



**Occupancy Tax Coordination Committee
AGENDA
February 23, 2026**

Committee Members: CROCITTO, Wild, Strough, Turner, Runyon, Butler, Patchett

Chair of the Board shall serve as an Ex-Officio member when needed in accordance with Section C (4) of the Rules of the Board.

- I. Committee meeting called to order by Chairman Crocitto.
 - II. Motion to approve minutes of the January 20, 2026 Occupancy Tax Coordination Committee meeting.
 - III. Privilege of the floor and public comment
 - IV. Action Agenda/New Business Items:
 - a. **Committee Approval:** To award 2026 Municipal Supplemental Occupancy Tax Funding for seven events/projects recommended applications totaling \$261,600
Rationale: Committee members have reviewed applications and are asked to vote on awards
 - V. Discussion Items:
 - a. Jeff Mead, Ed Moore Glens Falls Civic Center Coalition
 - b. Heather Bagshaw, Tourism Department Overview
 - c. Jessica Carson, Cash Flow Report
 - d. Christine Norton, Treasurer Report
 - VI. Referrals: None
 - VII. Privilege of the floor and public comment
 - VIII. Motion to adjourn
-

Attachment #1: Municipal Supplemental Funding Application Summary Report

Attachment #2: Glens Falls Civic Center Coalition Presentation

Attachment #3: Tourism Department Report

Attachment #4: Cash Flow Report

Attachment #5: Treasurer Report

Application Summary

Period: 2026

Total Award Limit Budgeted 75,000.00

| <u>Organization Name</u> | <u>Event/Project</u> | <u>Amt. Requested</u> | <u>Amt. Awarded</u> |
|-----------------------------|--|-----------------------|---------------------|
| Municipality - Glens Falls | Funds to Develop & Expand New & Existing Events in the City of Glens Falls | 100,000 | 50,000 |
| Municipality - Hague | Hague Event Pavilion- Occupancy Tax Application | 175,000 | 150,000 |
| Municipality - Hague | Music in the Park- Occupancy Tax Application | 10,000 | 10,000 |
| Municipality - Horicon | Food Truck Fridays on the Pond 2026 | 21,100 | 21,100 |
| Municipality - Lake Luzerne | 2026 Concerts and Food Trucks | 13,000 | 13,000 |
| Municipality - Queensbury | 2026 Balloon Festival Fire and EMS Coverage | 7,500 | 7,500 |
| Municipality - Thurman | Observatory Building | 10,000 | 10,000 |
| | | \$336,600 | \$261,600 |

HARDING MAZZOTTI ARENA

LLP

February 16, 2026

To: Warren County Supervisors

From: Jeff Mead, Adirondack Civic Center Coalition Board of Directors

Re: Arena Ice Pro Chiller Plant and Machine Room Update

Warren County Supervisors:

We wanted to give you an update on our Ice Pro Chiller Plant and Machine Room and the need for a full replacement. Below we will detail the current state of our machine room, the reasoning for this need, what we have done currently in this process, and our plan.

CURRENT STATE AND UPDATE

Current Ice Plant Chiller Plant / Machine Room

Our current Ice Pro Chiller Plant was installed in 1999 using a freon refrigerant called r-22. In 2020, r-22 was banned in the United States and is in the phase out process due to ozone depleting properties. We can only purchase reclaimed or recycled refrigerant at this time. Due to this phase out, the cost to purchase r-22 has gone from \$20.00 to \$30.00 per pound in 2020 to \$100.00 to \$200.00 per pound in 2026. Our system requires 5000 pounds to function properly and keep the ice surface frozen. Parts and equipment to work on r-22 are also becoming increasingly difficult to locate to work on and mainly only used parts are now available.

Boilers

The three (3) boilers in the arena were purchased in the early 1980s. Boilers are used for arena heat and hot water. Currently, only two (2) of there are in working condition. Parts are no longer available to purchase for repair on these boilers. The boilers are very low efficient.

Air Handling Units

Air Handling Units 9 and 10 were installed in 1978—original to the building. They were purchased as indoor units that have been used outdoors for forty six (46) years. They are well past their useful life.

Arena Floor

The arena has two (2) floors currently. The last time a replacement was done (1999), a second floor was poured on top of the original floor. A third floor cannot be added, as a potentially collapse of the other two (2) floors may result. These floors must be removed.

Boards and Glass

New boards and glass need to be purchased with this full renovation. The current boards and glass do not meet NHL and AHL standards.

PROCESS AND PLAN

We have engaged CHA Solutions to assist with a solution for our Ice Plant and Machine Room project.

Phase 1—Complete Feasibility Study (document enclosed)

\$40,000.00 internal payment - \$20,000.00 Grant, \$20,000.00 Adirondack Civic Center Coalition Payment.

Phase 2—Engineering and Design (document enclosed)

| | |
|---------------------|-----------------------------------|
| \$750,000 - \$1.25M | Grants Available |
| \$200,000.00 | City of Glens Falls Approved |
| \$200,000.00 | Warren County—Proposed |
| TBD | Adirondack Civic Center Coalition |



7/15/2025

Mr. Ed Moore
Vice President,
The Adirondack Civic Center Coalition
1 Civic Center Plaza,
Glens Falls, NY 12801

**RE: NYSERDA FlexTech Energy Study
CHA Proposal No. Y02588**

Dear Mr. Moore:

Thank you for considering CHA Consulting as a potential partner for the upcoming Ice Rink and HVAC project at the Cool Insuring Arena. CHA Consulting is an approved NYSERDA FlexTech consultant and can work directly with the state to expedite the funding for the energy study. CHA Consulting will partner with Constantine Kontogiannis from Odyssey Energy Solutions LLC to complete this study. The CHA Team is pleased to submit this proposal for an energy study co-funded by NYSERDA's FlexTech program. This will be a feasibility study with the following objectives:

- Provide 2-3 options for the refrigeration system improvement in alignment with the latest DEC requirements/regulations.
- Investigate the replacement of the existing hot water boilers with high efficiency condensing boilers. The new boilers will serve the new proposal HVAC system and the presently inoperative under slab heating system.
- Investigate the replacement of the existing Air Handling Units (AHUs).
- Investigate the opportunity for thermal energy storage using the currently unused thermal storage tank.
- Investigate the HVAC and ice system controls upgrades including removal of existing pneumatic actuators.
- Investigate any ancillary energy improvements such as lighting, etc.
- Coordinate with National Grid on available power and analyze power requirements of the proposed systems.

The study will include energy savings calculations, carbon emissions calculations, detailed cost estimates and payback periods. The study will serve as a pre-requisite for a design funding application to be submitted to NYSERDA by **7/31/2025**.

Outlined below is our recommended path forward for further developing the refrigeration system and energy improvement project based on current available funding programs:

- **Phase 1** – Complete feasibility study which will serve as a pre-requisite for further NYSERDA funding opportunity during detailed design.
- **Phase 2** – Apply for NYSERDA PON 5614 – Large Scale Thermal Program which is a competitive program that offers up to \$750,000 in design funding by July 31st, 2025. The total engineering cost for



this project is anticipated to be between \$750,000 & \$1,250,000 depending on the final design scope of work.

- **Phase 3 – Construction / Implementation** of the recommended upgrades. Based on the initial conversation during the site meeting on 6/13/2025, the construction cost can range between \$5M and \$7.5M depending on the scope of the work. This can be completed by different delivery methods such as Energy Services Performance Contract, Design/Build or EPC, or traditional design-bid-build. ESPC would allow for expedited completion, followed by DB/EPC then DBB.

Potential Costs and Incentives/Grants

| Project Phase | Total Estimated Cost | Available Funding/Grants | Net Cost to Civic Center Coalition |
|------------------------|----------------------|--------------------------|------------------------------------|
| Phase 1 – Study | \$40,000 | \$20,000 | \$20,000 |
| Phase 2 – Design | \$750k - \$1.25M | \$375k - \$750k | \$375k - \$750k |
| Phase 3 – Construction | \$5M - \$7.5M | \$1M - \$2M | \$4M - \$6.5M |

Project Schedule

The CHA Team will commit the resources necessary to complete the project by 7/31/2025 to submit for the NYSERDA PON 5614 design funding.

Study Proposal Fee

The total project budget and associated NYSERDA cost-share are provided below.

| Task | Civic Center Coalition Cost Share (50%) | NYSERDA Cost-share (50%) | Total Project Budget |
|-------------------|---|--------------------------|----------------------|
| Feasibility Study | \$20,000 | \$20,000 | \$40,000 |

Please note: The proposed study fee is subject to final approval of the project scope and associated budget by NYSERDA. This disclaimer is included to account for any potential revisions or feedback from NYSERDA that may impact the final scope or cost structure. We trust this proposal meets your satisfaction. If you have any questions, please do not hesitate to contact Mitch DeWein at (518) 453 – 3980 at your convenience. Thank you for considering CHA and we look forward to working with you on this project.

Sincerely,

Mitch DeWein, CEM
Business Practice Leader
Generation and Energy Management

CC: Joe Thomson – Chief Engineer, CHA
Saarthak Narsipur – Project Manager, CHA

HARDING MAZZOTTI ARENA FLEXTECH ENERGY STUDY DRAFT REPORT

1 Civic Center Plaza
Glens Falls, NY

CHA Project Number: 102588

January 2026

Prepared for:
Harding Mazzotti Arena
1 Civic Center Plaza
Glens Falls, NY

Prepared by:
CHA Consulting, Inc.
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ACKNOWLEDGEMENTS

We extend our sincere appreciation to Larry Didio, Operations Manager, whose responsiveness and comprehensive support in answering our questions and providing the information we needed enabled the successful completion of this report. We also thank Jeff Mead, President of the Adirondack Thunder, for coordinating site visits and meetings and ensuring our team had access to the resources necessary to complete this study. Finally, we are grateful to Ed Moore, Board Member of the Adirondack Coalition, whose leadership, sustained engagement with our progress, and steadfast support helped maintain project momentum and ensure adherence to schedule. Their collective contributions were essential to the quality and rigor of this energy study for the Harding Mazzotti Arena in Glens Falls, NY.

LIST OF ACRONYMS & ABBREVIATIONS

| | |
|-------------------|--|
| AHRI | American Heating and Refrigeration Institute |
| ASHRAE | American Society of Heating and Refrigeration Engineers |
| CHA | CHA Consulting, Inc. |
| DEC | Department of Environmental Conservation |
| DOE | Department of Energy |
| EPA | Environmental Protection Agency |
| UC | Union College |
| NYS | New York State |
| NYSERDA | New York State Energy Research and Development Authority |
| °F | Degrees Fahrenheit |
| AHU | Air Handling Unit |
| BTU | British Thermal Unit |
| CO | Carbon Monoxide |
| CO ₂ | Carbon Dioxide |
| CO ₂ E | Carbon Dioxide Equivalent |
| COP | Coefficient of Performance |
| CT | Cooling Tower |
| DDC | Direct Digital Controls |
| DX | Direct Expansion |
| ECM | Energy Conservation Measure |
| EG | Ethylene Glycol |
| EWT | Entering Water Temperature |
| GPM | Gallons per Minute |
| HP | Heat Pump OR Horsepower |
| HR | Heat Recovery |
| HVAC | Heating, Ventilation & Air-Conditioning |
| KWH | Kilowatt-Hour |
| LF | Linear Foot |
| MBH | Thousand British Thermal Units per Hour |
| MMBTU | Million British Thermal Units |
| MT | Metric Ton |
| MW | Megawatt |
| PG | Propylene Glycol |
| PSI | Pounds per Square Inch |
| RH | Relative Humidity |
| SF | Square Feet |
| VFD | Variable Frequency Drive |

1.0 EXECUTIVE SUMMARY

CHA Consulting, Inc. (CHA) was contracted to complete an energy study report for the Harding Mazzotti Arena (Arena). This NYSERDA FlexTech study was undertaken to address the growing operational, reliability, and compliance risks associated with the Civic Center's aging ice plant and supporting mechanical systems. The most critical driver for action is the existing ice refrigeration system, which relies on R-22 refrigerant that has been fully phased out of production and import in the United States. Continued operation depends on reclaimed refrigerant that is increasingly scarce and costly, significantly increasing the risk of extended downtime in the event of a leak or major equipment failure.

In addition, the existing direct-expansion ice floor configuration circulates refrigerant directly within the slab, making future maintenance and replacement impractical and inconsistent with modern safety and serviceability standards. Any long-term replacement of the ice refrigeration equipment therefore requires replacement of the ice floor itself with a system that isolates refrigerant to the mechanical room. Beyond the ice system, several other core building systems are at or beyond their expected service life, including chillers with limited redundancy, an aging cooling tower that supports critical heat rejection for both ice and comfort cooling loads but is currently under sized and is experiencing multiple equipment failures, non-condensing boilers operating at lower efficiency, arena air-handling equipment that relies on manual operator intervention to manage humidity and ventilation, and a controls system that is antiquated. Collectively, these conditions present increasing financial, operational, and event-delivery risk and support the need for a comprehensive replacement strategy rather than continued reactive repairs.

The recommended solution prioritizes restoring reliability and operational resilience for the ice rink while improving overall building performance where feasible. After evaluating multiple alternatives, CHA recommends replacing the existing ice plant and floor with a new glycol-based ice floor served by water-cooled chillers with heat recovery, along with replacement of the associated cooling tower. Alternative concepts such as heat pump chillers were evaluated but ruled out due to space limitations, constructability challenges, and the inability to reliably meet the low ice-making temperatures required for arena operations. The recommended configuration allows ice-making and comfort cooling loads to operate simultaneously while providing operational redundancy, reducing the risk that a single equipment failure disrupts events or hockey operations.

The new cooling tower is an essential component of this solution, ensuring reliable heat rejection for the water-cooled chillers and supporting stable performance during peak conditions. Heat recovery from the chiller condenser loop allows otherwise rejected heat to be reused for domestic hot water preheating and other low temperature heating needs, improving overall system

Cooling Insurance Arena Flextech Energy Study

efficiency without compromising ice quality. In parallel, replacement of the existing boilers with high-efficiency condensing boilers reduces fuel consumption, improves reliability, and aligns with available utility incentive programs.

Replacement of the arena air-handling and dehumidification equipment with a single integrated air-handling unit is recommended primarily to improve humidity control, ventilation reliability, and freeze protection during winter operation, supporting consistent event conditions and reducing operator burden. A comprehensive building controls upgrade is also recommended to integrate all major systems, including chillers, cooling tower, boilers, air-handling, and dehumidification under a single platform that enables automated sequencing, system protection, and simplified event-mode operation.

The table below indicates the cost and energy savings of all the recommended measures evaluated in this study. It is recommended to implement all the recommended measures in tandem to make sure the new system operates at the highest efficiency from day one.

Table 1. Summary of Measures

| ECM # | ECM Description | Implementation Cost incl. Incentives (\$) | Annual Cost Savings (\$) |
|--------------|--|--|---------------------------------|
| 1C | Replace Arena Floor and Chillers with Water Cooled Chillers w/ Heat Recovery | \$6,062,697 | \$6,600 |
| 2 | Replace Boilers w/ Condensing Boilers | \$348,619 | \$5,000 |
| 3 | Replace Existing Air Handling Units | \$2,553,040 | -\$24,800 |
| 5 | Upgrade Existing Controls | \$600,000 | - |
| | Total Project Cost: | \$9,564,356 | |

2.0 PROJECT UNDERSTANDING

The Arena is seeking to replace its aging ice rink refrigeration system to comply with updated refrigerant regulations. This transition presents an opportunity to explore energy-efficient upgrades across the facility. CHA conducted a comprehensive feasibility study under NYSERDA's FlexTech program to evaluate alternatives for the rink system and assess improvements to supporting infrastructure including boilers, air handling units, thermal storage, and controls.

