DataCOS, EES' Data Center Infrastructure Management System, Provides Significant Energy Reduction in 25,000 Square Foot Data Center

Overview

A major financial client was concerned about the rising costs of their data center operation. The data center had grown and technology changes resulted in inefficient HVAC operations. There were also load issues on the power distribution units (PDUs) on the floor. EES installed the DataCOS data center infrastructure management (DCIM) system to optimize the operations of the AC units and track PDU power consumption for a total view of data center operation.

HVAC Modifications

The DataCOS DCIM system was installed to control the operation of the data center AC units. The fans on the units ran at full speed which was not always a necessary requirement. Sensors were installed in the aisles for feedback and a VFD was installed to optimize the load on the coil by slowing the fan speed. The system actively controls the VFDs to maintain proper environmental conditions. Some characteristics of the control included

- Distributed control with bypass contactors to service the VFDs
- System was programmed for fail safe operation in the event of equipment failure
- System was installed in piecemeal manner to meet budget constraints
- Active trending of environmental conditions gave full view of temperature distribution within the data center.

This resulted in

- 70% reduction in data center energy costs
- Payback was less than 2 years
- Allowed AC units and central cooling plant to operate more efficiently

PDU Monitoring

In addition to the HVAC control, EES installed branch circuit monitoring of the PDUs on the data center floor. The data center utilized dual corded power outlets for the server racks. Each branch circuit is tied into the DataCOS DCIM system to display current amp draw on each circuit and provide two warning levels for alert and alarm. Rack usage translates to heat within the system which also affected the HVAC load of the AC Units. The PDU monitoring provided the following:

- Actual real time amp draw of each circuit
- Alerts and alarms before trip of a breaker lessened downtime
- Screens developed to provide overall data center energy usage with drill down capability
- Detailed reporting of energy usage by rack and PDU
- Better management of rack space to distribute equipment load
- Remote annunciation of all alerts and alarms so that personnel can respond promptly

Results

The DataCOS DCIM system not only enhanced the energy efficiency of the data center but also provided the necessary information to make management decisions on equipment installation for future growth. The information allowed the client to delay capital expenditures that were unnecessary since the HVAC and power were being used in the most efficient manner. This contributed to their overall bottom line. The system also allowed the client to meet their carbon reduction initiatives that were instituted by senior management.

The system was designed to be user friendly and intuitive for facilities and IT personnel. Upon completion of the project, the client commissioned Engineered Energy Solutions to install the system in their redundant data center site. In addition, EES added other systems including chiller control, generators, lighting control, chilled water BTU monitoring and automatic transfer switches to DataCOS. The flexibility of the system allowed these other items to be integrated into a full package which provides information, control, and alarms for overall data center support modifications. The information from DataCOS DCIM will be used for LEED certification of the data centers.