



DATA CENTER

Frontier Special Report

Beyond Greenwashing: Sustainability Meets Compliance

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Introduction

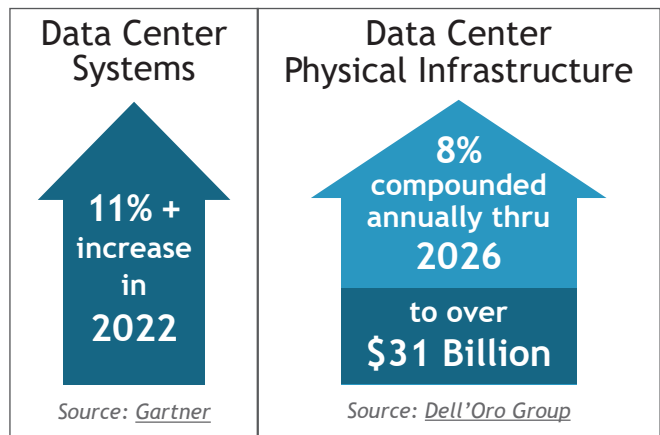
Despite the trend toward the consolidation of IT workloads in hyperscale clouds, private and co-located data centers are expected to experience strong growth for the foreseeable future.

Gartner expects spending on data center systems to rise more than 11% in 2022, making it the fastest-growing segment of all IT infrastructure. Dell’Oro Group forecasts data center physical infrastructure spending to continue to grow at an 8% compound annual growth rate through 2026 to over \$31 billion.

Much of this expansion is expected to be driven by cloud and co-location service providers, many of which have made sustainability a top priority. Growing demand for smaller edge data centers, which are typically located closer to population areas, is further driving the construction of facilities that harmonize with local communities.

With sustainability fast becoming a priority for the entire industry, operators must establish material, impactful and measurable ways to assess progress and communicate results to stakeholders. There are many standards and certifications to choose from. While choosing the right ones for an organization

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can be complex, those decisions guide operators toward practices that drive continuous improvement and demonstrate a commitment to constituents.

Company-set goals are typically guided by standards like the International Organization for Standardization (ISO) 14001 and ISO 50001, as well as a host of metrics that measure factors like power, energy efficiency, water consumption, greenhouse gas emissions, materials recycling, and carbon credits.

Hyperscalers lead the way

The major cloud vendors have set ambitious sustainability goals that other operators can emulate.

- ▶ **Facebook** has committed to reaching net zero emissions across its value chain in 2030.
- ▶ **Google** plans to achieve zero-waste-to-landfill for its global data center operations in the same timeframe.
- ▶ **Microsoft** has pledged to be carbon negative by 2030 and by 2050 to remove from the environment all the carbon the company has emitted directly or by electrical consumption since 1975.

These ambitious goals may not be practical for the average data center and shouldn't be used to define the standard for sustainability. Rather, every data center operator should develop a realistic program that is relevant to its business, set its own goals, and measure progress. Measurement is the cornerstone of the effort.

This guide proposes a set of metrics and mechanisms that any data center can use to evaluate and report

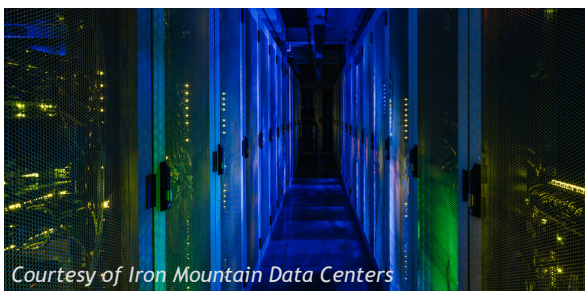
on its progress toward sustainability goals. It also aims to demystify the major International Organization for Standardization (ISO) sustainability standards such as ISO 50001, ISO 9001, ISO 30134, ISO 14064, and ISO 14001.

Data center operators can use these frameworks and management system standards to establish a baseline of metrics that track their progress toward their companies' environmental, social, and corporate governance goals, as well as to demonstrate compliance with various regulations set forth by federal governments. Compliance also has business benefits as it may enable operators to opt out of some government-imposed energy requirements.

Use these standards to create a framework for sustainability improvement as well as relevant metrics for each. They can be applied to evaluating your performance as well as those of your supply chain partners.

Sustainability components and measurements

Sustainability goals can be broken down into five basic impact areas.



- 1 Energy** refers to the energy required – typically in the form of electricity – to power the data center and equipment.
- 2 Greenhouse gas emissions**, which are also called “carbon emissions,” encompass elements that contribute to atmospheric warming such as carbon dioxide, methane, perfluorocarbons, and hydrofluorocarbons.
- 3 Water consumption** is a growing concern as supplies in some areas of the country are dwindling. Water is used not only for data center

cooling but also for electricity generation, making it a cousin to sustainable power use.