3.0 EXISTING SYSTEMS

3.1 Overview

The Arena was built in 1979 and contains an approximately 15,000 square foot ice rink which seats 4,774 spectators. It also includes Heritage Hall, a 7,335 square foot banquet and event space. The building uses hot and chilled water for space conditioning as well as for ice rink maintenance.

3.2 Space HVAC

Three 1,200 MBH non-condensing natural gas boilers generate 180°F supply and 160°F return heating hot water which is distributed to air handlers and cabinet heaters throughout the building as well as a heat exchanger for domestic hot water.

The gas chiller provides chilled water to air handlers for comfort cooling. On grade, there is a 225-ton closed circuit cooling tower served by a 2,000-gallon cooling tower sump in the mechanical room.

The office spaces throughout the building are served by individual air source VRF units. Air handling units (AHUs) heat and cool the facility. AHUs 1-4 have been removed or abandoned in place. AHU-7 serves Heritage Hall, and AHU-8 serves the main lobby. AHU-9 and AHU-10 serve the Arena; both are indoor units that have been installed outdoors. Each unit is sized for 174 tons of cooling and 73 MBH of heating at 50,000 cfm of supply air flow. AHU-9 provides some outdoor air and AHU-10 provides dehumidification via a side stream desiccant system. In current operation the outdoor air damper is manually operated. Facility personnel noted that when the ice is in, the outdoor air damper is often kept closed. The heating and cooling coils use water as the working fluid, and as a result the coils are at risk for freezing when outdoor temperatures reach below freezing temperature. The space outdoor air requirement is frequently met through the use of the arena exhaust fans when outdoor air temperatures would cause coil freezing in AHU-9. Each unit has a 50-hp supply air fan. The fans are on VFDs to control air flow as required. AHU-9 and AHU-10 operation is set by the site operator dependent on the event type at the site. Under the current operation, the arena AHUs are not operated during rodeo events or concerts.

Cooling Insurance Arena Flextech Energy Study

For rodeo events, the arena exhaust fans will operate to meet the space exhaust load and ventilation air requirements. For all other events, AHU-10 operates to meet the space dehumidification load and AHU-9 operates to meet the space ventilation requirement. Both units are sized to meet the space comfort heating and cooling loads. The site operator does not operate the two AHUs simultaneously. The existing cooling tower does not have the capacity available to support comfort cooling and icemaking simultaneously.

When ice is in, the rink space is kept at approximately 62°F and 40% relative humidity (rh). This complies with the NHL mechanical/HVAC-R system policy, which requires NHL arenas to “achieve and maintain parameters at ice level between 60°F and 64°F and RH (relative humidity) levels of 40% to 45% during games”¹. There is no space conditioning when the ice sheet is out and there are no events in the space. The arena exhaust fans operate when there is no ice and the outdoor air temperatures are moderate, to bring fresh air into the space. The exhaust fans run overnight when the ice is out to negatively pressurize the space and draw cool outdoor air into the space, and are turned off in the morning when outdoor air temperatures begin to rise.

The dehumidification unit is not operated when the ice sheet is out. The unit is not typically operated during the heating months when outdoor air temperatures are lower. The typical operating months are April through September when the ice sheet is in.

3.3 Ice Rink

The ice sheet is kept between 15-20°F during occupied hours, and when covered the ice is kept at the non-game setpoint around 20°F. There is no night setback for the ice temperature. The ice sheet is controlled off four temperature sensors on the slab. There are existing infrared sensors that read from above, but they can easily be obstructed by snow on the ice or other obstacles and therefore are not used.

The existing ice rink system mainly uses an R-22 electric chiller, which serves only the ice rink. The production and import of R-22 refrigerant in the United States was banned as of January 1, 2020. Reclaimed and recycled R-22 may be used to service existing systems but is in increasingly short supply. For both reasons, the Civic Center is looking to replace the R-22 based chiller.

The gas fired chiller is mainly for comfort cooling, but it can switch to the ice rink as needed.

¹ <https://media.nhl.com/site/asset/public/ext/2020-21/2020-21MechanicalHVACPolicy.pdf>

3.4 Domestic Hot Water

The three natural gas hot water boilers provide domestic hot water to the building via a plate and frame heat exchanger. The domestic hot water serves the kitchen (noted to be a minimal load), the bathrooms, and the Zambonis (140-150°F supply temperature). Concessions have a separate domestic hot water system.

3.5 Thermal Storage Tank

The existing horizontal thermal storage tank is original to 1979 and was last operational in or before 1999.

3.6 Controls

The existing controls system is Johnson Controls International (JCI). Controls in the building are a mix of direct digital control (DDC) and pneumatic controls.

4.0 UTILITY ANALYSIS

National Grid provides electricity and natural gas to the project site. Electricity comes in from Church Street, and the natural gas service comes from Oakland Ave. The facility's annual energy usage is shown in the table below.

Table 2. Annual Utility Usage

| | Consumption |
|---------------------|-------------|
| Electric (kWh) | 1,570,000 |
| Natural Gas (therm) | 50,000 |

The facility's blended rates, based on 18 months of bills, are shown in the table below.

Table 3. Utility Rates

| | Blended Rate |
|------------------------|--------------|
| Electric (\$/kWh) | \$0.153 |
| Natural Gas (\$/therm) | \$0.82 |

The end use breakdown of natural gas consumption was estimated based on information from site visits. This is shown in the Figure below. The ice is out for a period in the summer, which means that the Zamboni, Munters dehumidification unit, and the comfort chiller have zero load. The equipment unit capacities and efficiencies were used to determine the equipment gas usage. A schedule with the number of ice cuts performed for each day was provided by the site operator. This schedule was used to determine the gas consumption from the Zamboni operation.

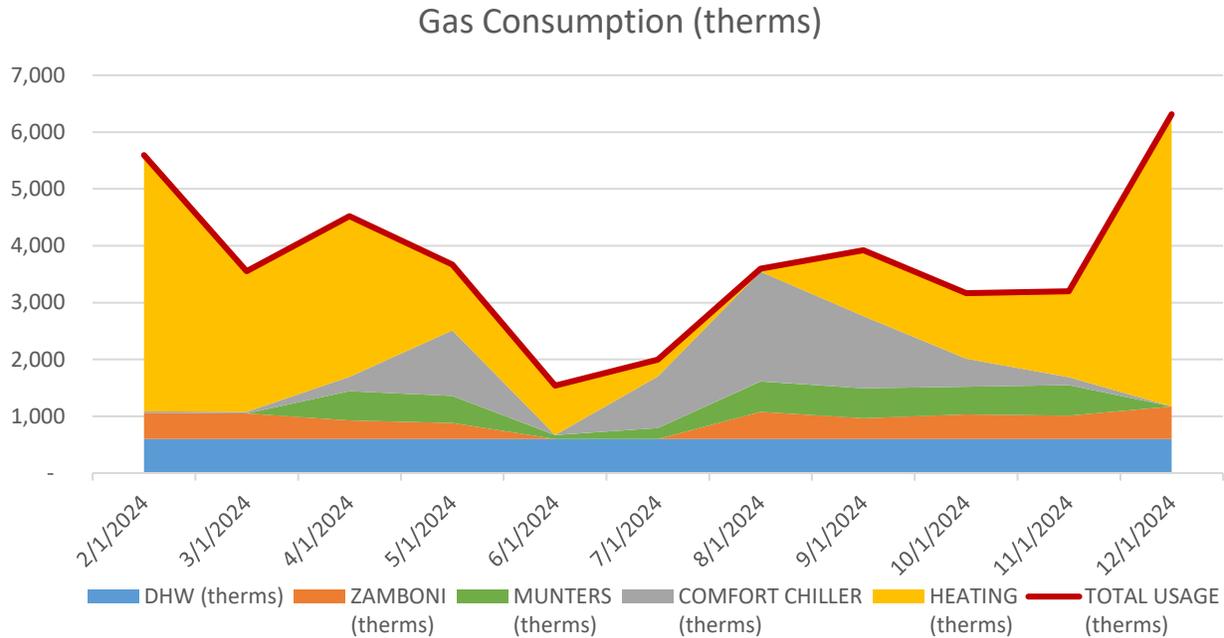


Figure 1. Gas Consumption

The end use breakdown for electricity was also estimated. The ice is out for a period in the summer, which means that the ice chiller, Munters dehumidification unit, and jumbotron all have zero load at that time.

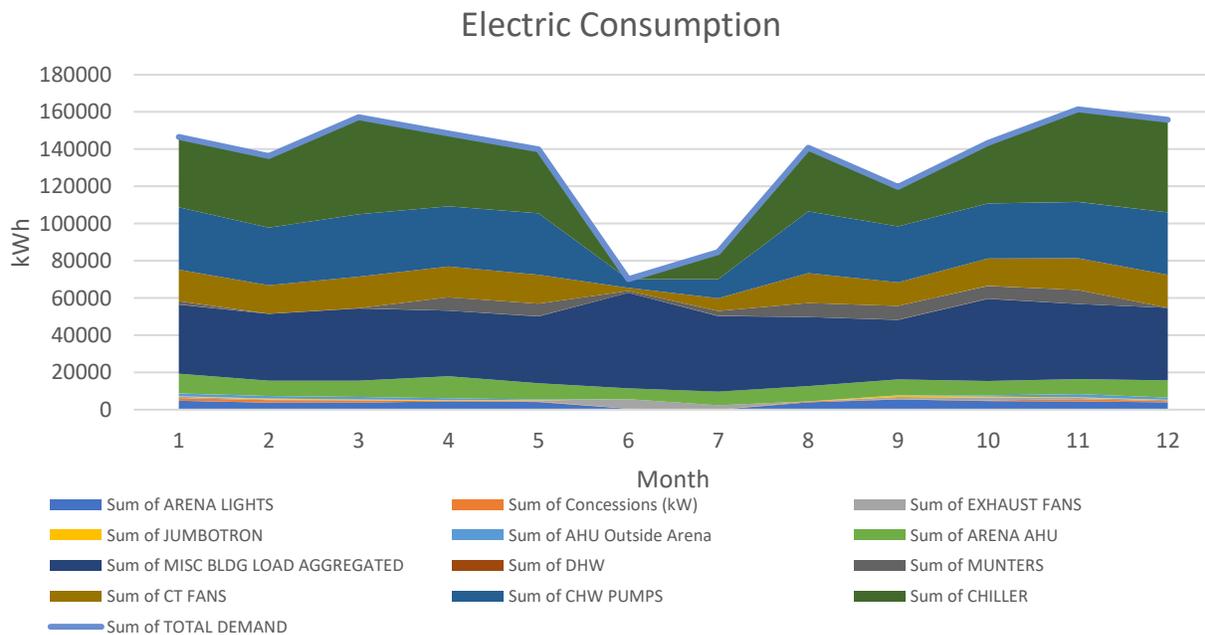


Figure 2. Electric Consumption

The electric usage modeling relied heavily on the testimony of the on-site operators. Traditional software methods of building energy modeling were not viable for this project as the existing equipment constraints due to age and deteriorating function needed to be accounted for. Due to the age of the equipment the performance data from the manufacture was very limited and in cases did not include equipment efficiencies. The equipment electric consumption could not be modeled as accurately software modeling compared to the Excel based energy modeling conducted in this project. Excel modeling was made possible through the detailed operation descriptions from the operators, the 15-minute kW data, and a daily event schedule.

Table 4. Arena Event Types

| Event Type | Ice Status |
|-----------------------|-------------------|
| Basketball | Ice Covered |
| Brewfest | Ice Covered |
| Comedy Show | Ice Covered |
| Concert | Ice Covered |
| Dance | Ice Covered |
| Graduation | Ice Out |
| High School Game | Ice in Use |
| High School Wrestling | Ice Covered |
| Junior Game | Ice in Use |
| MMA Event | Ice Covered |
| Private Event | Ice Covered |
| Pro Game | Ice in Use |
| Rental | Ice Covered |
| Rodeo | Ice Covered |
| Spa Show | Ice Covered |
| Youth Tournament | Ice in Use |

The electric consumption breakdown was modeled based on unit operation schedules developed through site visits, discussions with the site operators, and equipment specifications. A schedule of arena events was provided for 2023, 2024, & 2025 along with incremental 15-minute kilowatt usage data for those years. The event schedule provided dates, event types, and number of times the ice was resurfaced during that day. The resurfacing data was used to calculate part of the domestic hot water load from the Zamboni operation. Equipment operation schedules were developed for each event based on the existing conditions of the equipment, the ice status, and information from the operator. The total electric data was broken out into twelve usage categories as shown in Figure 2. The focus of this analysis surrounded the electric consumption of the chillers, chilled water pumps, cooling tower, arena air handling units, and the Munters dehumidification unit.

The first step in the analysis was determining the electric consumption of sources that are outside the scope of the energy conservation measures. Electrical loads were determined for the concession equipment and jumbotron screen usage. These loads were then applied for typical duration of the events excluding events where concessions would typically not be available. A miscellaneous building load value was developed to encompass all the electric loads not in the scope of this study that would not be dependent on the activity within the arena. This miscellaneous load includes the electric consumption from the VRF units in the offices, any non-arena lighting, and other process loads not considered in this study. The miscellaneous load use was determined through analyzing the recorded building electric use during days when there were no ice and no events scheduled. The load was applied throughout the remaining days of the year.

Using the existing drawings and information on the recent lighting upgrade the electric load for the arena lighting was calculated and applied for the lighting schedules for all events. The exhaust fan electric load was modeled using operation information provided by the site operator and the scheduled horsepower in the existing mechanical drawings. Electric loads for the air handlings units outside of the arena that are still being operated were calculated from existing drawings and applied in the model using event type, occupancy, and recorded outdoor air temperatures to develop an operating schedule

Information gathered from conversations with the on-site operator was relied on for developing operating schedules for the air handling and dehumidification units serving the arena. The unit's name plate information was used to calculate the kWh load for each unit. Constraints to the equipment operation were considered in developing the operator schedule as only one AHU operates at a time, exhaust fans need to be utilized when the out door air temperatures would cause coil freezing in the AHUs when the ventilation dampers are open, and the AHUs are not operated when there is ice is out and there are no events taking place. The operating schedules were then further developed considering these constraints along with event type, space occupancy, and outdoor air temperature. The model reflects events, including rodeo and concerts, when the AHU system is not used and is instead handled by the exhaust fans. The Munters unit operation is limited to only when there is ice in and it is not covered. There is limited need for dehumidification in the winter months as expressed by the site operator. This condition is accounted for in the model using the outdoor air temperature and month of operation to determine when the dehumidification unit is operating.

From determining the electric load that does not contribute to the ice making and chiller water system, we were able to use the remaining load to determine when the chillers would be operating. Using this schedule of chiller operation the electric load from the chilled water pumps and cooling tower were modeled as their operation is dependent on the chiller operation. During

graduation events when there was no ice the chilled water pumps and cooling tower fan use were modeled to account for the gas comfort chiller providing air conditioning through the arena AHUs. The remaining electric use recorded in the 15-minute incremental data after removing the calculated loads was determined to be the load from the electric chiller. The accuracy of this chiller load modeling was deemed valid when further analyzing the resulting data. The chiller demand peaks during a pro game event when the arena occupancy is at its highest and the ice making demand would be at its highest. The peak electric demand aligned with the peak capacity of the existing electric chiller. Appropriate load trends were seen for when the ice was covered, uncovered and not being used, or in use.

5.0 ENERGY CONSERVATION MEASURES

The table below lists the ECMs assessed during the development of this study report.

