

Leading Health System Saves \$360K in Annual Energy Costs and Earns Nearly \$700K in Rebates

A Vertiv Case Study



About The Company

For three-quarters of a century, patients have turned to one of the nation's top healthcare providers to meet their healthcare needs. The health system, which offers a not-for-profit health plan combined with a network of healthcare providers and specialists, serves 12.2 million members in eight states and the District of Columbia through its unique model of coordinated care.

Care for members and patients is focused on their total health and guided by personal physicians, specialists, and teams of caregivers.

Expert medical teams are empowered and supported by industry-leading technology advances and tools for health promotion, disease prevention, state-of-the-art care delivery, and world-class chronic disease management.

Background

To reduce environmental impact as part of an overall mission to improve human health, one of the nation's leading healthcare systems engaged Vertiv to upgrade 63 data center cooling units. With the oversight of the healthcare system's data center engineering firm, [Tec Inc. Engineering and Design](#), Vertiv completed the upgrade project, generating a savings of more than 3 million kilowatt hours (kWh) and \$360,000 in energy costs per year, as verified by [ICE](#), a global consulting firm. Leveraging these impressive results, Vertiv spearheaded a rebate process that ultimately secured a \$200,000 grant from the [Maryland Energy Administration](#) (MEA) through the [Data Center Energy Efficiency Program](#) (DCEEP), as well as a rebate of \$490,023 from local utility provider [Pepco](#), offsetting project costs by 50%. Combined with energy savings, the project is estimated to pay for itself in less than three years, allowing the healthcare system to further its sustainability goals, enhance reliability of data center infrastructure, and increase workforce productivity.

Case Summary

Location: Silver Spring, Maryland

Critical Needs: One of the country's leading healthcare systems is striving to reduce energy costs and become carbon neutral in 2020. The cooling unit retrofit is part of the organization's decade-long commitment to reducing environmental footprint. It will enable the healthcare consortium to reinvest the considerable savings into additional innovative technologies, further establishing the foundation for a sustainable future.

Vertiv Solutions: The comprehensive thermal management solution consisted of retrofitting 63 Liebert® thermal cooling units located in the organization's main data center. The retrofit included new electronically commutated (EC) fans for all 63 units, new Vertiv™ iCOM™ controls and advanced sensors, new chilled water actuators, and networking to enable cooling unit teamwork for improved efficiency and industry-leading reliability.

Results:

- Saved more than 3 million kWh and \$360,000 in energy costs per year
- Reduced carbon footprint by 72%
- Resulted in \$690,023 in rebates from local and state-level energy providers
- Estimated project payback, or return on investment, of less than three years
- Ensured industry-leading reliability by improving visibility and control
- Improved workforce productivity through adaptive autotuning

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The Solution

Implementing the right fans for the job

Energy efficiency was at the heart of the retrofit project. To optimize the 63 cooling units in the data center — a mix composed primarily of aging chilled water cooling systems along with several pumped refrigerant and direct expansion systems — Vertiv replaced the units' existing constant velocity internal supply fans. By switching to new variable speed EC fan technology, the fans can now modulate from 60-100% to match the load in the data center and put out only as much cooling as required.

Upgrading controls to improve visibility, save energy, and increase productivity

Next, Vertiv recommended a hot aisle/cold aisle containment system. To optimize the new aisle configuration, Vertiv replaced the outdated AMG controller with the latest Vertiv™ iCOM™ platform and advanced sensors. Instead of relying on return air sensors, newly installed supply air sensors take exact temperature measurements of the air entering the cold aisle. This information controls the cooling capacity of the units and determines how hard the fans need to work. Remote sensors are deployed in the cold aisle where they provide feedback to the fans, which then adjust modulation to ensure correct airflow. The controls and sensors work in unison to deliver the lowest possible cooling capacity and fan speed rate for adequate cooling and reliability.

Because this all happens through automatic adaptive autotuning, it not only saves kilowatts, it saves manpower. Servers can be swapped in and out as needed, and the sensors and control platform automatically respond, adjusting fan speed based on the new conditions with no need for technician intervention. Thanks to the Vertiv™ iCOM™ control's easy-to-use, touch screen interface, data center managers have remote, centralized visibility into the conditions in the room and complete control to make changes if needed. Both efficiency and reliability are always optimized with much less legwork for staff, allowing more time for high value activities.

Introducing teamwork for additional efficiency and reliability

The updated controller, along with a newly installed network/BMS communication card, enables teamwork, or networking units together to eliminate fighting: some heating and humidifying while others are cooling and dehumidifying, needlessly wasting energy. The units in a teamwork group coordinate fan speed to provide an even, consistent flow that eliminates hot spots while allowing each unit to cool based on its individual supply air sensor. When the capacity changes in the data center, Vertiv™ iCOM™ can command additional units to cascade on or off as needed.

The new teamwork mode safeguards against performance problems with individual units — if one is running out of capacity, in alarm, or needs to be turned off for maintenance, the remaining units in the team pick up the slack to ensure ongoing, consistent cooling for enhancing overall reliability.

Reaping all the rewards of an optimized thermal solution

As a result of optimizing the data center cooling solutions, cooling units can operate in their most energy efficient modes. The data center reduced its consumption of energy by more than 3 million kWh per year, reducing the facility's carbon footprint by an astonishing 72%, and generating \$360,000 in annual energy savings.

Vertiv worked with an independent rebate engineering company and global consulting firm [ICF](#), local energy provider [Pepco](#) (an Exelon Company), and the [Maryland Energy Administration](#) (MEA) to demonstrate and document these savings. The healthcare system received a total of \$690,023 in funds from MEA and Pepco, offsetting half of the project costs. The rebates, combined with the annual energy savings, are expected to result in a full project payback of less than three years.

Ultimately, the healthcare system made great strides toward its sustainability goals while cutting its costs, improving the reliability of a mission-critical facility and enhancing the productivity of its IT team — an exceptional outcome by any standards.