

Article Overview

Energy savings in data centers can be achieved through optimized cooling, IT consolidation, virtualization, and strategic environmental management.

IT Systems Optimization

Reducing energy consumption starts with the IT equipment itself. Server virtualization consolidates workloads onto fewer physical machines, increasing utilization and reducing idle power draw. Selecting energy-efficient processors, power supplies, and network equipment further lowers energy use. Inactive servers can consume over 50% of full power, so consolidating and decommissioning underutilized hardware is critical. Efficient power supplies should be chosen based on expected load levels to maximize efficiency at typical operating conditions .

Cooling and Air Management

Cooling is a major energy consumer in data centers. Implementing hot aisle/cold aisle configurations prevents mixing of hot exhaust and cold intake air, ensuring cooling efficiency. Air containment systems and zoning strategies further reduce recirculation and allow higher supply air temperatures without compromising equipment reliability. Following ASHRAE guidelines, maintaining inlet air temperatures between 18°C and 27°C (64°F-80°F) balances energy efficiency and equipment safety . Even a small increase in temperature, such as 1°C, can reduce cooling costs by 4-5% .

Environmental and Site Strategies

Strategic site selection can leverage cooler climates for free cooling, reducing reliance on mechanical chillers. Applying reflective or high-albedo coatings to rooftops lowers heat absorption, decreasing indoor cooling loads. Standardizing asset data, including power requirements and heat output, enables smarter configuration and more efficient cooling strategies .

Operational and Low-Cost Measures

- o Consolidation of underutilized spaces reduces distributed ventilation needs and simplifies disaster recovery .
- o Orchestrating workloads around renewable energy availability and using containerized applications can cut idle server draw and improve resilience .
- o Monitoring and benchmarking energy efficiency using metrics like Power Usage Effectiveness (PUE) helps identify areas for improvement .

Summary



Data Center Room Energy Saving

By combining IT optimization, virtualization, efficient cooling, air containment, environmental management, and low-cost operational strategies, data centers can significantly reduce energy consumption while maintaining reliability and performance. These measures not only lower operational costs but also contribute to sustainability goals and long-term efficiency .

Best practices for energy-efficient data center design and operation The current period in

Power optimization in data centers requires strategic planning. These proven techniques help operators reduce

Many components affect data center power consumption. Increase energy efficiency in the data center with variable

Abstract Data centers are vital to the digital economy but consume significant amounts of electrical energy, highlighting the need for

This guide delves into comprehensive best practices for designing and operating energy

As a result, data center operators are increasingly looking for ways to improve energy efficiency without compromising

16 More Ways to Cut Energy Waste in the Data Center These energy efficiency measures fall into one of 5 categories: Information

Data centers are one of the most energy-intensive building types, consuming 10 to 50 times the energy per floor space of a typical

Data center energy-saving strategies must consider differences in geographical location, natural resources, and

This guide of gbc engineers provides a comprehensive overview of best practices for energy efficiency in data center

Improve your data center energy management by measuring, monitoring, and optimizing consumption. Unlock

The energy demand of the data center (DC) industry has accounted for 2% of the total global energy consumption, and

In contrast, mid-tier and small data centers (under 20,000 square feet of white space) often do not prioritize

energy

Data centers consume around 3% of global electricity. Learn how advanced cooling, AI, and renewable energy

The energy efficiency of data centers is usually expressed in terms of the power usage efficiency (PUE), which is the ratio of the total

This guide provides an overview of best practices for energy-efficient data center design which spans the categories of information

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