GREEN HOUSE DATA CHOOSES HIGH EFFICIENCY COOLING TO ACHIEVE 1.14 PUE

A Vertiv™ Case Study

ABOUT THE COMPANY

Founded in 2007, Green House Data is a cloud hosting and colocation services provider with highly energy efficient, and sustainable data centers located across the U.S. The company provides the high-availability infrastructure needed for IT operations while remaining a transparent, responsibly operated company.

www.greenhousedata.com

Background

Cloud hosting and colocation providers need to deliver agility, responsiveness and 100 percent uptime service level agreements to their customers, and they must provide these benefits economically.

When fast-growing Green House Data built a new data center in Cheyenne, Wyoming, they wanted the most efficient infrastructure possible, consistent with the company's commitment to sustainability. To further their strategy for cooling efficiency while staying cost competitive, Green House Data chose an Vertiv™ Free Cooling solution.

Case Summary

Location: Cheyenne, Wyoming

Vertiv Solutions:

- Utilized a close working relationship with Vertiv and industry-leading engineering expertise, working closely with Green House Data to design, manufacture, install and commission a thermal management system customized to meet their specific needs.
- Deployed four 300kW Liebert® Indirect Evaporative Free Cooling air handler units, with the ability to add up to 14 more units to grow with data center requirements. The highly efficient, aluminum air-to-air heat exchangers offer up to 66 percent efficiency in dry mode and up to 78 percent efficiency in wet mode, resulting in a possible mechanical PUE of less than 1.2 and minimal water usage.

Critical Need: Green House Data's available whitespace was dwindling in their original Wyoming data center because of the growing demand for the company's high-touch, customized IT solutions. To accommodate client growth, they built an additional data center, planning the new space based on lessons learned from the first location.

Challenges: Designing a 35,000 square-foot, five-megawatt data center that uses as little energy as possible is no simple task. Green House Data wanted to adopt an efficient thermal management system that would use outside air and minimal amounts of water 365 days of the year.

Go to VertivCo.com/GreenHouseData to see the video Case Study

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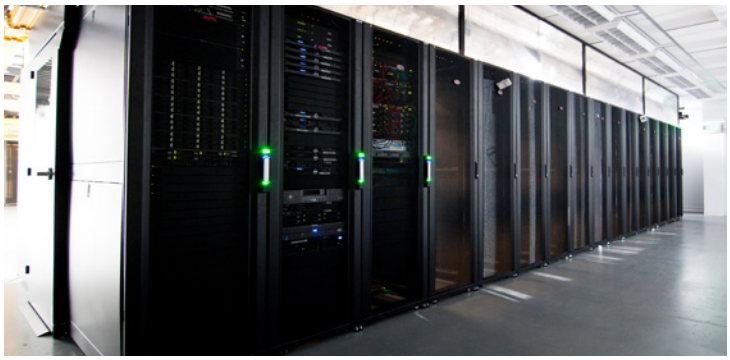

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- CORTNEY THOMPSON
GREEN HOUSE DATA CHIEF TECHNOLOGY OFFICER

The Situation

Launched in 2007 in Cheyenne, Green House Data focuses on providing high performance, custom technology infrastructure solutions from the most environmentally, operationally and capitally efficient data centers in the country. "We decided to expand because we saw our data center space was running very short and the demand for our high-touch, customized IT solutions was still skyrocketing," said Green House Data chief executive officer Shawn Mills. "We'd grown close to 100 percent year over year since our inception, and building a new data center was the next step in our evolution."

In 2014, southeast Wyoming was again chosen as the location for a new 35,000 square-foot, five-megawatt facility. In addition to being at low risk for natural disasters, there is ample broadband connectivity, energy costs are lower than other regions of the country, and the characteristically cold and dry climate pays off with great Free Cooling potential.

"In designing the new data center, we focused on using as little energy as possible. We were shooting for a PUE of 1.14, which is a very aggressive number, and cooling efficiency offered the most energy savings," said Green House Data chief technology officer Cortney Thompson. "We wanted to use outside ambient air 365 days a year for cooling. Cheyenne's climate heavily influenced the data center design."

The Solution

Energy efficiency is fundamental to Green House Data's business strategy. In fact, the company is the first company in Wyoming to become a Certified B Corporation (B Corp) for voluntarily meeting rigorous standards of social and environmental performance, accountability, and transparency within the overall goal of redefining business success.

