

# UNIQUE DATA CENTER DESIGN LEADS TO ENERGY EFFICIENCY

As Gundersen Health System got ready to move its data center to a new location, the IT and construction design teams worked together to develop a model that would improve energy usage. The data center incorporates a unique design for cooling and recapturing heat that's led to near "best of class" energy efficiency.

Data centers are notoriously high energy users because IT equipment runs 24/7 and there is a need to keep the equipment cool. Traditional designs use "cold" and "hot" aisles. Cold air is pumped into the cold aisle, drawn into the equipment and exhausted through the back of the equipment into the hot aisle. The hot air is captured, cooled, forced down into the floor and the cycle repeats.

The problem? With this design, it is difficult to keep the hot and cold air from mixing without expensive containment schemes. To cover the deficiencies of the airflow without hard physical separation, air must be pumped in very cold, usually about 62 to 65 degrees F, and cycled through using a high fan speed.

Gundersen's data center incorporates a chimney design that prevents the mixing of hot and cold air. The equipment is in an enclosed cabinet with a chimney exhaust system that attaches to the ceiling. Because the heat is captured so effectively, the

air does not have to return as cold as in the traditional models and the fans in the air handlers run at far lower speeds, resulting in energy savings.

Other efficient features include:

- **Free cooling:** Rather than running a refrigerant cycle in the winter, Gundersen takes advantage of free cooling by using cold air from outside to cool down the fluid coolers used by the chilled water system that supplies the air handlers.
- **Heat recovery:** Using a heat-recovery chiller, heat that's captured from the data center is used to heat the rest of the building. This also reduces the amount of cooling that's needed for the air going to the data center.
- **Central chilled water:** Rather than relying on a separate cooling system, Gundersen taps into the high-efficiency chillers at their power plant to cool the building in the summer months.

Gundersen's old data center ran at a power usage efficiency (PUE) of 2, meaning only half of the energy was used to run the equipment. The majority of the rest was used for cooling. Currently, the data center is running at a PUE of 1.2, which is close to best of class. Gundersen's annual energy savings from the project is \$65,000 to \$75,000 a year.



Gundersen's data center uses a chimney design to prevent hot and cold air from mixing, leading to energy efficiency and savings.

The data center project is part of Gundersen's Envision® plan to lead the healthcare industry in environmental stewardship and lower energy costs. Gundersen Health System is headquartered in La Crosse, Wis., with hospitals and clinics in Wisconsin, Minnesota and Iowa.

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