Table 5. Energy Conservation Measures

| ECM No. | Measure |
|----------------|----------------------------|
| ECM 1A | Heat Pump Chiller |
| ECM 1B | Water Cooled Chiller |
| ECM 1C | Water Cooled Chiller w/ HR |
| ECM 2 | Replace Boilers |
| ECM 3 | Replace Air Handling Units |
| ECM 4 | Evaluate Thermal Storage |
| ECM 5 | Controls Upgrade |

The above measures were evaluated based on the following factors:

- Energy use reduction
- Implementation cost
- Financial payback
- Resiliency and redundancy

CHA prepared calculations using bin analysis, past experience, and industry standards. The data used to support these calculations was obtained from the facility walk-through, drawings obtained from the site, and facility personnel interviews. Assumptions used in these calculations are derived from industry experience and research. Costs were estimated using a combination of vendor quotes, previous project costs, RS Means, and general experience. The following sections provide details for each of the ECMs.

5.1 ECM 1: Ice Rink Chiller Replacement

The existing ice rink chiller is direct expansion (DX), circulating R-22 throughout the ice rink floor. Both replacement options, 1A and 1B, will require ice rink floor replacement using a 35% ethylene

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glycol (EG) mixture as the heat transfer fluid. It is assumed that the “in kind” replacement costs include this ethylene glycol based rink floor replacement.

It is anticipated that reusing the path of the existing R-22 piping will be the most feasible route from the mechanical room to the ice rink. The concrete floor will need to be sawcut to allow for replacement of piping, as well as lowering the floor around the rink to previous elevation. Pipe routing within the rink itself will be designed in a reverse return configuration as shown in the Figure below.

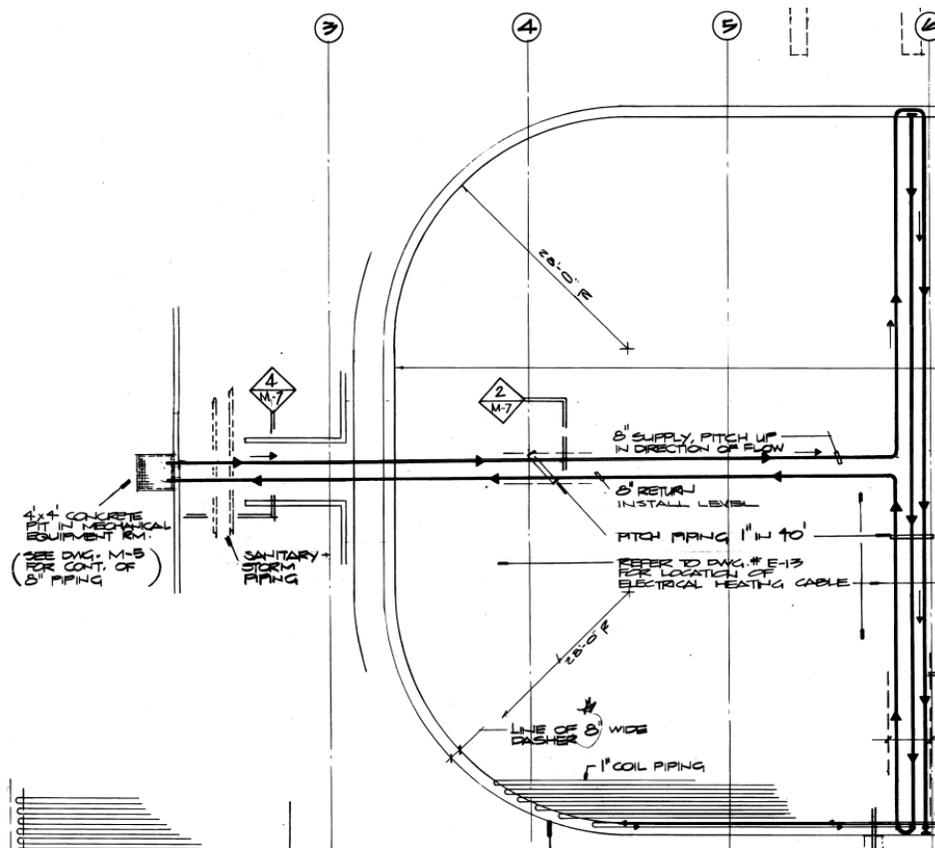


Figure 3. Existing Ice Rink Pipe Routing

The new floor would be a 6” concrete slab with subfloor heating below and headers run through the slab to freeze the rink.

The proposed system would be piped differently than the existing system, with ethylene glycol running through the rink floor. In regular operation the rink chiller will generate 10°F chilled water (35% ethylene glycol [EG]) for the rink, and the comfort chiller will generate 40°F chilled water (35% EG) for the air handlers, which will pass through a plate and frame heat exchanger to provide 42°F supply chilled water (40% propylene glycol [PG]). If one of the chillers is down, the other can provide redundancy. Either the comfort chiller will generate colder fluid to send to the

ice rink, or the ice chiller will generate warmer fluid to send to the air handlers via the heat exchanger. This operation will be controlled by two-way control valves. The proposed schematic is shown in the Figure below.

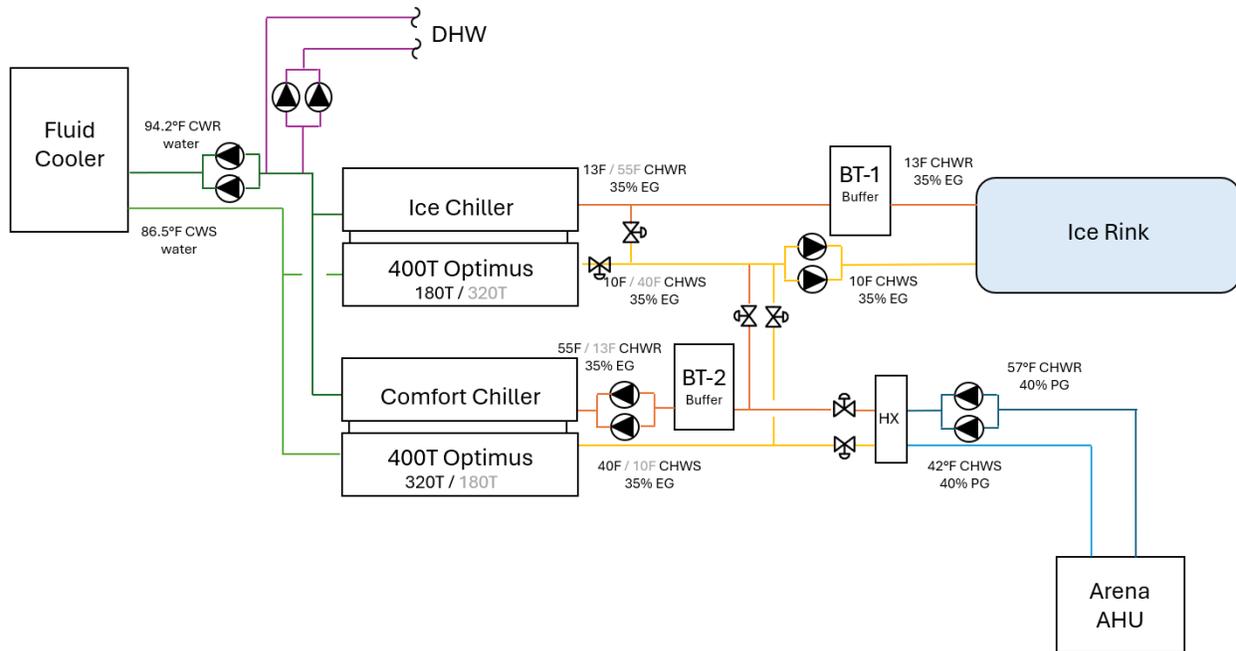


Figure 4. Chiller Schematic

5.1.1 Option 1A: Heat Pump Chiller

An investigation was conducted into the feasibility of implementing a heat pump chiller for the ice making and comfort cooling of the arena. During the site evaluation, the constructability of this option was found to be not feasible. There would be no outdoor space available for these heat pumps when considering the unit capacity size required for ice rink applications. The exterior space adjacent to the mechanical room is in close proximity to the property line, leaving minimal space for additional equipment installation. The space currently houses the existing fluid cooler, two Carrier air handling units, Munters unit, and additional electric equipment, some of which is shown in the design drawing below. As the drawing also shows, although the equipment (namely AHU-9) is on the Civic Center’s side of the fence it is likely straddling the property line.

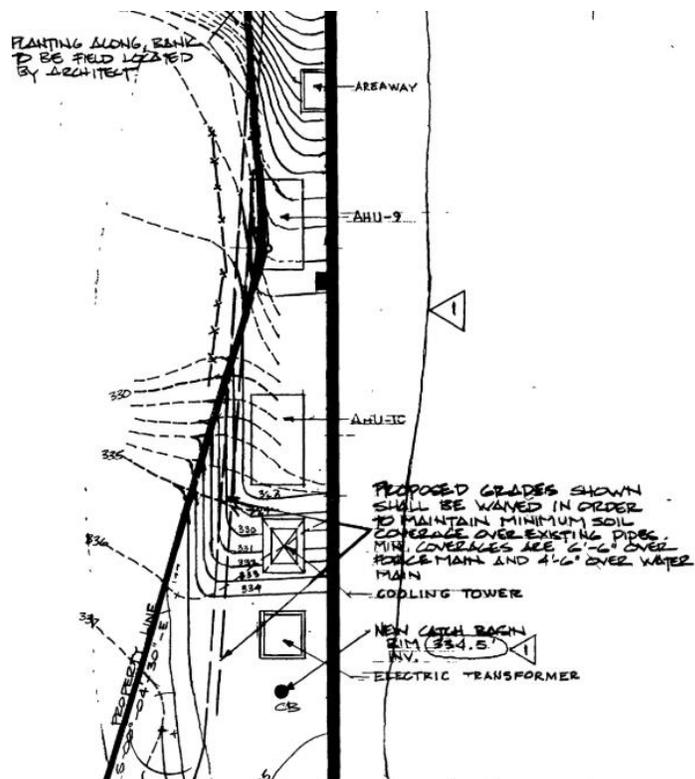


Figure 5. Civic Center East Property Line (1978)

The heat pump chiller option would lead to the removal of the fluid cooler, but the AHU and electrical equipment would remain leaving insufficient space for the heat pump chiller installation.

An investigation into removing the thermal storage tank and using the newly available space in the mechanical room for an indoor heat pump chiller solution was conducted. The ice making chiller requires a 10°F LGT. There was not an available indoor heat pump chiller unit that could meet this operating condition. As a result of the lack of constructability and available unit performance, this ECM option was not pursued further.

5.1.2 Option 1B: Water Cooled Chiller

Water cooled chillers were evaluated to replace the existing chillers for ice rink processes and comfort cooling. The ice rink chiller would be sized at 10°F LGT / 13°F EGT chilled glycol (35% EG) temperatures, 94°F / 86.5°F condenser water (40% PG) temperatures, with 180 tons of cooling at these conditions. The comfort cooling chiller would be sized at 40°F / 55°F chilled water (40% PG) temperatures, same condenser temperatures as above, with 320 tons of cooling at these conditions.

The existing evaporative cooler would need to be replaced and rightsized to serve both chillers simultaneously. A fluid cooler to serve both chillers would be larger than the existing evaporative

cooler which can serve only one chiller. The new fluid cooler would be about 675 tons, measuring approximately 12' W x 18' L x 22' H.

This ECM also includes replacing the chilled water pumps with variable speed pumps sized for the fluids and temperatures of the system and replacing the condenser water pumps for the correct fluids and flows of the system. A ventilation system would need to be evaluated for the mechanical room based on the new chiller refrigerant.

Table 6. ECM 1B Summary

| ECM 1B | Water Cooled Chiller | |
|---|----------------------------|-------------|
| Baseline | Electric Consumption (kWh) | 907,000 |
| | Natural Gas (therms) | 6,200 |
| Proposed | Electric Consumption (kWh) | 911,000 |
| | Natural Gas (therms) | 0 |
| Savings | Electric Consumption (kWh) | -4,300 |
| | Natural Gas (therms) | 6,200 |
| | Utility Savings (\$) | \$4,400 |
| Estimated Cost | | \$6,036,000 |
| Incremental Cost over In-Kind Replacement | | \$332,000 |
| Simple Payback (years) | | 75 |

This measure is not only an energy saving measure, but also increases system both redundancy, by providing a back-up option for the rink chiller, and quality, by allowing the rink chiller and the comfort cooling chiller to run simultaneously.

5.1.3 Option 1C: Water-Cooled Chiller w/ Heat Recovery

As an alternative for a water-cooled chiller, the same traditional water-cooled chiller with evaporative cooler was analyzed, with heat recovery off of the condenser water. The ice rink chiller would be sized at 10°F LGT/ 13°F EGT chilled glycol (35% EG) temperatures, 94°F / 86.5°F condenser water (40% PG) temperatures, with 180 tons of cooling at these conditions. The comfort cooling chiller would be sized at 40°F LWT / 55°F chilled glycol (40% PG) temperatures, the same condenser temperatures as above, with 320 tons of cooling at these conditions.

Even though the chiller is not a heat recovery chiller, the condenser water is warm enough in parts of the year to be used for domestic water preheat, snowmelt for the Zambonis, and subfloor heating under the rink. It is assumed that the chiller condenser water can be used to preheat these domestic hot water applications from 55°F to 75°F.

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The existing evaporative cooler would need to be replaced and rightsized to serve both chillers simultaneously. A fluid cooler to serve both chillers would be larger than the existing evaporative cooler which can serve only one chiller. The new fluid cooler would be about 675 tons, measuring approximately 12' W x 18' L x 22' H.

This ECM also includes replacing the chilled water pumps with variable speed pumps sized for the fluids and temperatures of the system and replacing the condenser water pumps for the correct fluids and flows of the system. A ventilation system would need to be evaluated for the mechanical room based on the new chiller refrigerant.

Table 7. ECM 1C Summary

| ECM 1C | Water Cooled Chiller w/ Heat Recovery | |
|---|--|---------|
| Baseline | Electric Consumption (kWh) | 907,000 |
| | Natural Gas (therms) | 6,200 |
| Proposed | Electric Consumption (kWh) | 911,000 |
| | Natural Gas (therms) | -2,700 |
| Savings | Electric Consumption (kWh) | -4,300 |
| | Natural Gas (therms) | 8,900 |
| | Utility Savings (\$) | \$6,600 |
| Estimated Cost | \$6,062,000 | |
| Estimated Cost w/ Incentives | \$6,027,000 | |
| Incremental Cost over In-Kind Replacement | \$323,000 | |
| Simple Payback (years) | 49 | |

This measure is not only an energy saving measure, but also increases system both redundancy, by providing a back-up option for the rink chiller, and quality, by allowing the rink chiller and the comfort cooling chiller to run simultaneously. This ECM includes \$35,600 in National Grid Custom Gas incentives, discussed further in Section 6.1.2.2 below.

5.2 ECM 2: Replace Boilers

As mentioned in Section 3.0 three natural gas boilers, each with an input of 1,500 MBH and output of 1,200 MBH, currently provide heating and domestic hot water for the building. This measure evaluated the energy savings associated with removing and replacing the existing boilers with three 1,203 MBH natural gas condensing boilers.

The proposed boilers will have a rated thermal efficiency of 96.2% and an average operating efficiency of 91.9%. The condensing boilers have a secondary heat exchanger that extracts the latent heat from the flue exhaust to preheat the return water. This allows them to achieve better operating efficiencies as compared to non-condensing boilers. During this process, the flue

temperatures decrease which causes the moisture in the flue exhaust to condense out. The condensate is an acidic and corrosive product. This acidity will be addressed with a condensate neutralization kit provided with the condensing boiler. The proposed boilers will share a common venting for flue gases and outdoor air, routed through the mechanical room exterior wall.