- 4 Waste** refers to materials contributed to landfills as a result of data center operations. Reuse and recycling can minimize the impact of waste. The metrics that are evolving in this area are likely to become a more critical part of corporate sustainability reporting in the future.
- 5 Land & biodiversity** metrics are fairly new in the data center industry and generally apply to the characteristics of land appropriated for data center use, the impact of the operation on ecosystems, and minimizing the impact of renewable energy usage on land and the environment.

The goal for data center operators shouldn't be to achieve best-in-class performance initially but to strive for steady improvement across each of these areas. It is also recommended that operators request regular reports from their supply chain partners that show the progress of each.

Whether the organization's goal is standards compliance, reporting to stakeholders, or guiding internal practices, a set of fundamental metrics is useful for measuring progress in a way that is comparable across organizations. Here are the basics to consider.

Total energy consumption

This includes primary energy use, purchased electricity, and electrical system energy losses from activities such as energy conversion and the generation, transmission, and distribution of purchased electricity.

Power usage effectiveness (PUE)

This ratio determines the energy efficiency of a data center. It is calculated by dividing the total amount of power entering a data center by the power used to run the IT equipment inside. A maximum efficiency ratio is expressed as 1.0.

PUE: the metric of choice

While not a perfect measurement, PUE is simple to calculate and provides a good general standard for improvement. It is also the metric of choice for data centers in the:

- ✓ UK government's climate change agreement
- ✓ U.S. Department of Energy's Better Buildings initiative
- ✓ U.S. Environmental Protection Agency's EnergyStar program
- ✓ European Union's Climate Neutral Data Centre pact

PUE is also often used as a baseline for government agencies to grant permits for industrial development. The [ISO 30134-1:2016](#) standard provides guidelines and requirements for calculating the key performance indicator correctly.

Total renewable energy consumption

This refers to the amount of energy obtained from renewable sources owned by the data center operator or purchased through carbon credits. The operator's objective should be to steadily increase this number.

Renewable energy factor

This ISO metric consists of the ratio of total renewable energy consumption to total energy consumption. A factor of 1.0 indicates all the data center power is renewable.

Energy reuse factor

Also an ISO standard under [ISO/IEC 30134-6:2021](#), this metric represents the ratio of energy reused divided by the sum of all energy consumed in a data center. A 1.0 ratio means all energy brought into the data center is reused for purposes such as heating nearby buildings.

Greenhouse gas emissions

This measures direct emissions from sources controlled or owned by the data center operator, such as the combustion of fuels and leakage of sulfur hexafluoride and hydrofluorocarbons. There are three scopes to this metric: direct emissions, location/market-based emissions, and all other indirect emissions from sources such as business travel, waste management, and the value chain.

Location-based and market-based carbon intensity

Adding up the first and second scopes described above and dividing by total energy consumption yields this metric, which is useful in site selection, planning, and design.

Carbon usage effectiveness

Another metric from the ISO 30134 family, this measures the carbon gas a data center emits daily and is calculated as a ratio of the total IT load obtained by dividing the total carbon dioxide emission equivalents of the facility's energy consumption by the total IT energy consumption.

Total site water usage

Data centers and power utilities are both major users of water. This calculation measures on-site usage including water withdrawal, evaporation, and discharge. The figure can be reduced by using reclaimed water for cooling or by returning it to the neighboring area.

Water usage effectiveness

Defined as a standard under [ISO/IEC 30134-9:2022](#), this is the ratio of data center water consumption to the sum of energy consumed by IT equipment. It is a simple metric for reporting the water intensity of data center operations and is useful in tracking usage reductions.

Standards and regulations

Of the many standards published by ISO, the five listed below are the most relevant to data center operators.

ISO 50001 – Energy Management

The objective of this standard is to help organizations:

- ▶ Develop a policy for more efficient use of energy,
- ▶ Set targets and objectives to meet the policy,
- ▶ Use data to better understand and make decisions about energy use,
- ▶ Measure the results, and communicate with top organizational leadership,
- ▶ Review the effectiveness of the energy management system, and
- ▶ Continually improve energy management.

The 30-page document covers requirements for a systematic, data-driven, and facts-based process that is focused on continually improving energy performance. It can be applied to organizations of any size regardless of the types of energy consumed. ISO 50001 also provides guidelines for understanding the contextual needs of the organization, leadership responsibilities, planning steps, performance evaluation, and improvement.

ISO 9001

This quality management standard can be applied to businesses of any size in any industry. It is based on such principles as strong customer focus, top management sponsorship, a process-based approach to quality, and continual improvement. The objective is to ensure that customers get consistent, high-quality products and services. In the data center, it provides a way for operators to balance sustainability with consistent quality, availability, and security.

ISO 9001 can be used as a guideline for process optimization and organizations may also choose to be certified by a qualified third-party assessor. More than one million organizations in over 170 countries have been certified.

ISO 14001

These guidelines set out the criteria for an environmental management system and map a framework for establishing and maintaining an effective environmental management system. Designed for any type of organization, regardless of its activity or sector, the standard is intended to assure management, employees, and external stakeholders



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that environmental impact is being materially measured, quantified and improved. More than 300,000 ISO 14001 certifications have been granted.

