

SHOWCASE PROJECT: DIGITAL REALTY: BEDFORD COLOCATION FACILITY

SOLUTION OVERVIEW

Originally built as a commercial office in 1971, the site was converted to a data center in 2000 and acquired by Digital Realty (Digital) in 2010. While most of the existing HVAC equipment was still several years within ASHRAE-recommended life expectancy for critical infrastructure, Digital proactively decided to upgrade most of the mechanical infrastructure to mitigate risk, improve overall operating energy efficiency, and reduce cost for their customers.

SECTOR TYPE

Data Centers

LOCATION

Bedford, Massachusetts

PROJECT SIZE

50,000 Square Feet

FINANCIAL OVERVIEW

\$3,846,000 - Total project cost after utility incentives

SOLUTIONS

In 2016, the site Operations team assessed efficiency opportunities and determined that the largest contributors to site non-IT energy load were the air-cooled chiller plant, primary and secondary pumping configuration, and constant volume down-flow chilled water computer room air handling (CRAH) units. Digital's efficiency work included upgrades to all constant volume CRAH units, aging air-cooled chiller equipment, and LED lights. Overall, the total project cost was \$4,462,000. Digital received \$616,000 in utility incentives, covering approximately 50 percent of the total CRAH fan upgrade costs and a portion of the chiller and LED upgrades. Leveraging these utility incentives and vendor assistance, the operations team created and executed a multi-year plan.

1) CRAH Upgrades

Each CRAH received an electrically commutated (EC) plug fan kit and upgraded microprocessor controls. With minimal associated risk and short installation timeframes, this upgrade provided additional benefits beyond improving energy efficiency. CRAH EC upgrades require less maintenance and allow for enhanced controls logic, helping to ensure that systems are tuned appropriately for varying customer IT loads.

2) Air-Cooled Chillers with VFDs

All air-cooled chillers were upgraded with newer models that incorporated variable frequency drives (VFD). VFDs allow the speed of the air-cooled chillers to be modified and regulated depending on demand, so that the chiller is only producing as much cooling as necessary, eliminating additional energy waste. This upgrade also enables enhanced control logic, eliminating manual monitoring. The chiller plant's exterior solid walls were replaced with louvered acoustical panels to improve airflow and energy efficiency.

3) LED Lighting

Digital's team replaced 2,800 fluorescent bulbs with LEDs, utilizing utility incentives. Digital was responsible for the installation and labor and the old fluorescent fixtures were disposed of by a certified vendor.

OTHER BENEFITS

The upgrades in the Bedford data center reduced operation and maintenance requirements (both in time and cost) and increased the site's property value for the Asset and Property Management Team. The reduced utility costs benefited existing customers and made the site more appealing for new customers. Enhanced lighting features and LED upgrades throughout the data center provided a safer and more pleasing working environment. In addition, the utility incentives covered a significant portion of the project, helping improve the project's economics and gain internal buy-in from upper management.

Annual Energy Use

Baseline(2017)



Actual(2019)



Energy Savings

39% Reduction in PUE-1

Annual Energy Cost

Cost Savings



Outside view of Digital Realty's Bedford data center