The boiler replacement would include replacement of circulation pumps, controls, boiler trim, and venting. To prevent short cycling and extend the life span of the boilers, a buffer tank should be provided during the boiler replacement. The buffer tank would be connected between the boiler and the heat exchanger serving the domestic hot water system. The tank allows the boiler to run for longer periods of time to limit wear on the boilers.

Based on the baseline and proposed natural gas consumption, the estimated emissions reduction is 34 MT CO₂e per year.

Table 8. ECM 2 Summary

| ECM 2 | Replace Boilers | |
|---|----------------------------|-----------|
| Baseline | Electric Consumption (kWh) | 925 |
| | Natural Gas (therms) | 42,300 |
| Proposed | Electric Consumption (kWh) | 2,450 |
| | Natural Gas (therms) | 35,900 |
| Savings | Electric Consumption (kWh) | -1,525 |
| | Natural Gas (therms) | 6,400 |
| | Utility Savings (\$) | \$5,000 |
| Estimated Cost | | \$349,000 |
| Incremental Cost over In-Kind Replacement | | \$115,000 |
| Simple Payback (years) | | 23 |

This ECM includes \$25,600 from a National Grid rebate for high efficiency gas equipment, discussed further in Section 6.1.2.

5.3 ECM 3: Replace Air Handling Units

The Arena is served by AHU-9 and AHU-10, as described in Section 3.0. This ECM evaluates replacing these two AHUs and the side stream desiccant dehumidification unit with a single AHU sized for 230 Tons of cooling with an integral desiccant wheel. This replacement equipment would maintain the design space conditions of 60°F and 40% RH. Alterations to the current ductwork layout and building penetrations would be required to allow for the new AHU configuration. The chilled water and hot water coils should operate with 25% PG to mitigate freezing that would occur from contact with outdoor air.

The system should employ demand control ventilation (DCV) to reduce energy consumption by only providing the ventilation required for the number of occupants at a given time. This would be controlled through multiple CO₂ sensors in the arena or in the return air duct of the air handler. The system should also employ humidity sensors in the space to control the desiccant wheel operation required to meet the 40% RH design condition and reduce energy consumption. Energy recovery shall be provided to the ventilation air.

Other conditions such as running at 100% outdoor air during rodeo events were not included in these design criteria but could be examined during design.

Table 9. ECM 3 Summary

| ECM 3 | Replace Air Handling Units | |
|---|----------------------------|-------------|
| Baseline | Electric Consumption (kWh) | 153,300 |
| | Natural Gas (therms) | 3,150 |
| Proposed | Electric Consumption (kWh) | 317,500 |
| | Natural Gas (therms) | 2,700 |
| Savings | Electric Consumption (kWh) | -164,300 |
| | Natural Gas (therms) | 460 |
| | Utility Savings (\$) | -\$24,800 |
| Estimated Cost | | \$2,553,000 |
| Incremental Cost over In-Kind Replacement | | \$1,296,000 |
| Simple Payback (years) | | N/A |

Though the cost of the unit operation increases for this ECM, the quality of operation improves substantially. Propylene glycol mixtures have a lower freezing point than water. Providing a coil designed for a working fluid of 40% propylene glycol will prevent the coil from freezing. As a result of resolving the coil freezing issue, the outdoor air damper can be operated without being dependent on the outdoor air temperature. This upgrade to the ventilation system will provide conditioned fresh air to the space rather than unconditioned air that infiltrates the building when the exhaust fans run in the existing HVAC operation.

Replacing the current air handling system with a single unit will reduce the amount of equipment requiring maintenance. Current operating of AHU-9 & AHU-10 only provides supply air on one side of the arena at a time as shown in the arena ductwork layout below. The single unit operation will provide a more uniform air distribution through the arena as the proposed unit will supply conditioned air through both runs of supply ductwork during operation. To allow for the conversion to the single unit configuration the exterior ductwork will need modification to route the existing ductwork penetrations to the AHU ductwork connections. Ductwork supports along the exterior

wall of the Arena will be necessary to support the new ductwork and connections. Utilizing both sides of the arena ductwork will allow for a more uniform air distribution throughout the arena.

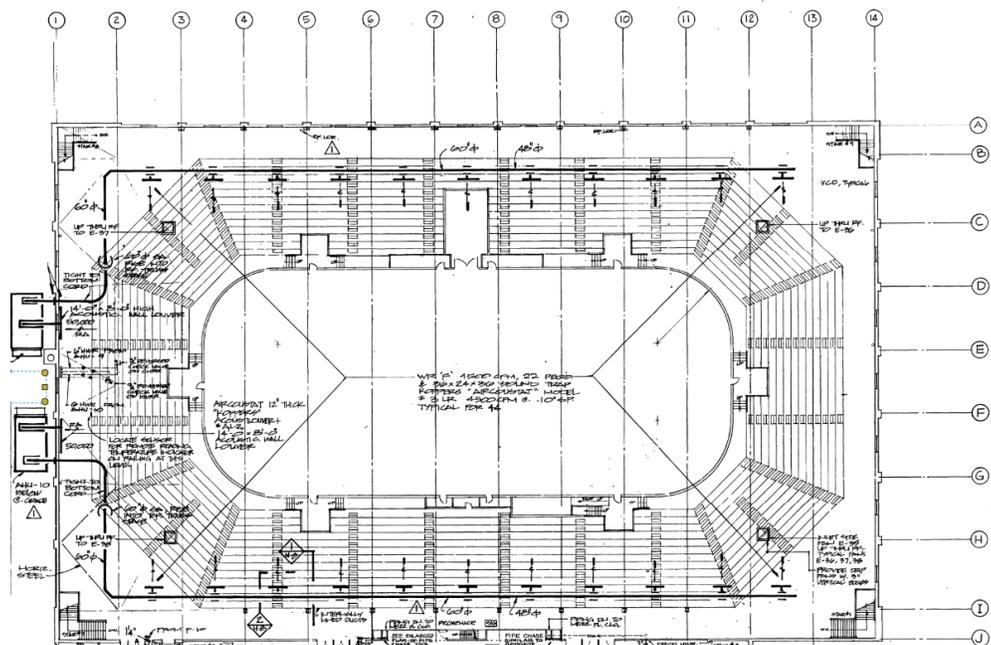


Figure 6. Arena Ductwork Layout

An investigation into different types of dehumidification was done to determine the best approach for this application. Passive desiccant wheels, active desiccant wheels, and mechanical dehumidification were compared and due to the low design temperature of the arena it was determined that the mechanical dehumidification and passive desiccant options would not be suitable for this application. The active desiccant wheel uses outdoor air to recharge the desiccant wheel to enable the wheel to continue to dehumidify the air. An investigation into reducing the total airflow from the AHU was investigated. In order to maintain a proper supply air design relative humidity, the total air flow needs to be maintained at 100,000 cfm of supply air. Similar to the existing side steam desiccant system, the total 100,000 cfm of the supply air to the arena would not pass through the desiccant wheel. The single AHU would be able to split the return air stream into an exhaust the air stream determined necessary by the DCV sensors, an air stream fed through the desiccant wheel, and the remaining air volume would be reconditioned to the design temperatures. Then, within the single unit the conditioned and dehumidified air is mixed with conditioned outdoor air and supplied to the arena. The single AHU would meet the arena HVAC requirements currently being met through three separate pieces of equipment.

NHL regulations provide guidelines for arena dewpoints during games. The NHL requires a dew point of 35°F at the start of the game but can drift to a 41.7°F dewpoint by the end of the game. This dewpoint drift would translate to a drift from 31 gr/lb humidity ratio to 39 gr/lb humidity ratio in the space air. For the AHU with the integrated desiccant wheel the unit can flow a maximum of

30,000 cfm through the desiccant wheel. At the design condition of full attendance during peak cooling outdoor air conditions the unit is limited in its ability to remove the moisture in the air because of the maximum air flow allowed through the desiccant wheel. To ensure the air handling unit operates within the NHL guidelines for the pro game a moisture balancing equation was used to model the humidity ratio throughout the game. A schedule was developed to model the arena occupancy throughout the game to consider breaks between periods and full occupancy during playing time. The model uses the latent heat added by the spectators and athletes in the arena to find the moisture being added to the space over time. Then humidity ratio of the supply air was calculated using the mixed humidity ratio of the return air and the desiccant treated air. The latent load in the space caused an increase in return air humidity ratio, but the performance of the selected desiccant wheel maintains a space humidity ratio below the 39 gr/lb threshold set by the NHL.

As part of the ice resurfacing process, the Civic Center Arena employs propane fueled Zambonis. ASHRAE 90.1 states in Table 6-2 that “Where combustion equipment is intended to be used on the playing surface, additional dilution ventilation, source control, or both shall be provided” but does not specify a required dilution rate. Minnesota, Massachusetts, and Rhode Island are the only states in the US with a noxious gas concentration limit specifically for ice arenas. Using the CO limit set by these standards and recommended by the US Ice Rink Association, safety control can be programmed into the new AHU to ensure the space CO concentration does not exceed the 20 ppm recommended by the US Ice Rink Association. This controls update would provide a safer arena especially during times of peak ice use and occupancy.

The upgraded unit replacement will help to decrease the maintenance time and costs spent on these units.

5.4 ECM 4: Evaluate Thermal Storage

The condition of the existing thermal storage tank is unknown due to its age and length of time unused. This measure evaluates removing the existing thermal storage tank and replacing it with eight ice storage tanks, sized in total for 1,300 ton-hours.

In normal circumstances, ice storage could be used to decrease in chiller size, however that would not be the case for this application to ensure that there is still full redundancy for the chiller serving the rink floor. This would allow for increased efficiency when running the comfort cooling chiller by running at part load for longer hours instead of full load during peak hours. At the same time, there would be a decrease in efficiency due to the lower supply temperatures off the comfort chiller. An additional benefit would be shifting the comfort cooling load to hours when the rink chiller is not running, thereby decreasing the coincident load on the fluid cooler.

Table 10. ECM 4 Summary

| ECM 4 | Evaluate Thermal Storage | |
|---------------------------------|---------------------------------|-----------|
| Baseline | Electric Consumption (kWh) | 205,000 |
| | Natural Gas (therms) | 0 |
| Proposed | Electric Consumption (kWh) | 155,000 |
| | Natural Gas (therms) | 0 |
| Savings | Electric Consumption (kWh) | 50,000 |
| | Natural Gas (therms) | 0 |
| | Utility Savings (\$) | \$7,700 |
| Estimated Cost | | \$858,000 |
| Estimated Cost incl. Incentives | | \$340,000 |
| Simple Payback (years) | | 44 |

5.5 ECM 5: Controls and Automation Upgrade

This measure includes upgrading the building BMS to automate equipment operation and scheduling and to include demand control ventilation. This measure also includes replacing remaining pneumatic controls with DDC. Existing pneumatic actuators are mainly some of the lobby temperature sensors, as well as dampers and control valves.

The scheduling feature of the BMS would save manhours by allowing the operator to choose a preset schedule for a given event type, thereby controlling the operation of the equipment serving the Arena.

Table 4. ECM 5 Cost

| ECM 5 | Controls and Automation Upgrade | |
|----------------|--|-----------|
| Estimated Cost | | \$600,000 |

6.0 FINANCIAL ANALYSIS

6.1 Potential Funding Sources

6.1.1 Municipal Bonds

The City of Glens Falls issues bonds to pay for municipal projects. The city's bond rating was recently upgraded to A1, signifying the city's improving financial status. Higher rated municipalities typically receive lower interest rates.

6.1.2 Utility Incentives

6.1.2.1 Clean Heat

Clean Heat, a joint utility incentive program, provides incentives for heat recovery and heat pump chillers. Equipment must be electrically operated and meet minimum efficiency requirements; equipment used for process heating is ineligible.

The chillers in ECM 1A may be applicable under Category 4 Custom Space Heating Applications, Category 6 Custom Centralized Hot Water Heating Applications, or Category 10 Custom Partial Load Space Heating Applications, depending on usage, all of which are incentivized at a rate of \$80/MMBtu of annual energy savings. It is assumed that the Civic Center will not be able to receive both the Clean Heat and Gas Equipment Incentives from National Grid for the same equipment. Since the estimated Gas Equipment incentive is higher, that value has been used for this analysis.

6.1.2.2 High Efficiency Commercial and Industrial Gas Equipment Incentives

National Grid's Update New York incentive program includes prescriptive incentive measures for various types of equipment². For condensing boilers between 1,000 and 1,700 MBH, with greater than or equal to 92% thermal efficiency, National Grid offers \$7,500 per boiler. For the three boilers, this would total \$22,500. However, the custom incentive below offers a slightly higher incentive rate and was assumed to be included for this project.

There are also custom incentives for gas-saving measures not covered by the prescriptive incentives, which offer up to \$4/therm, up to 85% of project costs, with a project incentive cap of \$250,000. The published \$4/therm rate is for 2024; until more updated information is published it is assumed that this will be the incentive rate for 2026. This includes projects such as heat

² https://www.nationalgridus.com/media/pdfs/bus-ways-to-save/ee4743_uny_ci-gas-incentives.pdf

recovery units, process improvements, etc. For ECM 1B Water Cooled Chiller with Heat Recovery, this would total \$35,600.

6.1.3 179D Tax Deductions

There is a federal tax deduction available for energy efficient commercial building property. The deduction requires that the property for an interior lighting system, HVAC system, or building envelope is part of a plan to reduce total annual energy and power costs by 25% or more in comparison to a 90.1 reference building.

For 2025, the deductions available are \$0.58-1.16/ft² for the base deduction, or \$2.90-5.81/ft² for a project that meets prevailing wage and apprenticeship (PWA) requirements. There is also an adder of \$0.02/ft² for each percentage point above 25% for the base deduction, or \$0.12/ft² for each percentage point above 25% for the PWA deduction.

6.1.4 Section 48 Tax Credits

Thermal storage qualifies for investment tax credits as “energy storage property” under Section 48. The base credit is 6%, jumping to 30% for projects that meet the prevailing wage and apprenticeship requirements, and a 10% adder for domestic content for a total of 40% of eligible system components.

This is expected to include the cost of the chiller connected to the thermal storage system, which would be the comfort chiller. The estimated incentive below reflects a 40% credit on thermal storage ECM component costs plus a 40% credit on the comfort chiller installation costs.

6.2 Financial Summary

The estimated implementation cost and incentive for each measure are shown in the table below.