ISO 14060 Family

This collection of standards – and ISO 14064-1:2018 in particular – provides clarity and consistency for quantifying, monitoring, reporting, and validating or verifying greenhouse gas emissions and removals to support sustainable development.

It is a standardized framework that helps in the management of risk, adherence to regulatory/government greenhouse gas programs, and guidance for managing and reporting responsibilities and verification activities. It also provides requirements for the use and allocation of renewable power.

An internationally recognized framework, ISO 14060 can be used to compare entities that follow the same family of standards.

ISO 27001

While not specific to sustainability, the ISO 27001 standard specifies the security of information spanning:

- ▶ Policy,
- ▶ Organizational practices,
- ▶ Asset controls,
- ▶ Personnel,
- ▶ Physical and environmental security,
- ▶ Operations management,
- ▶ And other areas

It is considered an important guideline for establishing a baseline of organizational rigor that is needed for responsible governance and management.

Pros and cons of certification

There are more than 22,000 ISO standards, but only a handful are eligible for certification as management systems. The most popular of these are ISO 9001 and ISO 27001. Organizations can comply with ISO standards without being certified and there are pros and cons to each approach.

ISO does not provide certifications. Those are granted by third parties that have demonstrated compliance with a standard set by ISO's Committee on Conformity Assessment. There are more than 1,200 ISO-related certification bodies across various industries. They provide documented evidence that a business conforms to the requirements of the latest ISO quality process standards, that processes are effective, and that they are consistent with international best practices. It is important that organizations only engage with third-party assessors that are accredited certification bodies to ensure the integrity and independence of the audit work performed, as well as the validity of an auditor's credentials.

The benefits of achieving certification include more consistent quality, improved customer satisfaction, and superior process consistency. Organizations can also market certification as a selling point in attracting the largest and most demanding customers.

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The disadvantages of certification are primarily cost and time. Third-party audits typically take place annually and can last for months. Costs vary widely depending on how much external expertise is needed, but they can easily eclipse \$50,000 for a mid-sized company with no quality system in place. However, pricing varies by the size of the company and costs can be significantly reduced if a company applying for certification takes on much of the preparation work.

Organizations may choose to comply with ISO standards without seeking certification, but they cannot market compliance as a selling point. Only organizations that are certified by an accredited certification body can advertise that achievement.

The transparency factor

Internal usage of standards and metrics can significantly improve sustainability performance for a company. A key question every company should consider is how far to go in making its performance public.

The decision to publish performance data has several benefits.

- 1** It enables the firm to differentiate itself, particularly in sectors in which sustainability performance factors are not widely disseminated. It can also enable a firm to qualify for business in markets in which sustainability initiatives are required for entry.
- 2** Disclosing sustainability performance can help attract talent by demonstrating a public commitment to sustainability. It helps define

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environmental awareness as part of the company's culture, which is a particularly strong selling point in attracting younger talent.

- 3** It saves time. A growing number of countries and communities are asking local businesses to report environmental performance. Building the capability to provide this information with the same rigor afforded to financial reporting ensures easy compliance and burnishes the company's image as a responsible member of the community.

Words into action

Becoming a sustainable business is about more than setting ambitious goals. While many companies boast of their commitments, it is the standards and measures they put in place to achieve those goals that matter to stakeholders. The discipline to achieve results is paramount to long-term sustainability success.

The focus shouldn't be on becoming the best in any category but rather on establishing achievable, well-intentioned, thoughtful, measurable, and actionable initiatives that are baked into the organization's culture via documented systems, processes, and reports and validated by a qualified and objective third party.

For example, Iron Mountain's recent verification of compliance with the ISO 14064 greenhouse gas standard reinforces the scope of the company's sustainability commitment. Iron Mountain's entire compliance program is transparent. Anyone at any time can request a copy of the company's data

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center certifications and trace the audit firm back to the accrediting body to ensure the competency of the assessors that conducted the conformity assessment. This demonstrates a commitment not just to sustainability but to accountability in the eyes of the constituents who matter most.

Given the continued growth that is expected in data center services, organizations must implement sustainability programs that deliver results. Done correctly, a program goes beyond establishing ambitious goals and defines measures and standards that will yield continuous improvement in the future.

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Iron Mountain Data Centers, a division of Iron Mountain incorporated, is a leading provider of data center and colocation services. Our global portfolio consists of hyperscale-ready, strategic edge, and underground data centers comprising over 3.5 million square feet across fifteen locations in five countries.

More than 1,200 customers including cloud providers, global enterprises, and local market organizations choose Iron Mountain Data Centers for our thirty-year proven track record, risk mitigation, and operational efficiency. Iron Mountain colocation facilities are sustainable and provide the most logical venue for hybrid IT with easy access to the carriers, cloud providers, exchanges, and IT services necessary for digital transformation.

Comprehensive compliance support ensures highly regulated enterprise and public sector customers are protected as they change their organizations to thrive in a multi-cloud world.

Iron Mountain offers some of the world's most secure data centers. Our multi-layered approach to security in our highly-protected facilities includes a combination of technical and human security measures.

