Advantix systems

Makers of DuCool Dehumidification and Cooling

CASE STUDY
Pines Ice Arena

Ice Rink Goes Green, Achieves 55% Energy Savings

A recreational ice arena in South Florida experienced high energy costs from cooling and dehumidifying its facility through conventional means such as chillers, cooling towers and desiccant wheel dehumidifiers.

By installing a liquid desiccant air conditioning system and tapping into renewable energy sources on the premises including the Zamboni ice shavings, the arena has achieved 55% energy savings, improved air quality, and lower maintenance requirements.

BACKGROUND

Pines Ice Arena is one of the largest recreational ice rinks in South Florida with two rinks, twelve party rooms, a full size gym, retail store, and offices. The facility is 80,000 square feet, holds approximately 2,000 people and reaches full capacity twice a week for six hours each time.

Previously, the arena operated with a standard chiller and dehumidification system consisting of two McQuay 120DW-H chillers (120 tons), one McQuay 60 ton chiller, two Munters 30 AM-G, gas fired dehumidifiers (9000 CFM), two cooling towers and a ventilation system (24,000 CFM).

Gas & Electric expenses averaged over $389,000 per year (approximately 90,000 kwh and 60,000 therms of gas). Water consumption averaged $31,000 per year.

CHALLENGE

Like most ice rink operations energy costs accounted for a major portion of Pines' operating budget. Using chillers and desiccant wheel dehumidifiers with frequent maintenance problems, the arena struggled to maintain optimal ice conditions. The system also consumed inordinate amounts of electricity, gas, and water.

"With rising energy costs, our facility was becoming very costly to maintain," states Shlomo Epstein, owner of Pines Ice Arena. "The refrigeration bill was extremely high during the hot, humid months, the two cooling towers used over 6 million gallons of water every year, and the desiccant wheels' maintenance was costly. Being environmentally and sustainability-conscious, I knew I had to find an alternative solution that would consume less energy, assure excellent air and ice quality and also save money on the maintenance. This ice rink serves the community and we wanted to do our part to be a responsible business."

ADVANTIX SOLUTION

As a short term solution, Pines replaced solid desiccant wheels with Advantix Systems' DuTreat stand-alone units to deliver an immediate, cost effective dehumidification and cooling solution. With the long term goal of maximizing sustainability and energy savings, Pines then installed six DuHandling units, which are powered by waste heat from cogeneration and a geothermal well. This installation allowed Pines Ice Arena to reduce energy consumption by 55%, lower maintenance costs, and achieve optimal air quality in less than a year. Based on innovative, liquid desiccant technology, Advantix Systems deliver cool, dry air without the need to overcool or deploy a desiccant wheel for dehumidification.

> "The results of this new system have exceeded my expectations. I never imagined that I could save so much money in energy consumption by tapping into existing processes in our facility."
>
> **Schlomo Epstein,**
> Owner of Pines Ice Arena

Cold Sources

- Ice resurface waste from Zamboni (dumped in ice pit)
- Geothermal well designed by Advantix engineers

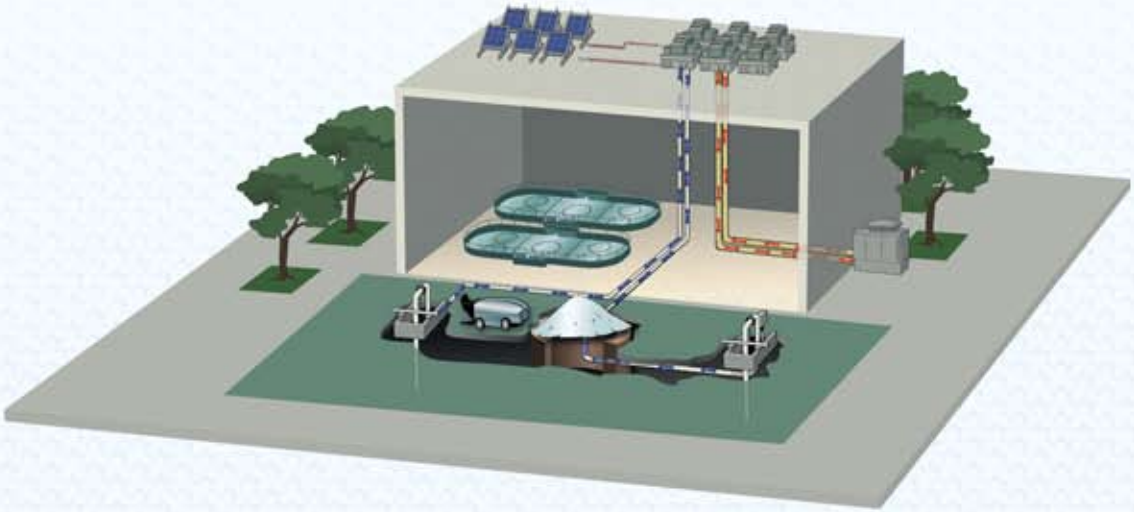
Hot Sources

- Waste water from microturbine
- Solar thermal panels (Phase II)

Once the units were installed, Pines was able to remove one chiller and one cooling tower, eliminate both desiccant wheels, and reduce maintenance costs significantly without compromising air quality.

Pines also tapped into waste heat and renewable energy sources on the property to become more sustainable and achieve even more energy savings.

Waste heat is often readily available at commercial and industrial facilities; Pines located numerous sources for the cooling and heating processes:



Ice shavings from the Zamboni are dumped into a shallow pit and used to additionally cool water from a geothermal well. This cool water is then pumped through the DH units, providing the necessary heat extraction. Meanwhile, free heat from solar thermal panels and the microturbine exhaust create hot water that provides the heat necessary for regeneration.

By using renewable energy sources, Pines greatly reduced its energy consumption in electricity, gas and water. The savings, thus far include the following:

- Electricity consumption has dropped by 55% with only a 10% increase in natural gas.
- Water consumption decreased by 17% and is expected to decrease by 25% later this year.

HOW IT WORKS

Advantix Systems' cooling & dehumidification systems are based on liquid desiccant's natural removal of moisture from air. This non-toxic, brine solution cools, dehumidifies and cleans the air at the same time without ever needing to be replaced and without exiting the system. When heated, the liquid desiccant releases the moisture back outside in the form of warm, vapor air, eliminating condensation from any point in the system. Liquid desiccant is also a natural disinfectant, eliminating bacteria, microorganisms, and odor from the air in just one pass.

"The results of this new system have exceeded my expectations," confirms Epstein. "I never imagined that I could save so much money in energy consumption by tapping into existing processes in our facility. Who knew that the Zamboni ice shavings dumped behind our building every day could be reused to cool the building? I'm proud that our ice rink is now a model in the community of green building alternatives."

FINANCIAL INCENTIVES

The integration of renewable energy and the reductions in energy consumption made Pines eligible for federal tax incentives. The Recovery Act's Investment Tax Credit allows Pines to claim a tax credit equivalent to 10% of the cost of the installed geothermal property and 30% of the cost of the installed solar property.

In addition, section 179D of Title 26 Internal Revenue Code established by the Energy Policy Act of 2005 allows for a federal tax deduction for energy-efficient commercial buildings which allows Pines to claim $1.80 per square foot for its 55% energy savings. With a facility of 80,000 square feet, this comes out to a pre-tax deduction of $144,000, and will reduce the amount Pines pays in federal income tax by $50,400.

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