Table 12. Cost Summary

| ECM # | ECM Name | Implementation Cost (\$) | Incremental Implementation Cost (\$) | Est. Incentive (\$) | Incremental Cost incl. Incentive (\$) |
|-------|----------------------------|--------------------------|--------------------------------------|---------------------|---------------------------------------|
| 1A | Heat Pump Chiller | - | - | - | - |
| 1B | Water Cooled Chiller | \$6,036,000 | \$332,000 | \$0 | \$332,000 |
| 1C | Water Cooled Chiller w/ HR | \$6,062,000 | \$358,600 | \$35,600 | \$323,000 |
| 2 | Replace Boilers | \$349,000 | \$140,500 | \$25,600 | \$115,000 |

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| | | | | | |
|---|---------------------------------|-------------|-------------|-----------|-------------|
| 3 | Replace Air Handling Units | \$2,553,000 | \$1,296,000 | \$0 | \$1,296,000 |
| 4 | Evaluate Thermal Storage | \$858,000 | \$858,000 | \$518,000 | \$340,000 |
| 5 | Controls and Automation Upgrade | \$600,000 | \$600,000 | \$0 | \$600,000 |

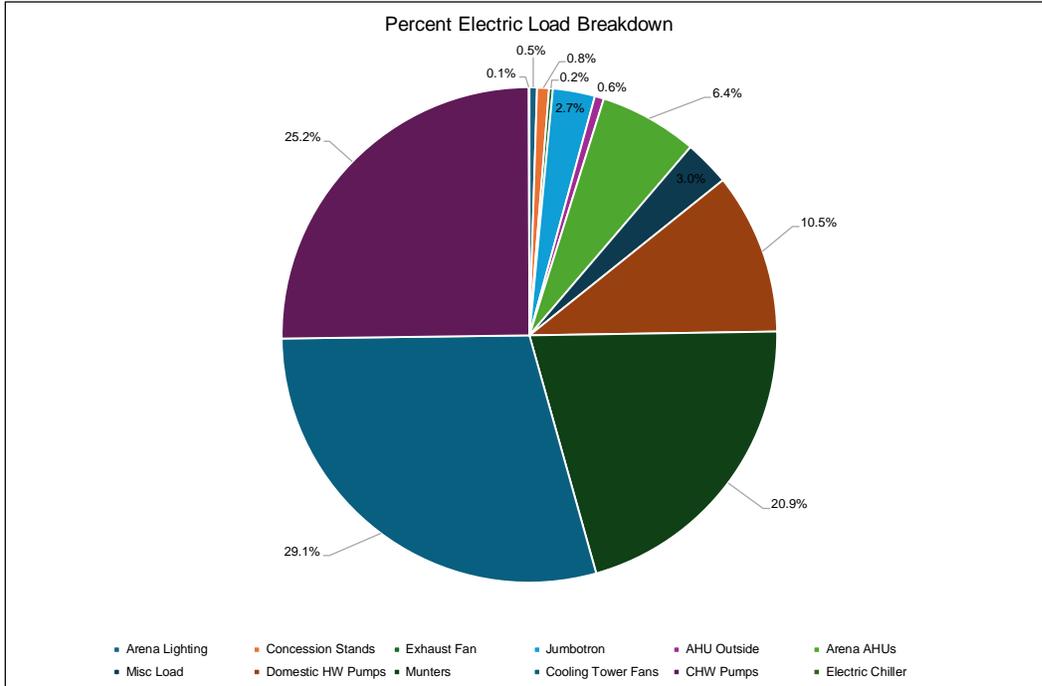
7.0 CONCLUSION

CHA identified several measures that, if implemented, would result in energy savings and improved operation for the building. These measures also provide replacements for much of the equipment that is at the end of life and needs to be replaced or uses phased-out refrigerant and needs to be replaced. Therefore, it is recommended to replace the chillers with water-cooled chillers and implement heat recovery, replace the boilers with condensing boilers, and replace the air handlers.

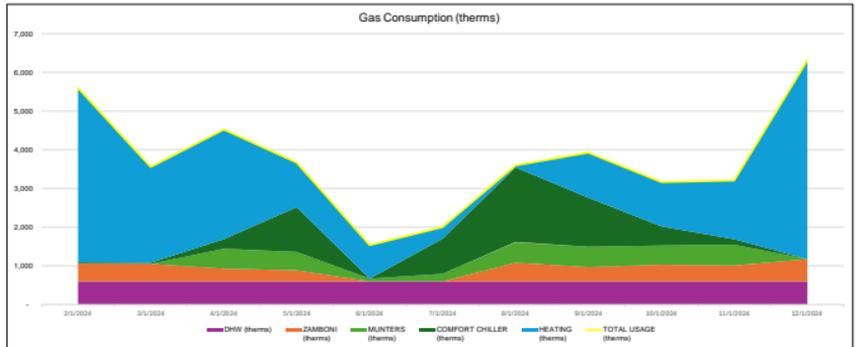
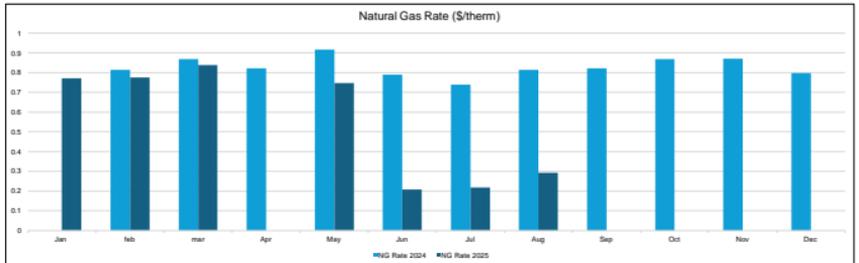
APPENDIX A

Energy Savings Calculations

| Baseline Equipment Monthly Electric Consumption (kWh) | | | | | | | | | | | | | |
|---|----------------|-------------------|---------------|--------------|--------------|----------------|----------------|-------------------|---------------|--------------------|----------------|------------------|------------------|
| Month | Arena Lighting | Concession Stands | Exhaust Fan | Jumbotron | AHU Outside | Arena AHUs | Misc Load | Domestic HW Pumps | Munters | Cooling Tower Fans | CHW Pumps | Electric Chiller | Total kWh |
| January | 4,869 | 1,370 | 750 | 264 | 1,448 | 10,641 | 37,137 | 90 | 1,680 | 17,049 | 33,480 | 37,714 | 146,492 |
| February | 3,726 | 1,481 | 210 | 522 | 1,480 | 8,092 | 35,943 | 76 | 14 | 15,267 | 31,050 | 38,413 | 136,274 |
| March | 3,726 | 1,276 | 75 | 408 | 1,384 | 8,727 | 38,839 | 89 | 42 | 16,956 | 33,435 | 52,262 | 157,220 |
| April | 4,420 | 473 | - | 180 | 1,144 | 11,790 | 35,185 | 84 | 7,112 | 16,587 | 32,400 | 39,011 | 148,386 |
| May | 4,066 | 473 | 390 | 204 | 392 | 8,620 | 36,045 | 81 | 6,650 | 15,555 | 33,075 | 34,397 | 139,948 |
| June | 544 | - | 5,100 | - | - | 5,913 | 51,246 | 59 | 980 | 1,656 | 4,635 | - | 70,147 |
| July | - | - | 2,385 | - | - | 7,328 | 40,635 | 44 | 2,688 | 6,819 | 10,260 | 14,436 | 84,595 |
| August | 3,958 | 425 | 105 | - | 48 | 8,145 | 37,071 | 60 | 7,462 | 16,149 | 33,165 | 34,237 | 140,825 |
| September | 5,522 | 126 | 1,140 | 924 | 64 | 8,547 | 31,963 | 89 | 7,308 | 12,747 | 30,150 | 21,134 | 119,714 |
| October | 4,706 | 315 | 1,425 | 642 | 712 | 7,586 | 44,189 | 90 | 6,804 | 14,841 | 29,550 | 32,473 | 143,333 |
| November | 4,515 | 1,134 | 735 | 324 | 1,712 | 8,001 | 40,289 | 75 | 7,518 | 17,094 | 30,240 | 49,776 | 161,413 |
| December | 3,944 | 693 | 450 | 276 | 1,152 | 9,208 | 38,934 | 88 | - | 17,814 | 33,435 | 49,757 | 155,751 |
| Totals | 43,996 | 7,765 | 12,765 | 3,744 | 9,536 | 102,598 | 467,477 | 925 | 48,258 | 168,534 | 334,875 | 403,611 | 1,604,097 |



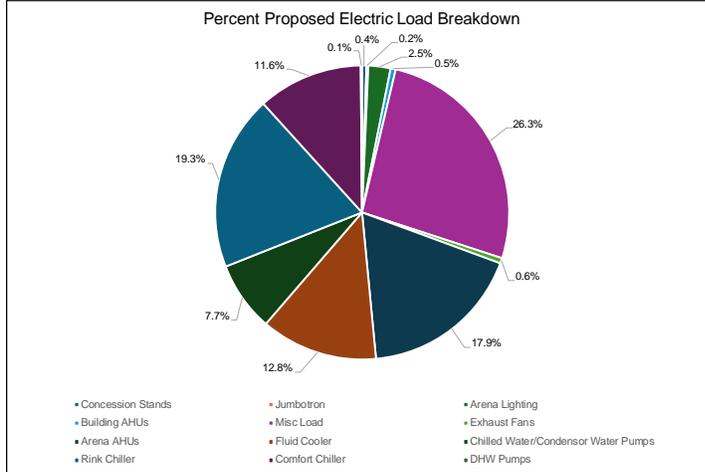
| GAS UTILITY RECONCILIATION | | | | | | | | | | | | | | | | |
|----------------------------|-----------|----------------------|-------------|--------------------|-----------------|------------------|--------------|------------------|------------------|----------------------|--------------------------|--------------|------------|------------|--------------|-----------------------------|
| START DATE | END DATE | TOTAL USAGE (therms) | COST (\$) | NG RATE (\$/therm) | BOILER (therms) | ZAMBONI (therms) | DHW (therms) | HEATING (therms) | MUNTERS (therms) | Muntes % of hours on | COMFORT CHILLER (therms) | CDD adjusted | Calc total | DHW (MBtu) | DHW (therms) | DHW (therms) saved from HR. |
| 1/2/2024 | 2/1/2024 | | | | | | | | | | | | | | | |
| 2/2/2024 | 3/1/2024 | 5988 | \$ 5,988.00 | \$0.81 | 5,570.91 | 461 | 600 | 4,510 | 2 | 0.0% | 25 | - | 5,988 | 48,000 | 1,129 | 35 |
| 3/2/2024 | 4/1/2024 | 3553 | \$ 3,553.00 | \$0.87 | 3,524.35 | 450 | 600 | 2,475 | - | 0.0% | 29 | 8 | 3,553 | 48,000 | 1,129 | 35 |
| 4/2/2024 | 5/1/2024 | 4520 | \$ 4,520.00 | \$0.87 | 3,754.52 | 327 | 600 | 2,827 | 512 | 5.8% | 254 | 21 | 4,520 | 48,000 | 1,129 | 35 |
| 5/2/2024 | 6/1/2024 | 3871 | \$ 3,871.00 | \$0.82 | 2,081.87 | 280 | 600 | 1,162 | 478 | 5.4% | 1,152 | 322 | 3,871 | 48,000 | 1,129 | 106 |
| 6/2/2024 | 7/1/2024 | 1539 | \$ 1,539.00 | \$0.79 | 1,468.49 | - | 600 | 868 | 71 | 0.8% | - | - | 1,539 | 48,000 | 1,129 | 116 |
| 7/2/2024 | 8/1/2024 | 1997 | \$ 1,997.00 | \$0.74 | 896.17 | - | 600 | 296 | 193 | 2.2% | 907 | 283 | 1,997 | 48,000 | 1,129 | 116 |
| 8/2/2024 | 9/1/2024 | 3956 | \$ 3,956.00 | \$0.87 | 1,127.61 | 476 | 600 | 52 | 537 | 6.1% | 1,931 | 539 | 3,956 | 48,000 | 1,129 | 116 |
| 9/2/2024 | 10/1/2024 | 3920 | \$ 3,920.00 | \$0.86 | 2,124.72 | 368 | 600 | 1,157 | 526 | 6.0% | 1,271 | 355 | 3,920 | 48,000 | 1,129 | 116 |
| 10/2/2024 | 11/1/2024 | 3168 | \$ 3,168.00 | \$0.87 | 2,183.59 | 432 | 600 | 1,152 | 490 | 5.5% | 493 | 138 | 3,168 | 48,000 | 1,129 | 106 |
| 11/2/2024 | 12/1/2024 | 3200 | \$ 3,200.00 | \$0.87 | 2,522.95 | 409 | 600 | 1,513 | 541 | 6.1% | 137 | 38 | 3,200 | 48,000 | 1,129 | 106 |
| 12/2/2024 | 1/1/2025 | 8714 | \$ 8,714.00 | \$0.86 | 6,314.00 | 572 | 600 | 5,142 | - | 0.0% | - | - | 8,714 | 48,000 | 1,129 | 71 |
| 1/2/2025 | 2/1/2025 | 8701 | \$ 8,701.00 | \$0.77 | 8,581.14 | 709 | 600 | 7,272 | 120 | 1.4% | - | - | 8,701 | 48,000 | 1,129 | 35 |
| 2/2/2025 | 3/1/2025 | 8153 | \$ 8,153.00 | \$0.77 | 8,150.99 | 461 | 600 | 7,090 | 2 | 0.0% | - | - | 8,153 | 48,000 | 1,129 | 35 |
| 3/2/2025 | 4/1/2025 | 5099 | \$ 5,099.00 | \$0.84 | 4,968.14 | 531 | 600 | 3,837 | - | 0.0% | 131 | 37 | 5,099 | 48,000 | 1,129 | 35 |
| 4/2/2025 | 5/1/2025 | 4520 | - | \$0.80 | 3,755.55 | 257 | 600 | 2,899 | 512 | 5.8% | 253 | 71 | 4,520 | 48,000 | 1,129 | 11 |
| 5/2/2025 | 6/1/2025 | 2013 | \$ 2,013.00 | \$0.75 | 1,534.56 | - | 600 | 935 | 478 | 5.4% | - | - | 2,013 | 48,000 | 1,129 | 106 |
| 6/2/2025 | 7/1/2025 | 2114 | \$ 2,114.00 | \$0.21 | 2,043.49 | - | 600 | 1,443 | 71 | 0.8% | - | - | 2,114 | 48,000 | 1,129 | 116 |
| 7/2/2025 | 8/1/2025 | 1963 | \$ 1,963.00 | \$0.22 | 863.46 | - | 600 | 284 | 193 | 2.2% | 906 | 283 | 1,963 | 48,000 | 1,129 | 116 |
| 8/2/2025 | 9/1/2025 | 3707 | \$ 3,707.00 | \$0.29 | 1,033.67 | 508 | 600 | 140 | 529 | 6.0% | 2,074 | 539 | 3,707 | 48,000 | 1,129 | 116 |
| | | Avg | | \$0.81 | | | | | | | | | | | | |



| Month | Proposed Equipment Monthly Electric Consumption (kWh) | | | | | | | | | | | | | Total kWh |
|--------------|---|--------------|----------------|---------------|----------------|---------------|----------------|----------------|---------------------------------------|----------------|-----------------|--------------|------------------|-----------|
| | Concession Stands | Jumbotron | Arena Lighting | Building AHUs | Misc Load | Exhaust Fans | Arena AHUs | Fluid Cooler | Chilled Water/Condensator Water Pumps | Rink Chiller | Comfort Chiller | DHW Pumps | | |
| January | 1,370 | 264 | 4,869 | 1,448 | 37,137 | 150 | 32,874 | 23,315 | 13,563 | 32,308 | - | 257 | 147,555 | |
| February | 1,481 | 522 | 3,726 | 1,480 | 35,943 | - | 30,073 | 20,593 | 12,561 | 32,749 | 182 | 240 | 139,548 | |
| March | 1,276 | 408 | 3,726 | 1,384 | 38,839 | 15 | 32,593 | 23,120 | 13,641 | 43,762 | 727 | 257 | 159,747 | |
| April | 473 | 180 | 4,420 | 1,144 | 35,185 | - | 31,061 | 22,715 | 13,219 | 33,017 | 13,321 | 248 | 154,982 | |
| May | 473 | 204 | 4,066 | 392 | 36,045 | 120 | 34,012 | 20,676 | 13,527 | 29,263 | 40,606 | 226 | 179,609 | |
| June | - | - | 544 | - | 51,246 | 5,100 | 4,581 | 1,347 | 1,733 | - | 4,574 | 44 | 69,169 | |
| July | - | - | - | - | 40,635 | 2,385 | 6,322 | 9,205 | 3,942 | 12,038 | 12,407 | 43 | 86,977 | |
| August | 425 | - | 3,958 | 48 | 37,071 | 105 | 32,345 | 21,800 | 13,266 | 29,450 | 63,068 | 152 | 201,688 | |
| September | 126 | 924 | 5,522 | 64 | 31,963 | 585 | 30,636 | 16,278 | 12,060 | 18,569 | 47,067 | 274 | 164,068 | |
| October | 315 | 642 | 4,706 | 712 | 44,189 | 1,395 | 25,057 | 20,031 | 12,391 | 27,799 | 18,863 | 264 | 156,364 | |
| November | 1,134 | 324 | 4,515 | 1,712 | 40,289 | 630 | 25,411 | 24,157 | 12,307 | 41,481 | 4,405 | 200 | 156,565 | |
| December | 693 | 276 | 3,944 | 1,152 | 38,934 | - | 32,477 | 24,726 | 13,551 | 41,881 | 182 | 249 | 158,065 | |
| Total | 7,765 | 3,744 | 43,996 | 9,536 | 467,477 | 10,485 | 317,442 | 227,963 | 135,759 | 342,317 | 205,400 | 2,452 | 1,774,336 | |

| Baseline & Proposed Equipment Electric Use Comparison | | | | |
|---|----------------------------|-------------------------------|-------------------------------|------------|
| ECM | Consumption Type | Baseline Electric Usage (kWh) | Proposed Electric Usage (kWh) | % Change |
| - | Concessions | 7,765 | 7,765 | 0% |
| - | Jumbotron | 3,744 | 3,744 | 0% |
| - | Arena Lighting | 43,996 | 43,996 | 0% |
| - | Building AHUs | 9,536 | 9,536 | 0% |
| - | Misc | 467,477 | 467,477 | 0% |
| ECM 3 | Exhaust fans | 12,765 | 10,485 | -18% |
| ECM 3 | Arena AHUs | 102,598 | 196,360 | - |
| ECM 3 | Munters (dehumidification) | 48,258 | 121,081 | - |
| ECM 3 | Arena Space Conditioning | 153,136 | 317,442 | 107% |
| ECM 1 | Fluid cooler | 168,534 | 227,963 | 35% |
| ECM 1 | Pumps (CHWS + CWS) | 334,875 | 135,759 | -59% |
| ECM 1 | Rink Chiller | 403,611 | 342,317 | -15% |
| ECM 1 | Comfort Chiller | - | 205,400 | - |
| | Domestic Hot Water Pump | 925 | 2,452 | 165% |
| | Totals: | 1,604,097 | 1,774,336 | 11% |

