Success Story: Facebook

Markets Served
IT

"Both UPSs achieve 99 percent efficiency with Eaton's Energy Saver System (ESS) technology, which continuously monitors incoming power conditions to operate at the highest efficiency level possible—"

Facebook and Eaton Collaborate to Optimize Data Center Efficiency

Location:
Forest City, NC

Segment:
Data centers

Problem:
To help Facebook bring the Power Usage Effectiveness (PUE) of their new data center significantly below industry average

Solution:
With Eaton's expertise, Facebook utilized UPS and ESS technology to help keep energy output well below average norms

Results:
Facebook is able to maintain a PUE rating well below the industry average

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Background

Data centers are among the largest consumers of electrical power in the United States consuming between 1.7 percent and 2.2 percent of the nation's power. Gartner Inc. recently estimated that it cost $1.6 million a year to power an 8,000-square-foot data center and those costs are rising 10 percent a year.

When Facebook began planning its new 300,000-square-foot Forest City, N.C., data center its goal was to be one of the most energy efficient data center operators in the world. Additionally, with more than 1 billion users, power reliability is a top priority for the company.

Challenge

A data center's power usage efficiency—specifically, how much power is actually used by the computing equipment (in contrast to cooling and other overhead)—is measured by its Power Usage Effectiveness (PUE) rating. PUE is determined by dividing the amount of power entering a data center by the power used to run the computer infrastructure within it. PUE is therefore expressed as a ratio, with overall efficiency improving as the quotient decreases toward 1.

This industry standard enables data center operators to quickly estimate the energy efficiency of their facilities, compare the results against other data centers, and determine if energy efficiency improvements need to be made. According to the Uptime Institute, the average PUE for data centers surveyed in 2011 was 1.83.[1] This means that for every 1.83 watts in at the utility meter, only one watt is delivered out to the IT load. Since Facebook's goal was to build a data center with optimal electrical efficiency, it determined that it needed to have a PUE significantly below the average.

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[1] Uptime Institute 2012 Data Center Industry Survey, Matt Stansberry & Julian Kudritzki

Solution

The new data center uses technology developed through Facebook's Open Compute Project, an initiative created to promote the use of its open source hardware designs and encourage others to share their own new designs. The company launched the project to drive innovation and a greater focus on energy efficiency in the data center industry.

Through its collaboration with Eaton, Facebook has achieved a PUE of 1.06-1.08 in its Prineville, OR, data center. Eaton's expertise in energy efficiency and backup power protection enabled it to work with Facebook to develop a solution for the Forest City facility that meets the company's growing demands and leads the way in environmentally responsible data center design.

Facebook's networking infrastructure and servers are kept available by Eaton's Power Xpert™ 9395 and 9390 uninterruptible power systems (UPSs). Both the Eaton 9390 units, installed for in-row server support, and the 9395 units protecting the network infrastructure have the highest efficiency rating (99%), the smallest footprint and weight, and the lowest total cost of ownership and lifecycle carbon footprint in the industry. Both UPSs achieve 99 percent efficiency with Eaton's Energy Saver System (ESS) technology, which continuously monitors incoming power conditions to operate at the highest efficiency level possible without compromising protection, even when lightly loaded – sustaining as much as 15 percentage point better than a traditional UPS.

In addition, Eaton's ability to provide an application-specific power distribution solution results in enhanced power reliability, efficiency, and safety for the data center.

Results

As a result of Eaton's collaboration with Facebook, the Forest City data center is projected to achieve an impressive PUE rating, similar to that of the Prineville, OR facility. Following the Forest City data center project, Eaton will collaborate with Facebook on the company's data center in Luleå, Sweden.

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