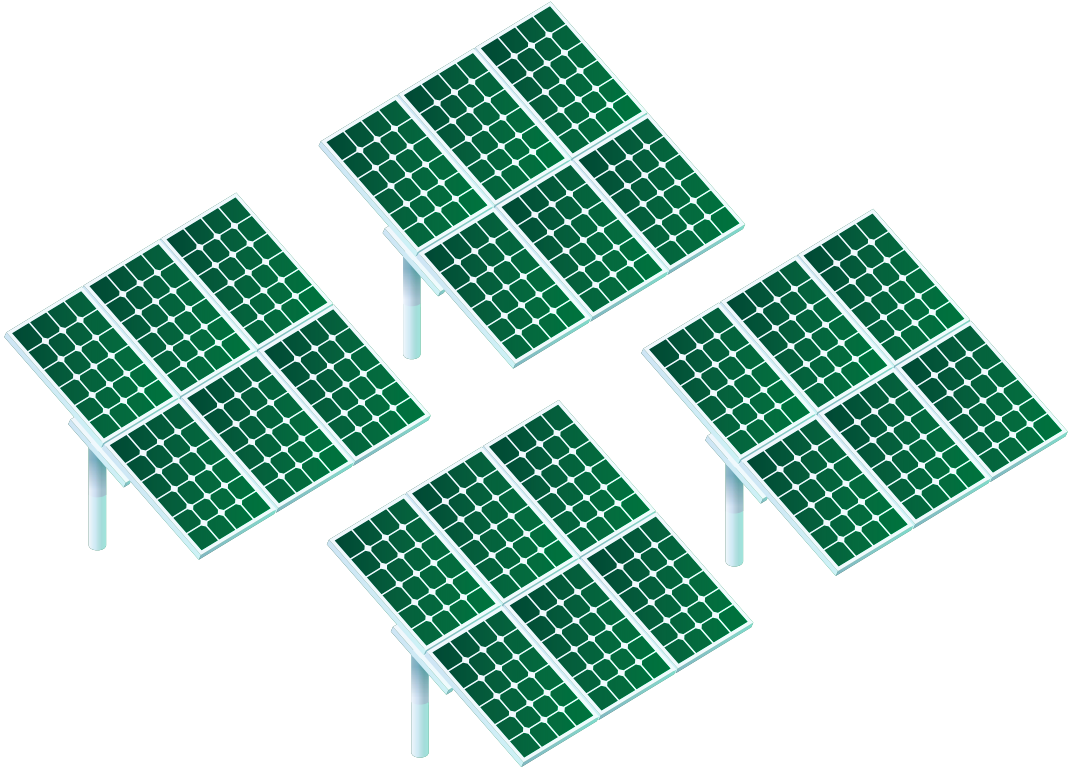
THE GREENER PATH

Operational Strategies for a More Sustainable Data Center
Securing a Safer, More Profitable Future



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Environmental, social and governance (ESG) issues have risen dramatically up the corporate agenda in recent years. Pressure to align business models with these concerns has never been greater. Chief among these is the ambitious environmental goal of stopping the rise of global temperatures.

Due to increasing demand and energy consumption, data centers are in the ESG spotlight like never before. It's estimated that, worldwide, these epicenters of connectivity account for about two percent of total greenhouse gas (GHG) emissions—putting their carbon footprint on a par with the global airline industry.

However, despite their historically high carbon footprint, data centers provide a valuable pathway to a greener, more sustainable world. Many digital transformations align with the idea of a more circular, carbon-light economy, and these rely on data centers to run workloads and store information.

Transition to a circular economy in the data center industry requires waste and pollution to be designed out of processes, and the life of products and materials extended. This change can be achieved by switching to green and renewable energy sources, reusing excess heat and rethinking how every data center is designed and managed, right through to end-of-life disposal of buildings and equipment.

Some Good News

Despite the undeniable environmental impact of data centers, there are some reasons to be optimistic. According to a 2020 study by Northwestern University, Lawrence Berkeley National Laboratory, and Koomey Analytics, between 2010 and 2018, global data center workloads and compute instances increased six-fold, data center internet protocol (IP) traffic increased by more than 10-fold and data center storage capacity increased by an estimated factor of 25.

Yet the researchers found efficiency advances mean the industry's power demands rose just 6% in the time it took for compute to jump 550%. The study cited improvements such as greater levels of server virtualization, shifts to low-power storage devices and structural moves from small, inefficient data centers to hyperscale facilities.

Other reasons to be optimistic include the cloud hyperscalers' willingness to harness their size to push forward on renewable purchasing and other sustainability initiatives. Meanwhile, smaller enterprises now have the opportunity to run their data centers from the cloud as virtualized environments, where efficient and sustainable operations are achievable using real-time data.

