

Business Technology Energy Efficiency Case Study:**Chiller Plant Retrofit (Cooled with H₂O)**

A somewhat Herculean effort to retrofit the chiller plant system at the Internet data center managed by Herakles Data in Sacramento resulted in about a 600 kilowatt drop in electricity usage per day.

The annual energy savings (3,155,641kWh and 575kW demand) also reduces greenhouse gas emissions, negating the CO₂ emissions from about 262 cars.

Herakles, which is pronounced "Hera-clees," manages an Internet data center that houses rows of server racks sometimes referred to as a "server farm."

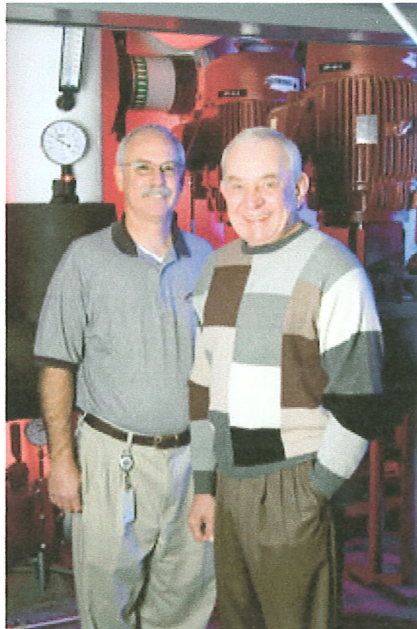
You can also call them a "Big-time Energy User." Most of the 54,000 square foot building is devoted to cavernous sections of raised floors. Standing on them are computer servers for large companies. They rent space and services from Herakles and another tenant in the building.

Electricity a major expense

What keeps the servers humming is reliable electricity and an extremely cool, controlled, air-conditioned environment 24 hours a day, seven days a week.

Because of that, the company's electric bill is about three million dollars a year, according to its President & CEO Lou Kirchner.

"Since power is such a big factor here, we are always looking for ways to conserve energy in everything that we do," says Mr. Kirchner. In consider-



Larry Stancil, left, and Lou Kirchner, both of Herakles Data

ing a chiller plant retrofit project, two major – and possibly mutually exclusive – considerations were: Can the retrofitted system keep up with the higher demand for air conditioning while at the same time, use less energy?

"And it hit both of them right on the nose," Mr. Kirchner says about the retrofit project completed in mid-2007.

A major component of the retrofit was replacing four, 350-ton screw-type, air-cooled chillers with only two, 500-ton centrifugal, water-cooled chillers that were twice as efficient. The water-cooled technology consumes half the energy and is more reliable.

Using SMUD's Energy Profiler Online (EPO) software, they were able to watch their load profile drop

from 3.6MW to 3.0MW on the day of the changeover. They also use EPO to manage their energy profile and schedule proactive cooling.

Four additional chillers were installed later in the year to keep up with the data center's growth. The water-cooled chillers are highly efficient for meeting the increasing cooling needs of today's servers, which hold a lot more data, but also emit more heat. And a hot environment means quick death for servers.

For any company, research and planning for a major retrofit is of utmost importance, says Kirchner, who saw the more energy efficient chillers in action before buying his own. The modular construction and short installation process were key selling points.

Planning was left to Director of Facilities Larry Stancil, who had to coordinate the purchasing, delivery and installation of the numerous components of the retrofit without interrupting one second of business. And mind you, this is a 24/7 operation. The entire process from purchasing to installation was completed in about six months.

Stancil describes it as "like changing a propeller on an airplane while it's in flight." But the retrofit was well worth it because of the energy savings.

"The new chillers are more efficient than most chillers, and they're more reliable," says Stancil. "So this retrofit was a win-win for us. The \$50,000 rebate from SMUD was an added bonus."