All It Took Was 2 Amps!

Case Study: Hospital

Benefits of SMARDT:

- Low Operating Costs
- Reduced Electricity Consumption
- Improved Energy Efficiency
- Reduced Maintenance Costs
- Built In Redundancy
- Reduced Rigging Costs
- Improved Reliability
- Lowest Cost of Ownership

SMARDT & Direct Energy Business Services team up to bring energy efficient & cost saving chiller operations to Arnprior & District Memorial Hospital.

Situation:

Arnprior & District Memorial Hospital in Ontario, had been working with the Ministry of Health for several years to replace their existing chiller. Besides the fact that the chiller was 37 years old, they had a number of issues that required solving. For one, the existing chiller used CFC 11, which was being phased out as per provincial legislation. The aging chiller was not energy efficient and incurred increasing maintenance and repair costs to keep it functional. There were also capacity limits that would be an issue with future expansion of the hospital. In addition, the chiller was also at risk of failure due to its increasing age and there were no redundancy systems in place should failure occur.

Arnprior Hospital hired McKee Engineering to consider options for replacement. The review was based on a number of considerations. The location of the chiller room made it difficult to bring in new equipment without major structural work being involved. The existing chiller was 150 tons, and the new chiller plant was sized for 240 tons to handle future expansion. All options had to include 100% redundancy in order to deal with critical loads, which included operating rooms and other vital areas. Hooking up a chiller to the hospital's emergency power generator would be beneficial. Various costs, such as life cycle, energy, and maintenance, had to be included in the proposal. Also, all options had to involve the use of new long-term refrigerant (134A).

Options:

McKee Engineering submitted a report to Arnprior Hospital that provided two options to replace the existing chiller.

The first option suggested two new water-cooled centrifugal chillers. Although this option had the lowest initial cost, it required some civil work to get the chillers into the existing mechanical room. The manufacturer also added the cost of taking the chillers apart at the factory and reassembling them at the site. The installation of multiple chillers provided redundancy, but would be difficult to be hooked up to the hospital's emergency power generator because of required starting currents. Also, this option had higher life cycle costs over the life of the chiller; these costs included lower energy efficiency and higher maintenance and repair costs.

The second option involved installing three new water-cooled SMARDT "modular chillers". Although the initial cost of the equipment is higher for this option, no civil work is required to install the new chillers in the mechanical room. The heat exchangers are small enough to use a crane to drop them down a small well on the side of the building into the mechanical room. There are also no assembly costs, as the modular SMARDT chillers can be shipped in pieces from the manufacturer and assembled on site. Since the option involves three 80 ton chillers, the issue of redundancy is solved. Also, one of the 80 ton chillers can be connected to the hospital's emergency power generator. This option is more energy efficient and has lower "life cycle" and "return on investment" costs over the life of the chiller. Since SMARDT chillers do not use oil, maintenance costs are 60% versus chillers that use screw or centrifugal technology.

A conversation between Brian Bourk, Arnprior's Operations Manager, and Gary Bond with Direct Energy sealed the deal. While discussing options for replacement, Gary mentioned that SMARDT chiller technology uses magnetic bearing technology. This means that the compressor starts on only 2 amps, and the chiller can be hooked up to a backup generator. Mr. Bourk responded, "This is impossible! No chiller starts on 2 amps. If this is true, you've proved the technology is the most advanced out there."

Conclusion:

After looking at many options with Brian and hospital staff, McKee Engineering recommended that Arnprior Hospital go with the SMARDT chillers. Since the SMARDT chillers are modular, the overall capital costs were lower because the civil requirements were greatly reduced during installation. The life cycle analysis favoured the SMARDT chillers, as the maintenance and repair costs are 40% lower over the life of the chillers. Energy savings were estimated at approximately $7,000 per year. This provided the hospital with the best return on investment. Also, since the SMARDT chiller only requires 2 amps to start, this allows one of the 80 ton modules to be connected to the hospital's emergency power generator in the future.

After the fact, Mr. Bourk is extremely pleased with the SMARDT chillers. "I can't get over how quiet these chillers are. The pumps are noisier… and I can't believe that I have a chiller running on 15 kW at times of light load." The hospital used a total system approach, including the chiller and the use of variable speed drives on the chilled water pumps to further enhance the energy savings of the chilled water plant.