Green House Data's environmental focus led the company to evaluate Vertiv™'s thermal management expertise and Free Cooling technologies. Several solutions were reviewed based on their ability to leverage Free Cooling in Cheyenne's climate as well as support Green House Data's 100 percent uptime service level agreement for the facility.

"The Liebert® Indirect Evaporative Free Cooling air handlers allowed us to avoid building a central cooling plant, they matched our modular build design, which is important for both environmental and capital efficiency, and they enabled us to more tightly control the data center temperature and humidity," said Thompson.

The Green House and Vertiv teams worked closely through the entire data center build-out process to determine the most efficient cooling system design and install it to function at the highest efficiency and lowest cost. "On everything from manufacturing all the way through commissioning and installation, we've been able to work closely with Vertiv and actually provide feedback that they ultimately incorporated into the design features," said Thompson. "Green House Data and Vertiv worked hand-in-hand to fine-tune the cooling infrastructure for high efficiency," Mills added. "This helped us squeeze out every last drop of energy efficiency."

In addition to saving energy, the Liebert Indirect Evaporative Free Cooling air handlers allow Green House Data to save data center space as well. The compact design of the heat exchanger allows the unit to be both smaller and lighter without sacrificing performance. This was a significant advantage for Green House Data, which needed to use every inch of real estate efficiently.

"When we designed our data center, it was really important to maximize the number of sellable square feet," said Mills "Delivering more cabinets per square foot of white-floor space is really critical, so we placed our initial four air handler units outside of the building so they would take up zero square footage inside the data center."

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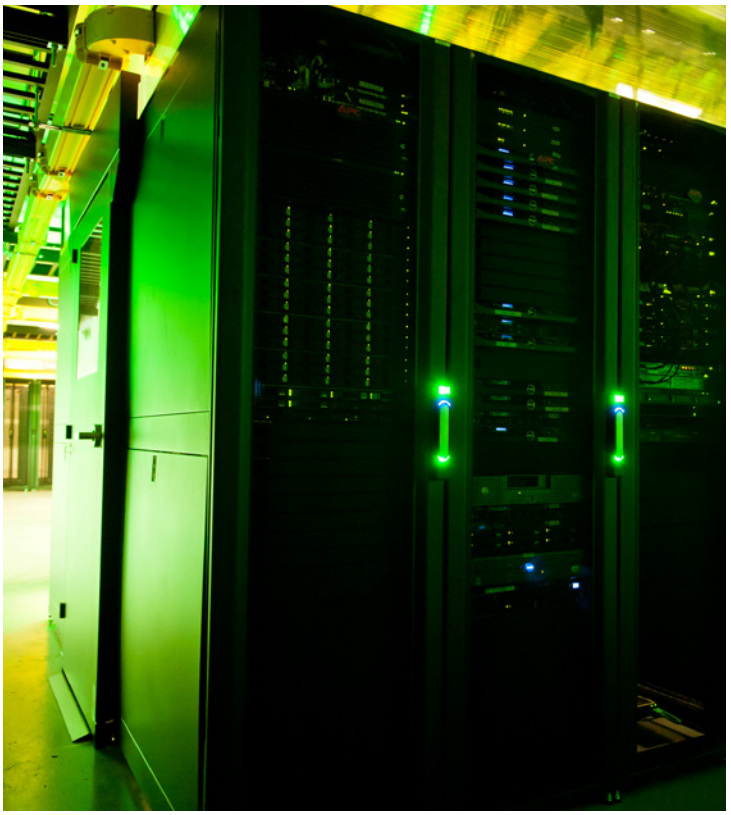
The initial installation of four 300kW air handlers provides 900kW of capacity with 300kW of redundancy. Up to 14 additional units may be added—allowing for up to 4800kW of capacity and two 300kW units for redundancy.

As previously noted, the new thermal management system also had to support Green House Data's 100 percent uptime SLA. "Clients come to a colocation facility expecting high availability, so having redundant cooling is extremely important," said Art Salazar, Green House Data's director of data center facilities and compliance. "The Liebert® Indirect Evaporative Free Cooling air handlers are very easy to maintain, there are fewer moving parts in them, and we were able to have them set up in series to provide N+1 concurrently maintainable cooling at all times."

