Mitsubishi Electric's green data centers maintdin highest reliability while meeting environmental demands

The power systems business is one of Mitsubishi Electric's earliest product solutions. Leveraging its extensive track record of success in the sector, the company assists customers in building green data centers to replace aging digital infrastructure. This new generation of data centers implements critical environmental measures based on international goals—all while maintaining the highest reliability and operational efficiency.

The road to carbon neutrality has included a series of milestones that paved the way for green data centers. In 2015, the Paris Agreement was adopted by 196 countries and began serving as a framework for new countermeasures in the fight against climate change. Its main goal is to achieve a carbon-neutral world in the twenty-first century, where a balance is achieved between the amount of carbon dioxide emitted and the amount of carbon dioxide absorbed from the atmosphere.[1]

The United Nation's SDGs (Sustainable Development Goals) was born around the same time, with one of the 17 goals conceived to ensure access to affordable, reliable, sustainable and modern energy for all. Electric power is a critical resource for data centers, which are fundamental components of digital infrastructure, and moving forward, these facilities will need to adapt to a new era and become green data centers, where power consumption is strictly managed with ultimate environmental goals in mind.

Mitsubishi Electric's experience as a manufacturer of multiple infrastructural components and their integration with a wide variety of existing and new systems gives the company a unique perspective on how green data centers can save energy and bring new value. What's more, the company's environmental technologies, based on decades of eliminating harmful substances and recycling manufacturing materials, allows the company to realistically envision potential performance.

Green data centers are critical for a sustainable future

ICT (Information and Communication Technology) and the rapid digital transformation of businesses including the adoption of IoT (Internet of Things) put data centers, which form the digital infrastructure behind everything, under immense pressure. The service life of a data center typically spans between ten and twenty years, which means that the data centers built in the 2000s to support the rapid popularization of computers and networks are now reaching the end of their lifespans.

The modern mindset about global environmental issues is changing, and future data centers are expected to implement specific measures that take this into account. At the same time, international awareness of environmental issues is increasing, and data centers built in the future will be required to take concrete measures. One indicator for evaluating the environmental friendliness of a data center is by using the value PUE (Power Usage Effectiveness), which is the ratio of the total amount of power used by a facility to the amount of electric power consumed by the IT equipment. A decade ago, PUE levels were at 2.0 or higher.

This indicates that equipment such as air conditioners, lighting, and uninterruptible power supplies (UPS) were consuming at least as much power as IT equipment.[2] In other words, cutting down on power used by such non-IT equipment is required for keeping power consumption at data centers under control.

In recent years, target PUE has been falling in the range of 1.3 to 1.5. Being a manufacturer of air conditioners, power supply equipment and other products, Mitsubishi Electric uses a variety of methods to bring PUE numbers down, pushing forward with efforts to promote the establishment of green data centers.

Curbing power consumption while increasing operational efficiency

A closer look at the power consumption of non-IT equipment reveals that cooling IT equipment accounts for more than half of the total power consumption at data centers. This has motivated Mitsubishi Electric, a leader in HVAC components and monitoring systems, to implement free cooling systems, which take advantage of the temperature differences between indoor and outdoor air. Such systems help lower PUE numbers by allowing data centers to make significant cuts in power consumption, to a far greater extent than would be possible with normal air conditioners.[3]

Data centers also require a stable supply of power feeding to IT equipment. Even though UPS units, which protect against power flicker caused by, for example, lightning surges, are a must, their power consumption is considerable. Mitsubishi Electric's UPS products keep power consumption low by reducing power loss arising during power conversion using the company's proprietary Insulated Gate Bipolar Transistors (IGBT). These semiconductors have achieved one of the highest levels of efficiency seen in the industry.

Mitsubishi Electric not only works to curb the power consumption of its products, but also provides clients with solutions to manage their equipment with maximum operational efficiency by linking data center equipment and monitoring the operational status of each component.

GENESIS64™, a software compatible with SCADA (Supervisory Control And Data Acquisition) software, is capable of monitoring and controlling equipment status by gathering relevant data in one place on a network. The graphical user interface allows for centralized management of the facilities in the data center for more efficient operation.[4] By monitoring and analyzing the power consumption of each floor, server room, and other compartments, as well as the power consumption of air conditioning systems, operational efficiency can be improved.

Furthermore, Mitsubishi Electric's inverters and circuit breakers can acquire information, like power usage, on electric circuits. By consolidating all the facilities data on the highly reliable MELSEC series sequencer via networks such as Modbus, BACnet, CC-Link and B/NET,[5] energy-saving support information can be centrally managed.[6]

Mitsubishi Electric excels at power supply systems and factory automation equipment and has built up comprehensive know-how over many years. This expertise not only serves as a foundation of providing stable digital infrastructure supported by green data centers, but also helps to increase the asset value of data centers while making them environmentally friendly.

Notes

(1). COP 21 (the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change); The Paris Agreement: Historical Agreement on Countermeasures Against Global Warming (https://eumag.jp/behind/d0116/)

(2). Impact of Progress of Information Society on Energy Consumption, Vol. 2 (Proposal Paper for Policy Making and Governmental Action toward Low Carbon Societies), produced by the Center for Low Carbon Society Strategy at the Japan Science and Technology Agency

(3). Mitsubishi Electric's Total Solution Catalog for Data Centers

(4). GENESIS64TM Product Catalog for Mitsubishi Electric SCADA Software

(5). Mitsubishi Power Distribution Monitoring System and Energy Saving Support Equipment Catalog

(6). General Catalog for Mitsubishi Electric No-Fuse Breaker and Ground Fault Circuit Interrupter Devices