

#### **INTELLIGENCE UPDATE**

### The two sides of a sustainability strategy



While much has been written, said and taught about data center sustainability, there is still limited consensus on the definition and scope of an ideal data center sustainability strategy. This lack of clarity has created much confusion, encouraged many operators to pursue strategies with limited results, and enabled some to make claims that are ultimately of little worth.

To date, the data center industry has adopted three broad, complementary approaches to sustainability:

- Facility and IT sustainability. This approach prioritizes operational efficiency, minimizing the energy, direct carbon and water footprints of IT and facility infrastructure. It directly addresses the operational impacts of individual facilities, reducing material and energy use and costs. Maximizing the sustainability of individual facilities is key to addressing the increased government focus on regulating individual data centers.
- **Ecosystem sustainability**. This strategy focuses on carbon neutrality (or carbon negativity), water positivity and nature positivity across the enterprise. Ecosystem sustainability offsets the environmental impacts of an enterprise's operations, which may increase business costs.
- **Overall sustainability**. While some data center operators promote the sustainability of their facilities with limited efforts on ecosystem sustainability, others build their brand around ecosystem sustainability with minimal discussion about the sustainability of their facilities. Although it is common for organizations to make efforts in both areas, it is less common for the strategies to be integrated as a part of a coherent plan.

Each approach has its own benefits and challenges, providing different levels of business and environmental performance improvement. This report is an extension and update to the Sustainability Series of reports, published by Uptime Intelligence in 2022 (see below for a list of the reports), which detailed the seven elements of a sustainability strategy. An upcoming report, *A net-zero data center is not a sustainable data center*, will further explore the differences between facility and IT sustainability and ecosystem sustainability.

# Data center sustainability

Data center sustainability involves incorporating sustainability and efficiency considerations into siting, design and operational processes throughout a facility's life. The organizations responsible for siting and design, IT operations, facility operations, procurement, contracting (colocation and cloud operators) and waste management must embrace the enterprise's overall sustainability strategy and incorporate it into their daily operations.

Achieving sustainability objectives may require a more costly initial investment for an individual facility, but the reward is likely an overall lower cost of ownership over its life. To implement a sustainability strategy effectively, an operator must address the full range of sustainability elements:

- **Siting and design.** Customer and business needs dictate a data center's location. Typically, multiple sites will satisfy these criteria, however, the location should also be selected based on whether it can help optimize the facility's sustainability performance. Operators should focus on maximizing free cooling and carbon-free energy consumption while minimizing energy and water consumption. The design should choose equipment and materials that maximize the facility's environmental performance.
- **Cooling system**. The design should minimize water and energy use, including capturing available free-cooling hours. In water-scarce or water-stressed regions, operators should deploy waterless cooling systems. Where feasible and economically viable, heat reuse systems should also be incorporated into the design.
- **Standby power system**. The standby power system design should enable fuel flexibility (able to use low-carbon or carbon-free fuels) and provide primary power capability. It should be capable and permitted to deliver primary power for extended periods. This enables the system to support grid reliability and assist in addressing the intermittency of wind and solar generation contracted to supply power to the data center, thereby reducing the carbon intensity of the electricity consumption.
- IT infrastructure efficiency. IT equipment should be selected to maximize the average work delivered per watt of installed capacity. The installed equipment should run at or close to the highest practical utilization level of the installed workloads while meeting their reliability and resiliency requirements. IT workload placement and management software should be used to monitor and optimize the IT infrastructure performance.
- **Carbon-free energy consumption**. Operators should work with electricity utilities, energy retailers, energy developers and regulators to maximize the quantity of clean energy consumed and minimize location-based emissions. Over time, they should plan to increase carbon-free energy consumption to 90% or more of the total consumption. Timelines will vary by region depending on the economics and availability of carbon-free energy.
- End-of-life equipment reuse and materials recovery. Operators need an end-oflife equipment management process that maximizes the reuse of equipment and components, both within the organization and through refurbishment and use by others. Where equipment must be scrapped, there should be a process in place to recover valuable metals and minerals, as well as energy, through environmentally responsible processes.
- Scope 3 emissions management. Operators should require key suppliers to

maintain a sustainability strategy, publicly disclose their greenhouse gas (GHG) emissions inventory and reduction goals, and demonstrate progress toward their sustainability objectives. There should be consequences in place for suppliers that fail to show reasonable progress.

While these strategies may appear simple, creating and executing a sustainability strategy requires the commitment of the whole organization — from technicians and engineers to procurement, finance and executive leadership. In some cases, financial criteria may need to shift from considering the initial upfront costs to the total cost of ownership and the revenue benefits/enhancements gained from a demonstrably sustainable operation. A data center sustainability strategy can enhance business and environmental performance.

## **Ecosystem sustainability**

An ecosystem sustainability strategy emphasizes mitigating and offsetting the environmental impacts of an operator's data center portfolio. While these efforts do not change the environmental operating profile of individual data centers, they are designed to benefit the surrounding community and natural environment. Such projects and environmental offsets are typically managed at the enterprise level rather than the facility level and represent a cost to the enterprise.