Customers and Investors Are Driving the Sustainability Agenda

Today, large enterprises and governments expect data center operators to pursue more sustainable operations. Similarly, investors in data centers increasingly require reassurance that their money will support an environmentally responsible venture. These market expectations have pushed data centers to reevaluate their energy consumption and environmental impact.

The most sustainable data centers:

- Have made commitments to green power, water reclamation, zero water cooling systems, recycling and waste management.
- Have replaced obsolete systems to take advantage of newer, more efficient technologies.
- Ensure IT and electrical equipment that reaches end of life is refurbished and reused.
- Recognize the need to lead with modular, energy-efficient data center designs from the onset.
- Adopt the latest in building technology and source sustainable materials.
- Have achieved recognized certification for healthy and sustainable building design and management.

Why Invest in Sustainability?

There are many reasons to invest in sustainability, with the positive impact on the environment and the world around us, of course, being the main one. However, there are also business reasons why sustainability is a good investment. Some of the major reasons include the following:

Reduce operational costs

Optimizing your data center's performance through efficient operations provides a double benefit of cost savings and enhanced sustainability. Dramatic efficiencies can be reached by improvements in IT equipment and operational adjustments like improving the chips powering servers to the larger power infrastructure and cooling systems. Automation can also unlock energy efficiency measures and drive operational costs down for both power and cooling plants.

Another way to drive down operational costs is by working closely with local utilities to find more efficient ways to introduce green energy options to their product mix. The potential energy cost savings can then be passed on to customers, creating a win-win situation and a more competitive product.

For new data centers, operational costs can be driven down further by simplifying the data center design. Removing high-environmental-impact components like diesel backup generators can also eliminate requirements for training, spare parts upkeep, fuel management and associated compliance requirements.

Comply with complex and fast-changing regulation

ESG disclosure is becoming mandatory around the world. For enterprises and data centers that do not have measurable sustainability as part of their governance—it is coming. Legislation is moving through governments throughout the globe, including:

- **European Union:** Lawmakers in the EU are working on proposals including a tax on dirty data centers and incentives for operators who invest in green data center technology. Incoming EU legislation will include taxonomy regulation, a universal financial law that sets conditions for investors and financiers who want to claim their deals are green.
- **Singapore:** In Singapore, Southeast Asia's data center hub, new data centers can only be built once designs are assessed and approved for energy efficiency by the National Environmental Agency (NEA). They must report energy performance of systems that account for four-fifths of their facility's total energy consumption. Existing data center facilities must also appoint an energy manager and report energy use and greenhouse gas emissions on an annual basis, also following strict reporting guidelines.
- **United States:** The U.S. government's Consolidated Appropriations Act of 2021 calls for a new study of how much energy and water data centers use and stipulates that federal agencies analyze and improve the efficiency of their data centers. The planned report will also provide projections and recommendations for best practices through to fiscal year 2025.

EU Self-Regulation: The Climate Neutral Data Centre Pact

In January 2021, a group of Europe's largest data center operators created and signed a green data center pact, committing to self-regulation before European Union officials pass data center sustainability laws.

The Climate Neutral Data Centre Pact outlines data center efficiency and renewable energy goals and sets aggressive targets for reaching them. It establishes a framework for tracking progress toward those goals. Overall, the pact commits the industry to making data centers climate-neutral by 2030.

Many data center operators including AWS, Google, Digital Realty's Interxion, NTT and CyrusOne have signed the pact.

Read more here.

Create a data center environment that attracts employees and customers

Sustainability is a top focus for almost every company today, with more and more companies incorporating sustainable purchasing targets into their procurement processes and valuing sustainability as part of their scoring systems. **The best thing that data center operators can do for the environment is to help their customers succeed with their sustainability targets.**

In a recent survey by 451 Research, 825 multi-tenant data center operators were asked about their sustainability initiatives. The results showed that 30% of all respondents said that their customers want to see contractually binding efficiency and sustainability commitments, and 43% said that most of their customers expect efficiency and sustainability clauses in the contract. These results clearly show that sustainability is a top priority in purchasing processes.

Sustainability is also a top priority for prospective talent: Employees express a preference for companies that have a strong sustainability and corporate responsibility agenda, which supports efforts in this area and helps attract talent to the company. With talent acquisition already a chief concern across the data center industry, a defined sustainability mission can give an organization a leg up in attracting the best workers to their facilities.

Increase the value of your asset

During the COVID-19 pandemic, ESG fund managers outperformed the broad market, proving that clean energy assets are a safe and better investment. This could indicate data centers that embrace sustainability are more likely to be good investments than those that don't.

