Request

To inspect data or request copies of data maintained by Todd County, submit a written request to the appropriate department or Data Practices Designee. Written requests may be submitted by mail, email, or fax using the Todd County Data Request Form attached to this document and through the online request. Requests for small amounts of public data may not require a written request at the discretion of the Responsible Authority or department designee.

If you choose not to use the data request form, your written request should include:

- A statement that you are making a request under the Minnesota Government Data Practices Act, Minnesota Statutes, Chapter 13;
- Whether you wish to inspect the data, obtain copies, or both; and
- A clear description of the data you are requesting.

Todd County generally cannot require you to identify yourself or explain the reason for your request for public data. However, depending on how you wish to receive the information, Todd County may require limited contact information to process your request. For example, if copies are to be mailed or emailed, an address or email address may be necessary.

If Todd County does not understand your request and has no way to contact you for clarification, processing of the request may be delayed or unable to proceed.

How Todd County Responds to a Data Request

Upon receiving your written request, Todd County will process the request as promptly and reasonably as possible.

- If Todd County does not maintain the requested data, you will be notified in writing as soon as reasonably possible.
- If the requested data are not public, Todd County will notify you in writing and identify the specific legal authority classifying the data as nonpublic.
- If the requested data are public, Todd County will:
    - Arrange a date, time, and place for you to inspect the data at no charge; or
    - Provide copies of the data as soon as reasonably possible.

You may choose to pick up copies or request delivery by mail or electronic means. Electronic copies will be provided if Todd County maintains the data electronically and the format is reasonably available.
Prepayment for copies is required unless other arrangements are approved by the Department Head or Data Practices Compliance Official.
If requested data contains technical terminology, abbreviations, or acronyms, Todd County will provide explanations upon request.
The Government Data Practices Act does not require Todd County to:

- Create new data in response to a request;
- Collect information not already maintained; or
- Convert data into a format not already used by the County.

The Act also does not require Todd County to answer questions that are not requests for existing government data.

Requests for Summary Data

Summary data are statistical records or reports prepared by removing all identifiers from private or confidential data on individuals.
Todd County will prepare summary data upon written request if the requester prepays the cost of creating the data. Todd County will respond within ten business days with either:

- The requested summary data; or
- Information regarding when the data will be available and the estimated cost.

Data Practices Contacts:

Todd County Administration

Responsible Authority: County Coordinator
Todd County Government Center
215 1st Avenue South, Suite 201
Long Prairie, MN 56347
Phone: (320) 732-6447

Auditor-Treasurer

Responsible Authority: Auditor-Treasurer
215 1st Avenue South, Suite 201
Long Prairie, MN 56347

Sheriff’s Office

Responsible Authority: Sheriff
115 3rd Street South
Long Prairie, MN 56347

Health & Human Services

Responsible Authority: Director
212 2nd Avenue South
Long Prairie, MN 56347

County Attorney

Responsible Authority: County Attorney
221 1st Avenue South
Long Prairie, MN 56347

Recorder’s Office

Responsible Authority: County Recorder
215 1st Avenue South, Suite 201
Long Prairie, MN 56347

Copy Costs – Members of the Public

Todd County charges members of the public for copies of government data as authorized under Minnesota Statutes, section 13.03, subdivision 3(c).
You must pay for copies before the copies will be provided unless other arrangements are approved by the Department Head or Data Practices Compliance Official.

For 100 or Fewer Paper Copies – 25 Cents per Page

For 100 or fewer pages of black-and-white, letter or legal-size paper copies:

- One-sided copies: $0.25 per page
- Two-sided copies: $0.50 per page

Most Other Types of Copies – Actual Cost

For copies not otherwise covered by statute or policy, Todd County may charge the actual cost of:

- Searching for and retrieving data;
- Employee time;
- Copying materials;
- Electronically transmitting data; and
- Mailing costs.

If Todd County must use an outside vendor to reproduce records, the actual vendor cost will be charged.
Employee time associated with searching for, retrieving, preparing, and copying data is charged at:
$21.00-$75.00 per hour after the first one-half hour per day
Todd County accepts cash, check, money order, or other approved forms of payment.

Todd County Data Request Form – Members of the Public

Date of Request: _____
Department: _____
I am requesting access to data in the following manner:
☐ Inspection
☐ Copies
☐ Both Inspection and Copies
Inspection is free. Copy charges may apply according to the Todd County Copy Cost Policy.

Description of Data Requested

(Describe the requested data as specifically as possible. Attach additional pages if necessary.)

Contact Information

Name: _____
Address: _____
Phone: _____
Email: _____
You are not required to provide contact information unless necessary to process your request. However, without sufficient contact information, Todd County may be unable to clarify or respond to your request.
Todd County will respond to your request as soon as reasonably possible.