

To learn more about Focus on Energy,SM call 800.762.7077 or visit focusonenergy.com

Wisconsin hockey, figure and recreational skaters rely on local ice arenas to provide space for practice, competition and recreation. However, ice arenas such as the Tri-County Ice Arena, in Neenah, present big management challenges. Energy costs are high and tough to manage because many arenas have big problems controlling humidity levels and condensation.

“Our electric bills have risen from an average of almost \$5,000 per month a few years ago to almost \$7,000 in winter months,” said Searl Pickett, the arena’s manager. “When you add it up, our energy bills have increased \$8,000 to \$10,000 each year.” Mr. Pickett recently worked with Focus on Energy’s Government Buildings and Operations Program and two of its Program Allies (Vyron Corporation and U.S. Lamp) to find a way to reduce these costs and improve the facility’s energy efficiency.

“We have one regulation rink and one studio rink inside the facility,” said Mr. Pickett. “Together, these rinks measure almost three-quarters of an acre.” The Tri-County Ice Arena, which was purchased jointly by Outagamie and Winnebago counties in 1980, is operated by a nonprofit organization with a Board of Directors. The Board includes two supervisors from each county and several private citizens. Mr. Pickett reports directly to the Board.

Working together, Focus on Energy, its Program Allies and Mr. Pickett identified two high priority energy efficiency projects: 1) install a desiccant



dehumidification system, and 2) retrofit the arena’s old light fixtures.

The arena’s existing refrigeration system was unable to adequately remove humidity from the air; this excess humidity was condensing and dripping to the skating surface.

“Our humidity problems were so bad that on many spring, summer and fall mornings, we would have twelve to fifteen big stalagmites and many smaller ones on the ice ovals,” said Mr. Pickett. “Some were 4 inches high. We’d have to chop them off with a chisel and then resurface the ice each day.”

The arena’s refrigeration system was forced to work overtime to compensate — 20 percent to 50 percent more — and it still had difficulty maintaining a proper ice temperature of 20°F. Also, the excess humidity caused hazardous “mushrooms” and puddles on the skating surface during the day.

Ben Radaozewski of Vyron Corporation worked with Mr. Pickett to correctly size and install a desiccant dehumidification system at the arena. “The system was up and running on September 19, 2002, and we haven’t seen any stalagmites since then,” said Searl Pickett.

“By fixing the humidity problem, the desiccant dehumidification system helped reduce condensation to almost zero and control the facility’s temperature. Now, we can keep the arena’s relative humidity at 40 percent to 50 percent. It’s cool, but relatively dry,

which improves the comfort level,” he said. “Also, by reducing the condensation, we should significantly reduce our annual maintenance chores. We used to have to repaint and battle rust every year. Now, we shouldn’t have to spend this extra money.”

This measure involves “fuel switching” because desiccant dehumidification systems are powered by natural gas. The desiccant dehumidification project reduced the facility’s annual electricity use by 569,229 kWh and annual electric demand by 47 kW. But, it increased natural gas use by 19,000 therms. However, the overall energy costs for the arena’s HVAC system will drop by \$29,956 each year, thanks to the benefits offered by the desiccant dehumidifier. This project also received a Focus on Energy Implementation Grant to offset the \$64,950 project costs.



Searl Pickett, Tri-County Ice Arena manager, surveys the arena.

DESICCANT DEHUMIDIFICATION: A GIANT DEHUMIDIFIER

Desiccant dehumidification systems control humidity levels more effectively than refrigeration systems. Humidity levels can be precisely set, allowing operators to “tune” the ice for any combination of strength, speed and resiliency. Because the desiccant system can completely eliminate fog, visibility and safety is increased for both the skaters and the spectators.

In addition, since moisture promotes the growth of molds and bacteria, the desiccant dehumidification system improves indoor air quality and extends the life of equipment such as wooden bleachers and HVAC ducting.

In addition to reducing the refrigeration load by 20 percent to 50 percent, desiccant dehumidification systems can incorporate heat recovery to help dehumidify the air, resulting in further energy load reduction.

The second project involved lighting. The Tri-County Ice Arena was lit using 40 high bay 400-watt metal halide fixtures with dual bulbs (for a total of 80 bulbs). Joe Daniels, from U.S. Lamp, recommended replacing the old units with 50 energy efficient, low bay 400-watt pulse start metal halide units. These new units operate with single bulbs, so while fixtures were added, the number of bulbs dropped from 80 to 50. U.S. Lamp performed the lighting retrofit in mid-August 2002.

“We noticed a dramatic increase in illumination and, so far, a substantial decrease in our electric demand,” said Searl Pickett. “Everyone who’s come into the arena has been very pleased.”

This lighting project reduced the facility’s annual electricity use by 55,042 kWh, annual electric demand by 13 kW and annual energy costs by \$2,995. This project also received a Focus on Energy Implementation Grant to offset the \$25,681 project cost.

PROJECT TECHNICAL SUMMARY *Tri-County Ice Arena*

SAVINGS PROJECTIONS	ANNUAL ELECTRICITY SAVINGS (kWh)	ANNUAL DEMAND SAVINGS (kW)	ANNUAL THERM USE	ANNUAL ENERGY COST SAVINGS
Focus on Energy Action Item				
Install desiccant dehumidification system	569,229	47	+ 19,000	\$29,956
Replace high bay 400-watt metal halide fixtures with low bay 400-watt pulse start metal halide units.	55,042	13	NA	\$2,995
TOTALS	624,271	60	+ 19,000	\$32,951