Older data center facilities—so-called legacy data centers that are 10+ years old—had a focus on availability and uptime when they were designed. Today, that focus has shifted more toward sustainability and corporate responsibility. Looking into the future, data centers are incorporating sustainability from the outset through sustainable design, development and materials. Increasing the lifetime of the asset through sustainable design and technology choices as well as lowering operational costs will yield higher valuations and higher return for investors, which is applicable for both legacy sites and newly built ones.

Engage your stakeholders: investors, management, staff, community and customers

Deeper levels of stakeholder engagement are being adopted over time, which will facilitate dialogue and enhance owner and occupier relationships, propelling the data center management market towards a greener future.

By involving suppliers, staff, investors, customers and even competitors in the drive for efficiency, smart procurement and waste management, more will be achieved. Organizations face the challenge of justifying capital and operational spending on data center facilities and need to be accountable to all stakeholders for how responsibly the facilities are run.

Use certifications to enhance reputation and performance

There are a host of mandatory and voluntary sustainability and corporate responsibility reporting tools and certification schemes in operation around the world. Keeping abreast with certifications and reporting are a crucial part of sustainability efforts, and publishing sustainability data has become a core part of data center providers' annual reporting, sending a message to key stakeholders that there is a genuine commitment to ESG responsibility.

Examples of the data center sustainability certifications and information sharing programs include:

- Green building ratings can be achieved using well-established schemes such as BREEAM, CEEDA, DGNB, HQE, LEED, WELL and ENERGY STAR.
- There are also standards specifically for data center buildings, including EU Code of Conduct for Energy Efficiency in Data Centers, European Green Deal and the DCEP framework (U.S.).
- Another reporting tool which is voluntary, independent and not regulated is The Green Grid Data Center Maturity Model (DCMM). It's effectively a benchmarking tool which touches upon power, cooling, compute, storage and network.
- The Better Building Challenge: The U.S. Department of Energy is encouraging businesses, manufacturers, cities, universities and states to commit to improving the energy efficiency of their portfolio of buildings by at least 20% over 10 years and share their strategies and results.

Benefit from technology and innovation

Efficient energy, water and waste management are essential to reduce consumption and carbon emissions. They also increasingly make sense operationally and economically. Here are some sustainable solutions used within the industry today:

→ Cooling technologies

Liquid cooling has numerous advantages over air-based cooling, most notably since liquid conducts heat better than air. If placed at heat-intensive spots, this can rapidly reduce temperature in a targeted manner, requiring less energy to do so than air while generating less noise.

→ Wind and solar power

Cooling solutions can now be powered by 100% renewable wind and solar power. One emerging technology seeks to harness solar thermal hybrid air conditioning, which makes use of solar energy to power cooling refrigerants. Read more: Why Southeast Asia is at the forefront of a new wave of sustainable data centers

→ Cooling equipment optimization using AI and machine learning

Data analytics can reduce cooling energy needs by up to 30% and present data center operators with measurable carbon emissions savings that will support their net-zero emissions programs.

→ Waste heat utilization

The Nordic countries and Germany are already implementing this by injecting data center server waste heat into district energy systems for reuse. Stockholm's Data Parks, for example, aim to use waste heat from data centers to heat 10% of the city by 2035. Read more: Where data centers store info—and heat homes

→ Digital tools for lowering power usage effectiveness (PUE)

Digital strategic analytics services can model a company's facilities to identify and quantify energy reduction opportunities. This can lead to capital upgrades that will directly reduce PUE. AI solutions can forecast power consumption and analyze data output, humidity, temperature and other important statistics to improve efficiency, drive down costs and reduce total power consumption.

→ Replacing traditional water-evaporating cooling systems with closed-loop systems.

These systems utilize recycled water rather than fresh in order to reduce the burden on local water systems.

Lessons from a Live Data Center: Global colocation provider uses digital tools to lower PUE

A leading owner, operator and developer of large, multi-tenant, carrier and cloud-neutral data centers across EMEA and APAC company chose CBRE for its strategic analytics services as it endeavored to reduce PUE.

The Challenge

This operator wanted to deliver one of the most energy-efficient and sustainable data centers in the region. This meant building at a significant scale, so customers could benefit from reduced total cost of occupancy through energy savings.

The Solution

CBRE | Romonet modeled the facility over the life of the development, identifying designs that would achieve an ambitious annualized PUE of 1.33 for the building. The design solutions were applied to the campus, and as a result, customers are receiving a more cost-effective solution for housing their equipment.

Results

Heightened visibility has unlocked cost savings, optimized energy usage and improved reliability and facility operations.

