



SHOWCASE PROJECT: NO COST ENERGY-SAVINGS MEASURES AT A 1 MW DATA CENTER

SOLUTION OVERVIEW

Located in Northern Virginia, this one Megawatt capacity data center was built in 2007 and is operated by an agency within the Department of Justice. The facility is embedded within an 81,000 foot building that also houses other functions such as offices and a print shop. Currently, the data center features 22,600 square feet of whitespace that sits upon a three foot raised floor to allow space for transmission cables and air flow. The amount of whitespace may increase in the future since the building has been identified as a core enterprise facility, and will serve as a consolidation site for the federal agency.

In February 2015 the agency partnered with Lawrence Berkeley National Laboratory (LBNL) to perform an “energy health check” on the facility. Specialists from LBNL made several visits to the site over the course of the year as they completed an assessment to identify strategies which could reduce the energy intensity of the data center space. The LBNL team found a number of potential improvements and submitted a report with their conclusions. While the agency reviewed and prioritized the proposed recommendations for budget approval, it decided to pursue several “no-cost” opportunities that were identified. The changes were successful, and the facilities team was pleased to find that the power usage effectiveness (PUE) of the site has already improved from 2.3 to 1.7 without any capital investment.

SECTOR TYPE

Data Center

LOCATION

Virginia

PROJECT SIZE

1 Megawatt

FINANCIAL OVERVIEW

\$0 of Capital Investments

SOLUTIONS

Over the course of LBNL's 2015 partnership with the federal agency, the laboratory sent specialists to visit the Northern Virginia site three times. These walkthroughs were strategically conducted throughout the year (February, June, October), to ensure that the assessment team was able to

view the facility in action during each of the region's seasonal climates. At the end of the third visit the team had acquired a solid understanding of the data center's year round operations, and was therefore able to make adjustment recommendations that went beyond traditional mechanical equipment upgrades.

The following five no-cost changes were implemented by the facilities team:

1. Increased computer room air handler (CRAH) return temperatures from 65° to 72° F.
2. Turned off CRAH reheat elements to prevent simultaneous heating and cooling.
3. Adjusted the humidification set points from 42° F with 28% humidity to 45° F with 10% humidity.
4. Created warm weather and cold weather schedules for the two chillers, three condenser water pumps, and cooling tower fans. During fall, winter, and spring one chiller and one condenser water pump are shut off to take advantage of the cooler outside temperatures.
5. Reduced the number of CRAH units operating at once by 13. Before this adjustment the data center space was over-cooled, and the team realized they could achieve the same temperature set points with less units in operation.

OTHER BENEFITS

The completed "no cost" energy efficiency measures outlined above resulted in the reduction in the data center's PUE from 2.3 to 1.7. Additionally, blanking panels were recently installed at the facility to enable better air management, which is expected to lower the PUE to 1.56. The facilities team is also currently exploring aisle containment solutions, networking of the CRAH units to further improve air management, and deploying the data center infrastructure management (DCIM) tool "Site Scan" in hopes of achieving even greater energy intensity reductions.

Annual Energy Use

Baseline(June, 2015)



Actual(October, 2015)



Energy Savings

46% Reduction in PUE-1

Annual Energy Cost

Cost Savings

\$9,400 (estimated)



3-D Rendering of the Facility