Remarks:
 1. Arena Space Conditioning combines the baseline electric consumption for the Arena AHUs, Munters Unit, and Exhaust Fan load used to meet the Arena ventilation load, and compared to the proposed usage of the custom Arena AHU



| Arena Space Loads | | |
|--|-----------------|--------------|
| Cooling | | |
| Added heat from Lighting | | |
| Rink Sqft | 17,688 | sqft |
| Lighting Density | 1.98 | W/sqft |
| Arena Added Heat | 35.02 | kW |
| Arena Added Heat | 119.50 | MBH |
| Seating Area | 14,227 | sqft |
| Lighting Density | 0.27 | W/sqft |
| Seating Added Heat | 3.84 | kW |
| Seating Added Heat | 12.07 | MBH |
| People Load | | |
| Seated | 4,774 | People |
| Athletes | 12 | People |
| Seated | 1,910 | MBH |
| Athletes | 21.6 | MBH |
| Seated % SENSIBLE @ 75 F db | 61% | |
| Seated % Latent @ 75 F db | 39% | |
| Athlete % SENSIBLE @ 75 F db | 39% | |
| Athlete % Latent @ 75 F db | 61% | |
| Seated Sensible Heat | 1,169.63 | MBH |
| Seated Latent Heat | 739.97 | MBH |
| Athlete Sensible Heat | 8.52 | MBH |
| Athlete Latent Heat | 13.08 | MBH |
| Roof Infiltration Loads | | |
| q | 21.45 | MBH |
| U | 0.024 | Btu/h*sqft*F |
| A | 31,915 | SQFT |
| tb | 88 | F |
| ti | 60 | F |
| Latent Heat gain OA | | |
| RA | 88,000 | cfm |
| Temp | 60 | F |
| Relative Humidity | 45 | % |
| Humidity Ratio | 0.0052 | lb/lb |
| OA Flow Rate | 16,000 | cfm |
| Temp | 88 | F |
| Relative Humidity | 49 | % |
| Humidity Ratio | 0.0140 | lb/lb |
| Mixed RH | 0.0068 | |
| SA Flow Rate | 100,000 | cfm |
| ti | 60 | f |
| Relative Humidity | 40 | % |
| Humidity Ratio | 0.0045 | lb/lb |
| qt | 1,121 | MBH |
| Sensible Heat Gain OA | | |
| RA Flow Rate | 84,000 | cfm |
| ti | 60 | F |
| OA Flow Rate | 16,000 | cfm |
| tb | 88 | F |
| Mixed Temperature | 64 | F |
| qs | 241.9 | MBH |
| Infiltration Loads Exterior Walls | | |
| q | 14.999 | MBH |
| U | 0.071 | Btu/h*sqft*F |
| Ae | 7,545 | SQFT |
| tb | 88 | F |
| ti | 60 | F |
| Infiltration Loads Interior Walls | | |
| q | 13.66 | MBH |
| U | 0.181 | Btu/h*sqft*F |
| Ai | 2,940 | SQFT |
| tbi | 70 | F |
| ti | 60 | F |
| Heat loss to Ice | | |
| V | 5.654 | fpm |
| h | 0.618 | BTU/h*sqft*F |
| Qcv | 38.39 | Btu/h*sqft |
| Q | -679.01 | MBH |
| Pressurization | | |
| SA Air Flow | 100,000 | CFM |
| Cd | 0.6 | |
| rho | 0.075 | lb/ft^3 |
| Ai | 2,940 | SQFT |
| dP | 0.0240 | in wg |
| Heating | | |
| Added heat from Lighting | | |
| Rink Sqft | 17,688 | sqft |
| Lighting Density | - | W/sqft |
| Arena Added Heat | - | kW |
| Arena Added Heat | - | MBH |
| Seating Area | 14,227 | sqft |
| Lighting Density | 0.27 | W/sqft |
| Seating Added Heat | 3.84 | kW |
| Seating Added Heat | - | MBH |
| People Load | | |
| Seated | - | People |
| Athletes | - | People |
| Seated | - | MBH |
| Athletes | - | MBH |
| Seated % SENSIBLE @ 75 F db | 61% | |
| Seated % Latent @ 75 F db | 39% | |
| Athlete % SENSIBLE @ 75 F db | 39% | |
| Athlete % Latent @ 75 F db | 61% | |
| Seated Sensible Heat | - | MBH |
| Seated Latent Heat | - | MBH |
| Athlete Sensible Heat | - | MBH |
| Athlete Latent Heat | - | MBH |
| Roof Infiltration Loads | | |
| q | -47.57 | MBH |
| U | 0.024 | Btu/h*sqft*F |
| A | 31,915 | SQFT |
| tb | -2.1 | F |
| ti | 60 | F |
| Latent Heat gain OA | | |
| N/A | | |
| Sensible Heat loss OA | | |
| RA Flow Rate | 84,000 | cfm |
| ti | 60 | F |
| OA Flow Rate | 16,000 | cfm |
| tb | -2.1 | F |
| Mixed Temperature | 50 | F |
| qs | -1,073.1 | MBH |
| Infiltration Loads Exterior Walls | | |
| q | -33.267 | MBH |
| U | 0.071 | Btu/h*sqft*F |
| Ae | 7,545 | SQFT |
| tb | -2.1 | F |
| ti | 60 | F |
| Infiltration Loads Interior Walls | | |
| q | 13.66 | MBH |
| U | 0.181 | Btu/h*sqft*F |
| Ai | 2,940 | SQFT |
| tbi | 70 | F |
| ti | 60 | F |
| Heat loss to Ice | | |
| V | 5.654 | fpm |
| h | 0.618 | BTU/h*sqft*F |
| Qcv | 38.388 | Btu/h*sqft |
| Q | -679.01 | MBH |
| Pressurization | | |
| SA Air Flow | 100,000 | CFM |
| Cd | 0.6 | |
| rho | 0.075 | lb/ft^3 |
| Ai | 2,940 | SQFT |
| dP | 0.0240 | in wg |

| Variable Definitions | |
|----------------------|--------------------------------------|
| A | Arena Area |
| Ae | Exterior Wall Area |
| Ai | Interior Wall Area |
| Cd | Discharge Coefficient |
| dP | Pressure Differential |
| h | Convective Heat Transfer Coefficient |
| OA | Outdoor Air |
| q | Heat Gain/Loss |
| Qcv | Convection Heat Loss (Ice) |
| qs | Sensible Heat Gain/Loss |
| qt | Latent Heat Gain/Loss |
| RA | Return Air |
| rho | Air Density |
| SA | Supply Air |
| tb | Exterior Temperature |
| tbi | Non-Arena Interior Temperature |
| tb | Exterior Temperature |
| U | Heat Transfer Coefficient |
| V | Velocity |

Harding Mazzotti Civic Center NYSERDA Flex Tech Study
 CHA Proj No. 102588
 ENG: LC/CS

ECM-3: Boiler Replacement

Existing Fuel
 Proposed Fuel

| | |
|---------|---|
| Nat.Gas | ▼ |
| Nat.Gas | ▼ |

| <u>Item</u> | <u>Value</u> | <u>Units</u> | <u>Formula/Comments</u> |
|----------------------------------|--------------|--------------|--|
| Baseline Fuel Cost | \$ 0.82 | / Therm | |
| Proposed Fuel Cost | \$ 0.82 | / Therm | |
| Baseline Fuel Use | 42,273 | Therms | Based on historical utility data |
| Existing Boiler Plant Efficiency | 78% | | Estimated or Measured |
| Baseline Boiler Load | 3,297,294 | Mbtu/yr | Baseline Fuel Use x Existing Efficiency x 100 Mbtu/Therms |
| Baseline Fuel Cost | \$ 34,664 | | |
| Proposed Boiler Plant Efficiency | 92% | | New Boiler AVG Efficiency |
| Proposed Fuel Use | 35,879 | Therms | Baseline Boiler Load / Proposed Efficiency / 100 Mbtu/Therms |
| Proposed Fuel Cost | \$ 29,421 | | |

*Note to engineer: Link savings back to summary sheet in appropriate column.

APPENDIX B

Cost Estimates

| Utility Rates | |
|--------------------|-------|
| Elec (\$/kWh) | 0.153 |
| Nat Gas (\$/therm) | 0.82 |

ECM Summary Sheet

| Implementation Costs, Utility Savings & Payback Periods | | | | | | | | | |
|---|-------------------|------------------------|---------|----------------|---------------------|-----------|------------------|---------------------|---------|
| ECM # | ECM Description | Annual Utility Savings | | | Implementation Cost | Incentive | Incremental Cost | Incremental Payback | Payback |
| | | Electric | Nat Gas | Total | | | | | |
| | | kWh | therms | \$ | | | | | |
| 1b | Chiller | -4,419 | 6,200 | \$ 4,408 | \$ 6,036,442 | \$ - | \$ 332,355 | 75 | 1,369 |
| 1c | Chiller w/ HR | -4,419 | 8,900 | \$ 6,622 | \$ 6,062,697 | \$ 35,600 | \$ 323,010 | 49 | 916 |
| 2 | Replace Boilers | -1,527 | 6,400 | \$ 5,014 | \$ 348,619 | \$ 25,600 | \$ 115,280 | 23 | 70 |
| 3 | Replace AHUs | -164,306 | 3,150 | \$ (22,555.78) | \$ 2,553,040 | \$ - | \$ 1,295,875 | -57 | -113 |
| 4 | Thermal Storage | 50,284 | 0 | \$ 7,693 | \$ 340,205 | \$ - | \$ 340,205 | 44 | 44 |
| 5 | Controls Upgrades | | | \$ - | \$ 600,000 | \$ - | \$ 600,000 | | N/A |

Harding Mazzotti Civic Center NYSEDA Flex Tech Study

CHA Proj No. 102588
 ENG: LC/CS

| Multipliers | |
|-------------|------|
| Material: | 1.00 |
| Labor: | 1.00 |
| Equipment: | 1.00 |

ECM 1B: Chiller Replacement

| Description | QTY | UNIT | UNIT COSTS | | | SUBTOTAL COSTS | | | TOTAL COST | REMARKS |
|------------------------------------|-------|------|------------|-----------|--------|----------------|-----------|--------|------------|--|
| | | | MAT. | LABOR | EQUIP. | MAT. | LABOR | EQUIP. | | |
| Remove gas fired chiller | 1 | EA | | \$ 8,500 | | \$ - | \$ 8,500 | \$ - | \$ 8,500 | |
| Remove electric chiller | 1 | EA | | \$ 8,500 | | \$ - | \$ 8,500 | \$ - | \$ 8,500 | |
| Remove steel dunnage | 1 | EA | | \$ 2,000 | | \$ - | \$ 2,000 | \$ - | \$ 2,000 | |
| Remove fluid cooler | 1 | EA | | \$ 2,500 | | \$ - | \$ 2,500 | \$ - | \$ 2,500 | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| Demo rink floor | 17000 | SF | | | | \$ - | \$ - | \$ - | \$ - | |
| Sawcut floor to rink | 175 | SF | | | | \$ - | \$ - | \$ - | \$ - | |
| Remove concrete | 318 | CY | | | | \$ - | \$ - | \$ - | \$ - | |
| Rink floor demo | 1 | EA | \$ 285,000 | | | \$ 285,000 | \$ - | \$ - | \$ 285,000 | Contractor quote integrated labor typ |
| Remove concrete | 1 | EA | \$ 198,400 | | | \$ 198,400 | \$ - | \$ - | \$ 198,400 | Contractor quote integrated labor typ |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| Remove chilled water pump 15hp | 1 | EA | | \$ 500 | | \$ - | \$ 500 | \$ - | \$ 500 | |
| Remove condenser water pump 20 | 2 | EA | | \$ 500 | | \$ - | \$ 1,000 | \$ - | \$ 1,000 | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| Ice rink floor concrete | 1 | SF | \$ 347,200 | | | \$ 347,200 | \$ - | \$ - | \$ 347,200 | Contractor quote integrated labor typ |
| | | LF | | | | \$ - | \$ - | \$ - | \$ - | |
| Ice rink floor 1" & 8" HDPE piping | 1 | LF | \$ 645,000 | | | \$ 645,000 | \$ - | \$ - | \$ 645,000 | Contractor quote integrated labor typ |
| Patch concrete floor 6" | 175 | SF | | | | \$ - | \$ - | \$ - | \$ - | combined with floor concrete from contractor |
| Civil work for floor | 1 | | \$ 580,000 | | | \$ 580,000 | \$ - | \$ - | \$ 580,000 | Contractor quote integrated labor typ |
| Dasher boards | 1 | | \$ 655,000 | | | \$ 655,000 | \$ - | \$ - | \$ 655,000 | Contractor quote integrated labor typ |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| Ice rink chiller | 1 | EA | \$ 260,000 | \$ 26,000 | | \$ 260,000 | \$ 26,000 | \$ - | \$ 286,000 | Vendor quote |
| Comfort chiller | 1 | EA | \$ 260,000 | \$ 26,000 | | \$ 260,000 | \$ 26,000 | \$ - | \$ 286,000 | Vendor quote |
| Ice rink pump | 2 | EA | \$ 7,500 | \$ 500 | | \$ 15,000 | \$ 1,000 | \$ - | \$ 16,000 | |
| Comfort cooling pump | 2 | EA | \$ 7,500 | \$ 500 | | \$ 15,000 | \$ 1,000 | \$ - | \$ 16,000 | |
| AHU pump | 2 | EA | \$ 5,000 | \$ 500 | | \$ 10,000 | \$ 1,000 | \$ - | \$ 11,000 | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| 2-way control valves 10" | 4 | EA | \$ 3,000 | \$ 750 | | \$ 12,000 | \$ 3,000 | \$ - | \$ 15,000 | |
| 2-way control valves 6" | 2 | EA | \$ 2,800 | \$ 750 | | \$ 5,600 | \$ 1,500 | \$ - | \$ 7,100 | |
| Plate and frame HX | 1 | EA | \$ 80,000 | \$ 10,000 | | \$ 80,000 | \$ 10,000 | \$ - | \$ 90,000 | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| Buffer tank | 2 | EA | \$ 2,000 | \$ 3,800 | | \$ 4,000 | \$ 7,600 | \$ - | \$ 11,600 | Previous project |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| 675T Fluid cooler | 1 | EA | \$ 310,000 | \$ 31,000 | | \$ 310,000 | \$ 31,000 | \$ - | \$ 341,000 | Vendor quote |
| Condenser water pump 20hp | 2 | EA | \$ 14,000 | \$ 1,150 | \$ - | \$ 28,000 | \$ 2,300 | \$ - | \$ 30,300 | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| Misc piping | 1 | LS | \$ 65,000 | | | \$ 65,000 | \$ - | \$ - | \$ 65,000 | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |

| | |
|---------------------|--------------------|
| \$ 3,908,600 | Subtotal |
| \$ 1,172,580.00 | 30% Contingency |
| \$ 508,118.00 | 10% Contractor O&P |
| \$ 447,144 | 8% Engineering |
| \$ 6,036,442 | Total |