The Results

Liebert® Indirect Evaporative Free Cooling air handlers now support many Green House Data clients. The system uses 90 to 95 percent less energy compared to conventional data center air conditioners and has been instrumental in pushing the PUE down to the target 1.14.

For CEO Mills, the energy savings gives the company a competitive advantage. "For colocation customers, better use of energy means lower costs, especially as the industry edges towards billing by the kilowatt hour. Our facility can save up to 64.5 percent in energy costs compared to an average data center."



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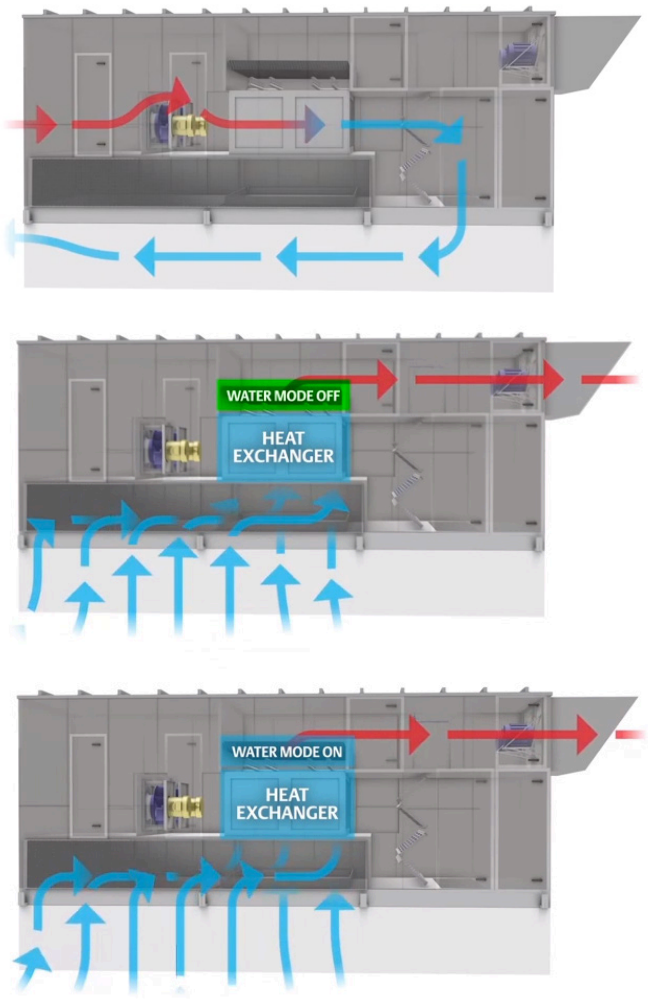
Achieving High Efficiency Through Custom Liebert® Indirect Evaporative Free Cooling Air Handlers

Liebert Indirect Evaporative Free Cooling air handlers cool the air through the evaporation of water, without introducing outside air into the data center, and use two air streams. The hot data center return air (primary stream) is taken through a heat exchanger where it is cooled by outside scavenger air (secondary stream) that has been cooled by water. The cooled primary air stream is then circulated throughout the data center by a blower, while the secondary air stream is exhausted to the outside.

During cold ambient conditions when the unit is operated in dry mode, the unit controller adjusts cooling capacity by modulating the scavenger fan to the desired leaving-air set point. The scavenger fan increases speed to increase cooling capacity or slows to reduce capacity. When the outdoor temperatures rise, and the Liebert unit cannot achieve the desired set point efficiently by using the heat exchanger in dry mode only, the unit pumps are activated and water is sprayed over the heat exchanger. This increases the capacity of the heat exchanger by bringing the outdoor air down near the wet-bulb condition.

The Liebert Indirect Evaporative Free Cooling air handler includes many energy-, water-, space- and weight- saving features to maximize unit performance without consuming much space. A high-performance, 100 percent aluminum-plate heat exchanger with over 30,000 square feet of surface area is used to maximize the amount of heat transfer between the data center and the outdoor air streams in both the dry and wet operating modes. This maximum heat transfer allows the air handlers to maintain the desired supply set point at warmer outdoor conditions while still operating in dry mode. In wet mode, this high level of effectiveness maintains a data center supply temperature within a few degrees of the outdoor wet-bulb temperature in most conditions.



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