

MIAMA Energy Efficiency Improvement Ideas

Idea	Description	Cost to implement	Estimated savings	MIAMA Vendors Associated
Low E Ceilings	Low E Ceiling installed in rink, this cuts down the radiant heat load on the ice surface, which reduces energy used by the compressors.	\$48,000	\$13,000	Energie Innovation, Inc.
Cleaning chemicals	Have a system the automatically dilutes the chemical to the proper dilution and also does not allow pouring of the chemical.... example 3M Twist and Fill. This keeps fro over use and extra chemicals getting into the environment and keeps the cost to a minimum by not over using chemical amounts. Majority of the U of M uses this system.			
Ice Resurfacer Maintenance	Can improve fuel consumption by 10%. Also will reduce the amounts of CO, NO2 and fine particles in you arenas Air.			
Hot Gas Reclaim	Hot gas from the refrigeration system is used to heat all 3 rinks			
T5 Fluorescent Lamps	Energy efficiency T-5 lamps installed in all 3 rinks. Lamps have same light output as Metal Halide but use 50% less power.			
Premium Efficiency Motors	All motors in the HVAC units have premium efficiency electric motors. These motors use less energy then older motors with the same horsepower rating and load.			
RO Water Purification System	RO water is used for ice making on all 3 rinks. Pure water freezes at a higher temperature which saves energy by having higher set points on the compressors. Other benefits using RO water are, harder ice, not as much snow, and ice is clearer making lines brighter.			

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Cold Water Resurface	Because of the benefits of the RO System we use cold water when we resurface, saving energy by not having to heat this water.			
Electric Resurfacer	Electric Resurfacer requires less ventilation, which decreases additional heating in the winter and extra dehumidification in the summer. Also eliminates air quality issues that come from a propane resurfacer.			
Light Motion Sensors	Light motion sensors are installed in all of our bathrooms and locker rooms.			
Roof Insulation	Extra 6 inches of insulation was added when rinks 1 & 2 roofs were replaced			
Power Curtailment	Participate in Xcel Power curtailment program. We reduce our energy load during curtailment periods. By doing this we receive an average monthly credit of \$600.00 on our utility bill.			
Exterior Lighting	All exterior lights are on photo cells and time clocks. Lights on, when it gets dark with photo cell, off, with time clock after last rentals.			
Equipment Turned Off	All unnecessary equipment is turned off at night vending machines, snack bar equipment.			
Log your utility use daily- you cannot save or know where to save without tracking your usage	We track Electric, Gas, Water Main and Water to our cooling tower every day at about 4 pm. By doing this you can find problems prior to getting a big utility bill at the end of a month. For the data to be useful we enter it into a spread sheet that way we can do data trending and always have a history to work from. We had a control vendor in to look at our HVAC controller and the next day we realized that our Natural Gas usage doubled due to a change made to an occupancy schedule had we not been tracking the usage we would not have known until our bill came after a month and it would have been double the amount that we normally have.			

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Eliminate your demand fee on your electric bill	We had Total Energy Concepts www.totalenergyconcepts.com install 7 capacitors at our arena on our largest motors(Compressors, Munters Unit, Cooling Tower and Brine Motors) saving 15% on our Electric bill each month and allowing our motors to run cooler and more efficient. Cost to implement here was ~\$14,000			
Install a water meter on your cooling water make up line	This saves water, chemicals. Your chemical supply company can treat your cooling tower water based on the amount of water being introduced to the system instead of the conductivity of the water. When doing this your system will only feed chemicals based on the makeup water entering the system and should eliminate bleeding off water and feeding chemicals at the same time saving chemicals from going straight down the drain. If you pay a sewer fee you can also use the meter to have that amount of water usage deducted from your bill since the water going into the cooling tower does not make it to the sewer.			
Use LED lights in your elevators, and score boards	Since elevator lights stay on 24 hours a day we were burning out safety coated light bulbs \$9 a piece we switched to LED bulbs in the Elevator and have not had one burn out and since it is plastic it is as safe as a safety coated bulb. LED bulbs 3 for \$15 we also use them in the score board to replace the incandescent bulbs behind the home and visitor			
Control backlit signs with a reverse photo eye	If you have backlit signs that have to be turned off and on manually or are always on you can save energy by having a reverse photo eye control the sign sett it so when the rink lights come on the sign turns on, without having to have extra wiring happen to light controls.			

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Leave the ice dirty(No resurface) at the end of the night	We have been leaving the ice dirty for 4 months and have found on the nights that we do this the ice surface is 1-2F cooler with the compressors running less. The snow acts like an insulator between the ice and the air.			
New programmable thermostats				
Energy management system to control occupied and unoccupied lighting cooling and heating				
Turn down all hot water temps to minimum needs				
Timers on all electric hot water heaters				
Timers on all vending machines				
Tune up all furnaces and water heaters annually and seek out recommended energy savings tips from service techs				
Check and replace all worn weather stripping to outside doors and doors that lead to the rink from heated areas				
Lower ice temp 2-4 degrees at night when ice surface is unoccupied	Most systems can add a controller that will do this. Experiment with this for a few months before you purchase a timer. Every system seem to different and results will vary.			

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Turning ice temp up over night.	Turning ice temp up over night. Tests have shown that this does save energy and still outweighs the electricity to bring ice temp down to desired temp for that days use.			Arena Systems, Custom Refrigeration, RinkTec Int'l, New Mech Mechanical, Gartner Refrigeration
Replace 32 watt T-8 bulbs with 28 watt T-8 bulbs	The loss of light is in the 7.5% area but the savings of the bulb is 12% on the energy savings for a 32 watt bulb. Questions to ask.... Are you able and reasonable for you to lose 7% of you light in certain areas?			
Tank less water heaters	Installing tank less water heaters instead of traditional tank heaters.			
Check for leaks in building envelope.	Turn lights out in all of you building and look for light coming in from the outside. Fill in all gaps with foam sealant or find ways to tighten up you			
Energy Audits	Energy audits, most energy companies will do this for free. Also most larger companies will help in the bidding process to give you the optimal savings payback. Most electrical companies what you to do the project and will find the lowest cost way to get it done.			
Ice Surface Temperature Testing	Many Arenas worry only on their slab temp. Possibilities are very high that your ice may be too cold and just wasting energy to keep your ice at an undesirable temp. Granted all areas are different and one slab temp may not work for another.			