International Colocation Company

Multi-Site Data Center Energy Solutions

OpTerra Energy Services (OpTerra) recently partnered with a colocation provider that has 5 million square feet of data center space in 80+ locations worldwide. OpTerra's dedicated data center team performed ASHRAE Level I/II/III audits to identify and engineer energy conservation opportunities for this customer.

OpTerra used factors like electricity costs and available utility incentives to evaluate the portfolio and ultimately select three initial locations to receive comprehensive efficiency upgrades. In this document, the selected sites are designated as Data Centers 1, 2, and 3 (DC 1, DC 2, and DC 3).

Project Summary:
Customized Data Center energy efficiency solution designed and delivered to three colocation sites in the United States.

Annual Electricity Savings: ....13.4MM kWh

Utility Incentive: $1.7MM

Simple Payback: ....1.83 years

Customized Data Center Energy Efficiency Solutions for Three Colocation Sites

At each of the three sites, OpTerra's team of Professional Engineers conducted a detailed engineering analysis of existing infrastructure, including Computer Room Air Conditioning (CRAC) units, heating and cooling systems, Building Automation Systems, and server rack configuration. Server racks were predominantly arranged in a hot aisle/cold aisle configuration, but in some cases utilized an alternate configuration. All CRAC units at each of the three sites operated continuously to supply cold air beneath the underfloor plenum.

OpTerra engineers designed an energy conservation solution tailored to each's colocation facility's precise needs. Key measures included:

- **Advanced Air Flow Balancing:** Installing both passive and active air flow measures like high-flow perforated tiles with electronically commutated (EC) motor fans, solid tiles, cold aisle containment, and blanking panels, allows the facility to deliver targeted cold air streams to server racks while returning exhausted hot air directly to the CRAC units. Implementing OpTerra's air flow balancing solution enabled DC 1 to place 53 of 112 CRAC units (47%) in hot standby mode, increasing equipment life and creating redundancy.

- **Intelligent Cooling:** A central digital control system with integrated sensors continuously monitors rack row temperatures and uses perforated floor tiles with modulated variable speed fans to deliver targeted cooling to rack zones exactly when needed. This system's customizable user interface enables data center employees to securely monitor and manage thermal conditions and alarms in real time.

- **HVAC Improvements:** Retrofitting standard induction fan motors on rooftop condenser units with EC motors greatly increases motor efficiency.

- **High-efficiency Lighting:** Replacing inefficient existing lighting with modern LED fixtures and controls bolstered energy savings throughout the three facilities.

Behind the Solution: AxiTop by ebmpapst

OpTerra incorporated 224 AxiTop diffusers into the intelligent cooling system we designed for DC 1. AxiTop diffusers convert dynamic airflow energy into static pressure, boosting efficiency by minimizing discharge losses and reducing operating speed. This measure cut DC 1's RTU load by 54%.

OpTerra installed this design-build solution safely, securely, and with minimal disruption. In fact, these data centers operated continuously throughout the project, which was a critical requirement for the company and its customers. The experienced onsite project management team carefully maintained the server room's temperature and consistent underfloor pressure throughout project installation.

The solution that OpTerra's skilled data center solutions team designed and delivered for this colocation customer yielded several key benefits, including significant **operating expense savings, precise and automated control of systems** throughout their facilities, **redundancy,** and **increased equipment life.**

OpTerra also facilitated robust utility incentives and tax benefits that resulted in the customer seeing positive cash flow before the end of year two.