Harding Mazzotti Civic Center NYSERDA Flex Tech Study

CHA Proj No. 102588
 ENG: LC/CS

| Multipliers | |
|-------------|------|
| Material: | 1.00 |
| Labor: | 1.00 |
| Equipment: | 1.00 |

ECM 1C: Chiller Replacement w/ Heat Recovery

| Description | QTY | UNIT | UNIT COSTS | | | SUBTOTAL COSTS | | | TOTAL COST | REMARKS |
|------------------------------------|-------|------|------------|-----------|--------|----------------|-----------|--------|------------|--|
| | | | MAT. | LABOR | EQUIP. | MAT. | LABOR | EQUIP. | | |
| Remove gas fired chiller | 1 | EA | | \$ 8,500 | | \$ - | \$ 8,500 | \$ - | \$ 8,500 | |
| Remove electric chiller | 1 | EA | | \$ 8,500 | | \$ - | \$ 8,500 | \$ - | \$ 8,500 | |
| Remove steel dunnage | 1 | EA | | \$ 2,000 | | \$ - | \$ 2,000 | \$ - | \$ 2,000 | |
| Remove fluid cooler | 1 | EA | | \$ 2,500 | | \$ - | \$ 2,500 | \$ - | \$ 2,500 | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| Demo rink floor | 17000 | SF | | | | \$ - | \$ - | \$ - | \$ - | |
| Sawcut floor to rink | 175 | SF | | | | \$ - | \$ - | \$ - | \$ - | |
| Remove concrete | 318 | CY | | | | \$ - | \$ - | \$ - | \$ - | |
| Rink floor demo | 1 | EA | \$ 285,000 | | | \$ 285,000 | \$ - | \$ - | \$ 285,000 | Contractor quote integrated labor typ |
| Remove concrete | 1 | EA | \$ 198,400 | | | \$ 198,400 | \$ - | \$ - | \$ 198,400 | Contractor quote integrated labor typ |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| Remove chilled water pump 15hp | 1 | EA | | \$ 500 | | \$ - | \$ 500 | \$ - | \$ 500 | |
| Remove condenser water pump 20hp | 2 | EA | | \$ 500 | | \$ - | \$ 1,000 | \$ - | \$ 1,000 | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| Ice rink floor concrete | 1 | SF | \$ 347,200 | | | \$ 347,200 | \$ - | \$ - | \$ 347,200 | Contractor quote integrated labor typ |
| | | LF | | | | \$ - | \$ - | \$ - | \$ - | |
| Ice rink floor 1" & 8" HDPE piping | 1 | LF | \$ 645,000 | | | \$ 645,000 | \$ - | \$ - | \$ 645,000 | Contractor quote integrated labor typ |
| Patch concrete floor 6" | 175 | SF | | | | \$ - | \$ - | \$ - | \$ - | combined with floor concrete from contractor |
| Civil work for floor | 1 | | \$ 580,000 | | | \$ 580,000 | \$ - | \$ - | \$ 580,000 | Contractor quote integrated labor typ |
| Dasher boards | 1 | | \$ 655,000 | | | \$ 655,000 | \$ - | \$ - | \$ 655,000 | Contractor quote integrated labor typ |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| Ice rink chiller | 1 | EA | \$ 260,000 | \$ 26,000 | | \$ 260,000 | \$ 26,000 | \$ - | \$ 286,000 | Vendor quote |
| Comfort chiller | 1 | EA | \$ 260,000 | \$ 26,000 | | \$ 260,000 | \$ 26,000 | \$ - | \$ 286,000 | Vendor quote |
| Ice rink pump | 2 | EA | \$ 7,500 | \$ 500 | | \$ 15,000 | \$ 1,000 | \$ - | \$ 16,000 | |
| Comfort cooling pump | 2 | EA | \$ 7,500 | \$ 500 | | \$ 15,000 | \$ 1,000 | \$ - | \$ 16,000 | |
| AHU pump | 2 | EA | \$ 5,000 | \$ 500 | | \$ 10,000 | \$ 1,000 | \$ - | \$ 11,000 | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| 2-way control valves 10" | 4 | EA | \$ 3,000 | \$ 750 | | \$ 12,000 | \$ 3,000 | \$ - | \$ 15,000 | |
| 2-way control valves 6" | 2 | EA | \$ 2,800 | \$ 750 | | \$ 5,600 | \$ 1,500 | \$ - | \$ 7,100 | |
| Plate and frame HX | 1 | EA | \$ 80,000 | \$ 10,000 | | \$ 80,000 | \$ 10,000 | \$ - | \$ 90,000 | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| Buffer tank | 2 | EA | \$ 2,000 | \$ 3,800 | | \$ 4,000 | \$ 7,600 | \$ - | \$ 11,600 | Previous project |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| 675T Fluid cooler | 1 | EA | \$ 310,000 | \$ 31,000 | | \$ 310,000 | \$ 31,000 | \$ - | \$ 341,000 | Vendor quote |
| Condenser water pump 20hp | 2 | EA | \$ 14,000 | \$ 1,150 | \$ - | \$ 28,000 | \$ 2,300 | \$ - | \$ 30,300 | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| DHW Pumps | 2 | EA | \$ 7,500 | \$ 1,000 | | \$ 15,000 | \$ 2,000 | \$ - | \$ 17,000 | |
| Misc piping | 1 | LS | \$ 65,000 | | | \$ 65,000 | \$ - | \$ - | \$ 65,000 | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |

| | |
|---------------------|--------------------|
| \$ 3,925,600 | Subtotal |
| \$ 1,177,680.00 | 30% Contingency |
| \$ 510,328.00 | 10% Contractor O&P |
| \$ 449,089 | 8% Engineering |
| \$ 6,062,697 | Total |

Harding Mazzotti Civic Center NYSEDA Flex Tech Study

CHA Proj No. 102588
 ENG: LC/CS

| Multipliers | |
|-------------|------|
| Material: | 1.00 |
| Labor: | 1.00 |
| Equipment: | 1.00 |

ECM 1: Chiller Replacement - In Kind

| Description | QTY | UNIT | UNIT COSTS | | | SUBTOTAL COSTS | | | TOTAL COST | REMARKS |
|------------------------------------|-------|------|------------|-----------|--------|----------------|-----------|--------|------------|--|
| | | | MAT. | LABOR | EQUIP. | MAT. | LABOR | EQUIP. | | |
| Remove gas fired chiller | 1 | EA | | \$ 8,500 | | \$ - | \$ 8,500 | \$ - | \$ 8,500 | |
| Remove electric chiller | 1 | EA | | \$ 8,500 | | \$ - | \$ 8,500 | \$ - | \$ 8,500 | |
| Remove steel dunnage | 1 | EA | | \$ 2,000 | | \$ - | \$ 2,000 | \$ - | \$ 2,000 | |
| Remove fluid cooler | 1 | EA | | \$ 2,500 | | \$ - | \$ 2,500 | \$ - | \$ 2,500 | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| Demo rink floor | 17000 | SF | | | | \$ - | \$ - | \$ - | \$ - | |
| Sawcut floor to rink | 175 | SF | | | | \$ - | \$ - | \$ - | \$ - | |
| Remove concrete | 318 | CY | | | | \$ - | \$ - | \$ - | \$ - | |
| Rink floor demo | 1 | EA | \$ 285,000 | | | \$ 285,000 | \$ - | \$ - | \$ 285,000 | Contractor quote integrated labor typ |
| Remove concrete | 1 | EA | \$ 198,400 | | | \$ 198,400 | \$ - | \$ - | \$ 198,400 | Contractor quote integrated labor typ |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| Remove chilled water pump 15hp | 1 | EA | | \$ 500 | | \$ - | \$ 500 | \$ - | \$ 500 | |
| Remove condenser water pump 20 | 2 | EA | | \$ 500 | | \$ - | \$ 1,000 | \$ - | \$ 1,000 | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| Ice rink floor concrete | 1 | SF | \$ 347,200 | | | \$ 347,200 | \$ - | \$ - | \$ 347,200 | Contractor quote integrated labor typ |
| | | LF | | | | \$ - | \$ - | \$ - | \$ - | |
| Ice rink floor 1" & 8" HDPE piping | 1 | LF | \$ 645,000 | | | \$ 645,000 | \$ - | \$ - | \$ 645,000 | Contractor quote integrated labor typ |
| Patch concrete floor 6" | 175 | SF | | | | \$ - | \$ - | \$ - | \$ - | combined with floor concrete from contractor |
| Civil work for floor | 1 | | \$ 580,000 | | | \$ 580,000 | \$ - | \$ - | \$ 580,000 | Contractor quote integrated labor typ |
| Dasher boards | 1 | | \$ 655,000 | | | \$ 655,000 | \$ - | \$ - | \$ 655,000 | Contractor quote integrated labor typ |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| Ice rink chiller | 1 | EA | \$ 260,000 | \$ 26,000 | | \$ 260,000 | \$ 26,000 | \$ - | \$ 286,000 | RS Means |
| Comfort chiller | 1 | EA | \$ 205,500 | \$ 2,300 | | \$ 205,500 | \$ 2,300 | \$ - | \$ 207,800 | RS Means |
| Ice rink pump | 2 | EA | \$ 7,500 | \$ 500 | | \$ 15,000 | \$ 1,000 | \$ - | \$ 16,000 | |
| Comfort cooling pump | 2 | EA | \$ 7,500 | \$ 500 | | \$ 15,000 | \$ 1,000 | \$ - | \$ 16,000 | |
| AHU pump | 2 | EA | \$ 5,000 | \$ 500 | | \$ 10,000 | \$ 1,000 | \$ - | \$ 11,000 | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| 2-way control valves 10" | 4 | EA | \$ 3,000 | \$ 750 | | \$ 12,000 | \$ 3,000 | \$ - | \$ 15,000 | |
| 2-way control valves 6" | 2 | EA | \$ 2,800 | \$ 750 | | \$ 5,600 | \$ 1,500 | \$ - | \$ 7,100 | |
| Plate and frame HX | 1 | EA | \$ 80,000 | \$ 10,000 | | \$ 80,000 | \$ 10,000 | \$ - | \$ 90,000 | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| Buffer tank | 2 | EA | \$ 2,000 | \$ 3,800 | | \$ 4,000 | \$ 7,600 | \$ - | \$ 11,600 | Previous project |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| 225T Fluid cooler | 1 | EA | \$ 200,000 | \$ 4,000 | | \$ 200,000 | \$ 4,000 | \$ - | \$ 204,000 | RS Means |
| Condenser water pump 20hp | 2 | EA | \$ 14,000 | \$ 1,150 | \$ - | \$ 28,000 | \$ 2,300 | \$ - | \$ 30,300 | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| Misc piping | 1 | LS | \$ 65,000 | | | \$ 65,000 | \$ - | \$ - | \$ 65,000 | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |

| | |
|---------------------|--------------------|
| \$ 3,693,400 | Subtotal |
| \$ 1,108,020.00 | 30% Contingency |
| \$ 480,142.00 | 10% Contractor O&P |
| \$ 422,525 | 8% Engineering |
| \$ 5,704,087 | Total |

Harding Mazzotti Civic Center NYSERDA Flex Tech Study

CHA Proj No. 102588
 ENG: LC/CS

| Multipliers | |
|-------------|------|
| Material: | 1.00 |
| Labor: | 1.00 |
| Equipment: | 1.00 |

ECM 2: Boiler Replacement

| Description | QTY | UNIT | UNIT COSTS | | | SUBTOTAL COSTS | | | TOTAL COST | REMARKS |
|--------------------------------|-----|-------|------------|-----------|------------|----------------|-----------|------------|------------|---------|
| | | | MAT. | LABOR | EQUIP. | MAT. | LABOR | EQUIP. | | |
| Remove 1,200 MBH Boiler | 3 | EA | | \$ 3,100 | | \$ - | \$ 9,300 | \$ - | \$ 9,300 | |
| Remove flue ductwork | 56 | LF | | \$ 20 | | \$ - | \$ 1,120 | \$ - | \$ 1,120 | |
| Remove hot water piping | 56 | LF | | \$ 6 | | \$ - | \$ 336 | \$ - | \$ 336 | |
| Remove natural gas piping | 15 | LF | | \$ 4 | | \$ - | \$ 60 | \$ - | \$ 60 | |
| Demo circulator pump | 3 | EA | | \$ 100 | | \$ - | \$ 300 | \$ - | \$ 300 | |
| 1200 MBH Boiler install | 1 | QUOTE | | \$ 46,350 | \$ 154,500 | \$ - | \$ 46,350 | \$ 154,500 | \$ 200,850 | |
| Hot water piping | 56 | LF | \$ 150 | \$ 50 | | \$ 8,400 | \$ 2,800 | \$ - | \$ 11,200 | |
| Natural gas piping | 15 | LF | \$ 100 | \$ 15 | | \$ 1,500 | \$ 225 | \$ - | \$ 1,725 | |
| 1" Insulation with jacket | 56 | LF | \$ 5 | \$ 10 | | \$ 280 | \$ 560 | \$ - | \$ 840 | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |

| | |
|-------------------|--------------------|
| \$ 225,731 | Subtotal |
| \$ 67,719.30 | 30% Contingency |
| \$ 29,345.03 | 10% Contractor O&P |
| \$ 25,824 | 8% Engineering |
| \$ 348,619 | Total |

Harding Mazzotti Civic Center NYSERDA Flex Tech Study

CHA Proj No. 102588
 ENG: LC/CS

| Multipliers | |
|-------------|------|
| Material: | 1.00 |
| Labor: | 1.00 |
| Equipment: | 1.00 |