- **Carbon-neutral or carbon-negative operations**. Operators should purchase energy attribute certificates (EACs) and carbon capture offsets to reduce or eliminate their Scope 1, 2 and 3 emissions inventory. The offsets are generated primarily from facilities geographically separate from the data center facilities. EACs and offsets can be purchased directly from brokers or from operators of carbon-free energy or carbon capture systems.
- Water-positive operations. Operators should work with communities and conservation groups to implement water recharge and conservation projects that return more water to the ecosystem than is used across their data centers. Examples include wetlands reclamation, water replenishment, support of sustainable agriculture, and leak detection and minimization systems for water distribution networks. These projects can benefit the local watershed or unrelated, geographically distinct watersheds.
- **Nature-positive facilities**. The data center or campus should be landscaped to regenerate and integrate with the natural landscape and local ecosystem. Rainwater and stormwater should be naturally filtered and reused where practical. The landscape should be designed and managed to support local flora and fauna, ensuring that the overall campus is seamlessly integrated into the local ecosystem. The overall intent is to make the facility as "invisible" as possible to the local community.
- Emissions reductions achieved with IT tools. Some operators and data center industry groups quantify and promote the emissions reduction benefits (known as Scope 4 "avoided emissions") generated from the operation of the IT infrastructure. They assert that the "avoided emissions" achieved through the application of IT systems to increase the operational efficiency of systems or processes, or "dematerialize" products, can offset some or all of the data center infrastructure's emissions footprint. However, these claims should be approached with caution, as there is a high degree of uncertainty in the calculated quantities of "avoided

emissions."

• **Pro-active work with supply chains**. Some operators work directly with supply chain partners to decarbonize their operations. This approach is practical when an enterprise represents a significant percentage of a supplier's revenue. However, it becomes impractical when an operator's purchases represent only a small percentage of the supplier's business.

Ecosystem sustainability seeks to deliver environmental performance improvements to operations and ecosystems outside the operator's direct control. These improvements compensate for and offset any remaining environmental impacts following the full execution of the data center sustainability strategy. They typically represent a business cost and enhance an operator's commercial reputation and brand.

## Where to focus

Facility and IT and ecosystem sustainability strategies are complementary, addressing the full range of sustainability activities and opportunities. In most organizations, it will be necessary to cover all of these areas, often by different teams focusing on their respective domains.

An operator's primary focus should be improving the operational efficiency and sustainability performance of its data centers. Investments in the increased use of free cooling, automated control of chiller and IT space cooling systems, and IT consolidation projects can yield significant energy, water and cost savings, along with reductions in GHG emissions. These will not only reduce the environmental footprint of the data center but can also improve its business performance.

These efforts also enable operators to proactively address emerging regulatory and standards frameworks. Such regulations are intended to increase the reporting of operating data and metrics, and may ultimately dictate minimum performance standards for data centers.

To reduce the Scope 2 emissions (purchased electricity) associated with data center operations to zero, operators need to work with utilities, energy retailers, and the electricity transmission and distribution system operators. The shared goal is to help build a resilient, interconnected electricity grid populated by carbon-free electricity generation and storage systems — a requirement for government net-zero mandates.

Addressing ecosystem sustainability opportunities is a valuable next step in an operator's sustainability journey. Ecosystem projects can enhance the natural environment surrounding the data facility, improve the availability of carbon-free energy and water resources locally and globally, and directly support, inform and incentivize the sustainability efforts of customers and suppliers.

Data center sustainability should be approached in two separate ways: first, the infrastructure itself and, second, the ecosystem. Confusion and overlap between these two aspects can lead to unfortunate results. For example, in many cases, a net-zero and water-positive data center program is (wrongly) accepted as an indication that an enterprise is operating a sustainable

data center infrastructure.

#### The Uptime Intelligence View

Operators should prioritize IT and Facilities sustainability over Ecosystem sustainability. The execution and results of an IT and facilities sustainability strategy directly minimize the environmental footprint of a data center portfolio, while maximizing its business and sustainability performance.

Data reporting and minimum performance standards embodied in enacted or proposed regulations are focused on the operation of the individual data centers, not the aggregated enterprise-level sustainability performance. An operator must demonstrate that they have a highly utilized IT infrastructure (maximized work delivered per unit of energy consumed) and minimized the energy and water consumption and GHG emissions associated with its facility operations.

Pursuing an Ecosystem sustainability strategy is the logical next step for operators that want to do more and further enhance their sustainability credentials. However, an ecosystem sustainability strategy should not be pursued at the expense of an IT and Facilities strategy to shield poor or marginal facility and IT systems performance.

The following Uptime Institute expert was consulted for this report: Jay Paidipati, Vice President Sustainability Program Management, Uptime Institute

Other related reports published by Uptime Institute include:

<u>Creating a sustainability strategy</u> <u>Data center sustainability standards</u> <u>IT Efficiency: the critical core of sustainability</u> <u>Three key elements: water, circularity and siting</u> <u>Navigating regulations and standards</u> <u>Tackling greenhouse gases</u> <u>Reducing the energy footprint</u>



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#### **About Uptime Institute**

Uptime Institute is the Global Digital Infrastructure Authority. Its Tier Standard is the IT industry's most trusted and adopted global standard for the proper design, construction, and operation of data centers – the backbone of the digital economy. For over 25 years, the company has served as the standard for data center reliability, sustainability, and efficiency, providing customers assurance that their digital infrastructure can perform at a level that is consistent with their business needs across a wide array of operating conditions.

With its data center Tier Standard & Certifications, Management & Operations reviews, broad range of related risk and performance assessments, and accredited educational curriculum completed by over 10,000 data center professionals, Uptime Institute has helped thousands of companies, in over 100 countries to optimize critical IT assets while managing costs, resources, and efficiency.