Understand and mitigate your risk

Risk management services can be deployed to identify and mitigate risk across environment, social and governance dimensions. An effective risk management strategy should include steps such as the following:

- Adopting a strategic approach to legislative compliance from property to portfolio scale
- Committing to sustainability due diligence reporting to assist acquisition and sale activities
- Planning preventative maintenance programs with lifecycle considerations to prolong and optimize the use of IT hardware and cooling systems.

The Greener Path Forward

Excessive carbon emissions impact businesses, people and the planet. Given the pressure data centers are under to demonstrate their commitment to net zero, now is the time to embrace meaningful change.

There are many ways to tackle a data center's carbon footprint. From sourcing renewables to increasing data-driven efficiency, practical steps can be taken for the good of all stakeholders. Once data center operators have access to the right expertise, strategic goals can be set, bold key performance indicators (KPIs) can be achieved and a framework for reporting carbon reduction and other ESG targets can take shape. Ultimately, with legal and competitive imperatives now shaping data center business strategy, this is the best way to proceed.

Strategies for Existing Data Centers of Any Age

1. Find your baseline: Assess your current energy, waste and water usage as well as current carbon emissions.
2. Set science-based targets: Introduce measurable targets to which your operational strategies can be accountable.
3. Introduce improvement measures to support achieving targets: A useful tool for understanding your baseline and implementing improvement measures is creating a physics-based model of your data center and comparing your operational status to the design criteria the data center was built to reach.
4. Conduct ongoing sustainability audits, benchmarking, improvement plans and refurbishment to drive performance and efficiency.
5. Deploy on-site physical features such as smart temperature and lighting controls, rainwater reclamation, waste initiatives and recycling and electric vehicle charging stations.
6. Implement energy procurement improvements with a focus on greener alternatives like renewables and on-site generation. Data centers with innovative green power procurement models are often able to purchase renewable energy on parity or below the price of conventionally produced power.

Considerations for New Data Centers

→ Site selection

Placing data center loads in places with reliable, clean power grids play a large role in the future sustainability of the data center. Locations with cooler climates will also enable free cooling solutions while the availability of connections to a district heating system will allow for the ability to reuse waste heat.

→ Sustainable design

Designing with sustainability in mind and considering the life cycle aspect of all components can reduce upfront costs of land, materials and equipment.

→ Modularity

Consider building in modules where you add capacity as you need it, only utilizing the resources you require in that moment.

Begin your journey toward sustainable operational excellence with CBRE

CBRE maximizes data center uptime, placing talent and risk management at the heart of our operational approach.

We develop a deep understanding of your portfolio, applying our global scale, expertise and buying power in the right configuration to make your data center work harder for you.

Our focus is your data center's uptime. Our clients benefit from experience and best practices accumulated by managing ~700 data centers in 45 countries—more than any firm in the world.

CBRE's services stand out where it matters most: Best-in-class training and proprietary technology platforms are the foundation of our life cycle data center services. Our team, over 3,800 strong, ensures uptime and delivers peak performance for your customers—with services that range from extensive maintenance, technology operations, consulting and project management to energy optimization and analytics.

What our customers expect from us

- **Uptime** – zero unplanned downtime
- **Safety** – 100% compliance all the time
- **Operational Excellence** – quality and operational excellence
- **Predictability** – use monitoring and analytics to reduce risk and forecast capacity
- **Access to Talent** – consistent supply and retention of quality data center professionals
- **Operating Efficiency** – balance site performance with cost to operate and maintain
- **Supply Chain** – leverage our global buying power to provide resiliency and competitive prices
- **Cost Reduction** – unlock maximum value of data center assets

The Global Leader in Data Center Operations

- **45 Countries**
- **2,175 Data Center Technicians**
- **200+ Data Center Project Managers**
- **~700 Managed Data Centers**
- **99.99968% Uptime**
- **$74B Supply Partnerships**
- **>4M Hours/Year DC Operation**

CBRE's Data Center Services

Critical Engineering & Management

We maintain the mission critical engineering and infrastructure that is essential for data center business continuity.

Supply Chain

We have built the most advanced and comprehensive procurement networks to leverage our aggregated spend and deliver significant client savings.

Analytics & Monitoring

Our automated analytics and monitoring improve the speed and quality of critical decision making for data center operations.

Technology Operations

Our teams will significantly improve the efficiency of your site management through our deep experience and the use of innovative technology.

Energy Optimization

We help data centers operators optimize their energy performance through efficient cooling systems and cost-effective energy contracting.

Project Services

Our dedicated projects division specialize in delivering project services to data center clients globally.

For more information on Data Center Solutions, please visit cbre.com/datacenters or contact:

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