ECM 2: Boiler Replacement - In Kind

| Description | QTY | UNIT | UNIT COSTS | | | SUBTOTAL COSTS | | | TOTAL COST | REMARKS |
|---------------------------|-----|------|------------|----------|--------|----------------|-----------|--------|------------|---------|
| | | | MAT. | LABOR | EQUIP. | MAT. | LABOR | EQUIP. | | |
| Remove 1,200 MBH Boiler | 3 | EA | | \$ 3,100 | | \$ - | \$ 9,300 | \$ - | \$ 9,300 | |
| Remove flue ductwork | 0 | LF | | \$ 20 | | \$ - | \$ - | \$ - | \$ - | |
| Remove hot water piping | 56 | LF | | \$ 6 | | \$ - | \$ 336 | \$ - | \$ 336 | |
| Remove natural gas piping | 15 | LF | | \$ 4 | | \$ - | \$ 60 | \$ - | \$ 60 | |
| Demo circulator pump | 3 | EA | | \$ 100 | | \$ - | \$ 300 | \$ - | \$ 300 | |
| 1200 MBH Boiler | 3 | EA | \$ 22,000 | \$ 5,100 | | \$ 66,000 | \$ 15,300 | \$ - | \$ 81,300 | |
| Pumps | 3 | EA | \$ 5,000 | \$ 500 | | \$ 15,000 | \$ 1,500 | \$ - | \$ 16,500 | |
| Expansion tank | 1 | EA | \$ 5,500 | \$ 300 | | \$ 5,500 | \$ 300 | \$ - | \$ 5,800 | |
| Air dirt separator | 1 | EA | \$ 6,600 | \$ 550 | | \$ 6,600 | \$ 550 | \$ - | \$ 7,150 | |
| Hot water piping | 56 | LF | \$ 150 | \$ 50 | | \$ 8,400 | \$ 2,800 | \$ - | \$ 11,200 | |
| Natural gas piping | 15 | LF | \$ 100 | \$ 15 | | \$ 1,500 | \$ 225 | \$ - | \$ 1,725 | |
| 1" Insulation with jacket | 56 | LF | \$ 5 | \$ 10 | | \$ 280 | \$ 560 | \$ - | \$ 840 | |
| Start up | 1 | LS | | | | \$ - | \$ - | \$ - | \$ - | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |

| | |
|-------------------|--------------------|
| \$ 134,511 | Subtotal |
| \$ 40,353.30 | 30% Contingency |
| \$ 17,486.43 | 10% Contractor O&P |
| \$ 15,388 | 8% Engineering |
| \$ 207,739 | Total |

Harding Mazzotti Civic Center NYSEDA Flex Tech Study

CHA Proj No. 102588
 ENG: LC/CS

| Multipliers | |
|-------------|------|
| Material: | 1.00 |
| Labor: | 1.00 |
| Equipment: | 1.00 |

ECM 3: Air Handler Replacement

| Description | QTY | UNIT | UNIT COSTS | | | SUBTOTAL COSTS | | | TOTAL COST | REMARKS |
|-------------------------------|-------|------|--------------|-----------|--------|----------------|-----------|--------|--------------|---------------------|
| | | | MAT. | LABOR | EQUIP. | MAT. | LABOR | EQUIP. | | |
| Remove AHU | 2 | EA | \$ - | \$ 3,000 | | \$ - | \$ 6,000 | \$ - | \$ 6,000 | |
| Remove dessicant unit | 1 | EA | | \$ 2,000 | | \$ - | \$ 2,000 | \$ - | \$ 2,000 | |
| Remove steel dunnage AHU-9 | 312.5 | SF | | \$ 20 | | \$ - | \$ 6,250 | \$ - | \$ 6,250 | |
| Remove steel dunnage AHU-10 | 240 | SF | | \$ 20 | | \$ - | \$ 4,800 | \$ - | \$ 4,800 | |
| Remove steel dunnage desiccan | 88 | SF | | \$ 20 | | \$ - | \$ 1,760 | \$ - | \$ 1,760 | |
| Remove Ductwork | 600 | SF | | \$ 2 | | \$ - | \$ 1,200 | \$ - | \$ 1,200 | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| AHU w/ desiccant wheel | 1 | EA | \$ 1,560,000 | \$ 10,000 | | \$ 1,560,000 | \$ 10,000 | \$ - | \$ 1,570,000 | Manufacturers quote |
| Steel dunnage | 500 | SF | \$ 20 | \$ 10 | | \$ 10,000 | \$ 5,000 | \$ - | \$ 15,000 | |
| Exterior wall penetrations | 80 | SF | | \$ 8 | | \$ - | \$ 640 | \$ - | \$ 640 | |
| Exterior wall patching | 80 | SF | \$ 20 | \$ 10 | | \$ 1,600 | \$ 800 | \$ - | \$ 2,400 | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| Ductwork | 600 | SF | \$ 10 | \$ 20 | | \$ 6,000 | \$ 12,000 | \$ - | \$ 18,000 | |
| Piping | 160 | LF | \$ 37 | \$ 45 | | \$ 5,920 | \$ 7,200 | \$ - | \$ 13,120 | |
| Insulation | 600 | LF | \$ 5 | \$ 13 | | \$ 3,000 | \$ 7,800 | \$ - | \$ 10,800 | |
| Support Brackets | 5 | EA | \$ 60 | \$ 5 | | \$ 300 | \$ 25 | \$ - | \$ 325 | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| CO2 sensor | 2 | EA | \$ 300 | \$ 100 | | \$ 600 | \$ 200 | \$ - | \$ 800 | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |

| | |
|---------------------|----------------------------|
| \$ 1,653,095 | Subtotal |
| \$ 495,928.50 | 30% Contingency Contractor |
| \$ 214,902.35 | 10% O&P |
| \$ 189,114 | 8% Engineering |
| \$ 2,553,040 | Total |

Harding Mazzotti Civic Center NYSEDA Flex Tech Study

CHA Proj No. 102588
 ENG: LC/CS

| Multipliers | |
|-------------|------|
| Material: | 1.00 |
| Labor: | 1.00 |
| Equipment: | 1.00 |

ECM 3: Air Handler Replacement -In Kind

| Description | QTY | UNIT | UNIT COSTS | | | SUBTOTAL COSTS | | | TOTAL COST | REMARKS |
|--------------------------------|-------|------|------------|-----------|--------|----------------|-----------|--------|------------|---------|
| | | | MAT. | LABOR | EQUIP. | MAT. | LABOR | EQUIP. | | |
| Remove AHU | 2 | EA | \$ - | \$ 3,000 | | \$ - | \$ 6,000 | \$ - | \$ 6,000 | |
| Remove dessicant unit | 1 | EA | | \$ 2,000 | | \$ - | \$ 2,000 | \$ - | \$ 2,000 | |
| Remove steel dunnage AHU-9 | 312.5 | SF | | \$ 20 | | \$ - | \$ 6,250 | \$ - | \$ 6,250 | |
| Remove steel dunnage AHU-10 | 240 | SF | | \$ 20 | | \$ - | \$ 4,800 | \$ - | \$ 4,800 | |
| Remove steel dunnage desiccant | 88 | SF | | \$ 20 | | \$ - | \$ 1,760 | \$ - | \$ 1,760 | |
| Remove Ductwork | 600 | SF | | \$ 2 | | \$ - | \$ 1,200 | \$ - | \$ 1,200 | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| AHU 50,000cfm | 1 | EA | \$ 300,000 | \$ 10,000 | | \$ 300,000 | \$ 10,000 | \$ - | \$ 310,000 | |
| AHU 50,000cfm | 1 | EA | \$ 300,000 | \$ 10,000 | | \$ 300,000 | \$ 10,000 | \$ - | \$ 310,000 | |
| Desiccant wheel | 1 | EA | \$ 100,000 | \$ 10,000 | | \$ 100,000 | \$ 10,000 | \$ - | \$ 110,000 | |
| Steel dunnage | 552 | SF | \$ 20 | \$ 10 | | \$ 11,040 | \$ 5,520 | \$ - | \$ 16,560 | |
| Exterior wall penetrations | 0 | SF | | | | \$ - | \$ - | \$ - | \$ - | |
| Exterior wall patching | 80 | SF | \$ 20 | \$ 10 | | \$ 1,600 | \$ 800 | \$ - | \$ 2,400 | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| Ductwork | 600 | SF | \$ 10 | \$ 20 | | \$ 6,000 | \$ 12,000 | \$ - | \$ 18,000 | |
| Piping | 160 | LF | \$ 37 | \$ 45 | | \$ 5,920 | \$ 7,200 | \$ - | \$ 13,120 | |
| Insulation | 600 | LF | \$ 5 | \$ 13 | | \$ 3,000 | \$ 7,800 | \$ - | \$ 10,800 | |
| Support Brackets | 5 | EA | \$ 60 | \$ 5 | | \$ 300 | \$ 25 | \$ - | \$ 325 | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |
| CO2 sensor | 2 | EA | \$ 300 | \$ 100 | | \$ 600 | \$ 200 | \$ - | \$ 800 | |
| | | | | | | \$ - | \$ - | \$ - | \$ - | |

| | |
|---------------------|----------------------------|
| \$ 814,015 | Subtotal |
| \$ 244,204.50 | 30% Contingency Contractor |
| \$ 105,821.95 | 10% O&P |
| \$ 93,123 | 8% Engineering |
| \$ 1,257,165 | Total |

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ECONOMIC IMPACT OF THE

COOL INSURING ARENA

to Warren, Washington, and Saratoga Counties



\$1.2M in Annual Tax Revenues



\$6.2M in Annual Employee Earnings



Increased Quality of Life

Annual Sales Revenue

within the region attributed to visitation to the Arena.

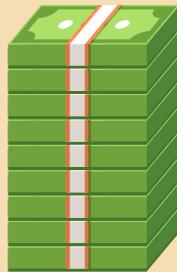
\$10.6M
in 2015-2016



\$13.2M
in 2017-2018



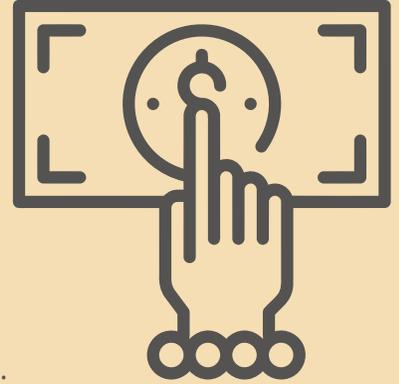
\$21M
in 2022-2023



\$13.6M

Annual Spending

Visitors coming to the Arena spent an estimated \$13.6 million in the region in 2022-2023, helping to support the local economy.



Annual Tax Revenue

Total annual tax revenue generated by the Arena within the region amounted to over \$1.2 million in 2022-2023, including municipal sales taxes, occupancy taxes, and property taxes.



\$780,000
in 2015-2016

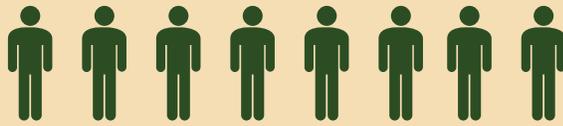
\$943,000
in 2017-2018

\$1.2M
in 2022-2023

Annual Attendance

210,000

in 2022-2023



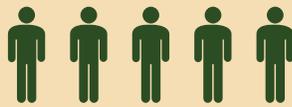
208,000

in 2017-2018*



151,000

in 2015-2016



68%

Approximately two-thirds of all attendees were visiting to watch Adirondack Thunder hockey games.



* In 2017-2018, the Thunder played six more home games than they did during the 2022-2023 season.

Total Jobs

supported throughout the three-county region due to visitation to the Arena.

131

in 2015-2016



155

in 2017-2018



161

in 2022-2023



Annual Earnings

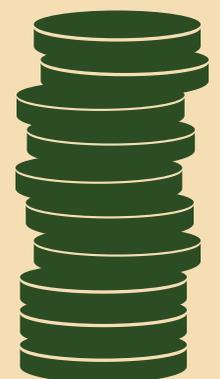
\$6.2M

in 2022-2023

\$3.6M
in 2015-2016



\$4.3M
in 2017-2018



Warren County Occupancy Performance Report

January 2026 Year-Over-Year Comparison

Hotel Performance (CoStar)

January 2026 significantly outperformed January 2025. Demand grew more than 7x faster than supply, creating stronger compression conditions.

- **Supply:** 137,369 room nights (+0.8%)
- **Demand:** 48,817 room nights (+5.8%)
- **Revenue:** \$6.41M (+14.8%)

Occupancy

Revenue growth was driving by a healthy demand recover, effective pricing decline and compounded RevPar lift. This was not discount-driving growth - rate and occupancy both improved.

- **Average Occupancy:** 35.5% (+4.9%)
- **Average ADR:** \$126.39 (+4.3%)
- **Average RevPAR:** \$46.58 (+13.9%)

Competitive Market Analysis (CoStar)

Warren County is a growth leader in this competitive set. While it is not the highest priced market (Essex is), Warren County is demonstrating **strong recovery momentum**, with performance gains well above most peers.

| Metric | Warren County Rank | Top 3 Counties (with Growth) |
|----------------|------------------------|--|
| Demand Growth | 1 of 3 growing markets | Warren, Essex, Franklin (<i>only 3 growing</i>) |
| Revenue Growth | #3 overall | Franklin (+31.5%) Essex (+20.4%) Warren (+14.4%) |
| RevPAR Growth | #3 overall | Franklin (+31.5%) Essex (+22.6%) Warren (+13.4%) |

| Warren County Cash Flow - Tourism 3 Month Projection January 2026 | | | | |
|--|--------------------|--------------------|--------------------|--|
| <u>Actual</u> | | | | |
| | Actual Nov 2025 | Actual Dec 2025 | Actual Jan 2026 | |
| Beginning Cash Flow Balance | \$ 3,596,550 | \$ 3,197,864 | \$ 3,047,400 | |
| Receipts | | | | |
| State/Federal Aid | \$ - | \$ - | \$ - | |
| All Other Revenue | \$ 395,920 | \$ 567,715 | \$ 597,519 | |
| Total Receipts | \$ 395,920 | \$ 567,715 | \$ 597,519 | |
| Disbursements | | | | |
| Payroll | \$ 61,742 | \$ 41,029 | \$ 35,953 | |
| Employee Benefits | \$ 19,902 | \$ 12,896 | \$ 15,087 | |
| All Other Disbursements | \$ 712,962 | \$ 664,254 | \$ 382,098 | |
| Total Disbursements | \$ 794,606 | \$ 718,179 | \$ 433,138 | |
| Ending Cash Flow Balance | \$ 3,197,864 | \$ 3,047,400 | \$ 3,211,781 | |

| <u>Projected</u> | | | |
|------------------|-----------------------|-------------------------|-------------------------|
| | Projected Feb 2026 | Projected March 2026 | Projected April 2026 |
| | \$ 3,211,781 | \$ 2,583,557 | \$ 2,766,662 |
| | | | |
| | \$ - | \$ - | \$ - |
| | \$ 250,000 | \$ 500,000 | \$ 200,000 |
| | \$ 250,000 | \$ 500,000 | \$ 200,000 |
| | | | |
| | \$ 42,545 | \$ 43,575 | \$ 43,575 |
| | \$ 15,679 | \$ 13,320 | \$ 13,320 |
| | \$ 820,000 | \$ 260,000 | \$ 320,000 |
| | \$ 878,224 | \$ 316,895 | \$ 376,895 |
| | | | |
| | \$ 2,583,557 | \$ 2,766,662 | \$ 2,589,767 |

| ACTUAL Tourism Cash on HAND vs. INVESTED: | | | |
|--|--------------|--------------|--------------|
| Tourism CASH ON HAND | \$ 1,697,864 | \$ 1,547,400 | \$ 1,711,781 |
| Tourism CASH INVESTED (ICS Reserve) | \$ 1,500,000 | \$ 1,500,000 | \$ 1,500,000 |
| Total Tourism Cash Balance | \$ 3,197,864 | \$ 3,047,400 | \$ 3,211,781 |

| <u>Projected</u> | | | |
|------------------|--------------|--------------|--------------|
| | \$ 1,083,557 | \$ 1,266,662 | \$ 1,089,767 |
| | \$ 1,500,000 | \$ 1,500,000 | \$ 1,500,000 |
| | \$ 2,583,557 | \$ 2,766,662 | \$ 2,589,767 |