# INVESTING IN MORE SUSTAINABLE DATA CENTERS

ESG RESEARCH – DATA CENTERS (2/2)

Data center energy consumption could **double by 2030**[1]. That number on its own hides the progress the sector has already made: over the past decade, processors and AI accelerators have **gained roughly 30 to 40% in performance per watt per year** [2]. These gains are a reminder that the sector's energy trajectory is not fixed. It is above all a matter of **choices**: of design, of the technologies used, and of how electricity is sourced.

Our first publication set out the constraints weighing both on local communities and on the sector's ability to grow: the grid, water, and local acceptability. **Investors** can support the response on three levels by:

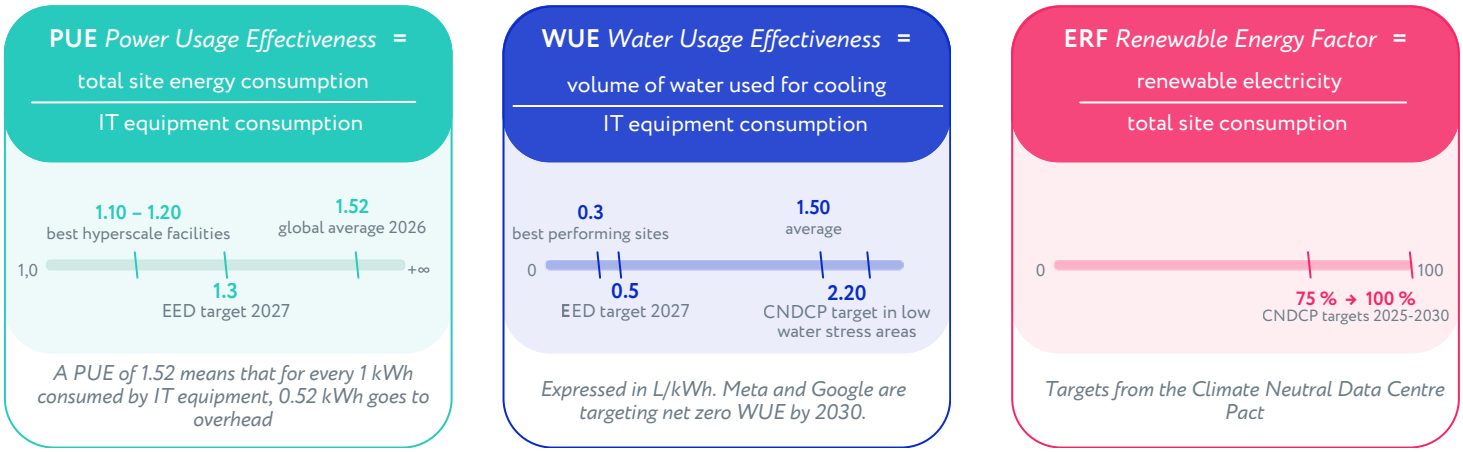
- **Analyzing** these issues through a double-materiality lens, weighing the transparency communities demand, the indicators available and a regulatory framework still taking shape;
- **Engaging** with operators on best practice, and support the standards emerging alongside it;
- **Selecting the companies** that solve the physical bottlenecks and grow with more sustainable infrastructure.

## DISCLOSURE IS THE STARTING POINT

**Disclosure** now determines access to permits. In 2026, moratorium bills were filed in 11 US states [3]. In Texas, the sector's most dynamic market, the governor asked the grid operator to stop approving new connections without an **audit covering electricity and water use** [4].

Developers who disclose their **energy sourcing**, their **water withdrawal and consumption**, their **emissions and other local impacts** are more likely to secure permits for their projects. In Europe, the **Energy Efficiency Directive** makes a set of indicators mandatory by 2027, PUE, REF and WUE among them (see below).

### Three EED indicators, explained [5]




Sources: European Commission, Climate Neutral Data Centre Pact, Sycomore AM

These ratios are now both a **regulatory compliance criterion and a selling point**, and they give investors a read on exposure. Three caveats should be noted:

- **They say nothing about utilization.** PUE measures a building's overhead, meaning the consumption that sits alongside the servers (cooling, power distribution and so on). That overhead persists whether the GPUs are computing. No standard metric captures under-utilization, but the grid connection shows it: on average, data centers use about only half the capacity they contract for[6]. At site level, low utilization pushes up the energy spent per unit of compute.

- **Their calculation is still debated.** The standard gives operators several measurement options, and the figures in project communications are design values calculated at full load, which can differ from those recorded in operation.

- **The energy-water trade-off is a local question.** Energy-intensive liquid cooling improves WUE, but degrades PUE, and moves water consumption upstream, into power generation. The right balance depends on the water stress risk level where the site is located, which group averages can hide. Since 2023, for instance, Equinix has drawn that line, ruling out water-hungry evaporative cooling at sites located in high water stress areas[7].

**These indicators also point to genuine progress**. The global average PUE stands at 1.52 on a site-by-site basis, but falls to 1.36 when weighted by installed power capacity, compared with nearly 2 fifteen years ago[8]. However, these efficiency gains must be viewed in the context of continued growth in both the volume and intensity of use[9].

## FROM DISCLOSURE TO BEST PRACTICES

Beyond analysis, investors can ask companies for **greater disclosure and promote best practice** through shareholder engagement. It gives a better read on **how risks and impacts are assessed, and how far they account for the local context and the stakeholders involved.**

**Encourage good practice, and help it scale**. The sector moves fast with a stream of good practices, innovations and initiatives. Their reach can remain limited by how widely they are adopted. One example is disclosure on energy sourcing, but also on the hourly matching of consumption with low-carbon generation, which only Google publishes among the hyperscalers. Another, less documented but material given the stakes, is transparency on refrigerant fluids and their end-of-life management.

**Use the vote at AGMs as a lever and support shareholder resolutions on transparency.** Several resolutions filed at Annual General Meetings, mostly at US hyperscalers, call for better disclosure on energy and water use, on where that use sits geographically, and on the risks attached.

**Support the common frameworks.** Shared standards are essential to assess companies against comparable indicators and to identify the most credible commitments. Several efforts contribute to that standardization, among them: The Climate Neutral Data Centre Pact, whose signatories represent more than 85% of European capacity[10], the EU digital sustainability label coming under the Energy Efficiency Directive, and the Green Data Centres Coalition, launched in April 2026 by nine building and sustainable finance organizations [11].

## SELECTING THE COMPANIES THAT PROVIDE SOLUTIONS

Energy, social acceptability and water constraints that data centers are facing represent **risks** for their siting and their operations. They also drive a r**edistribution of value** across the digital chain. Investors who want to support sustainable infrastructure built can select the companies that answer those constraints (see table below).

That dynamic does call for greater selectivity:

- **The fastest fix is not necessarily the most sustainable.** Onsite gas turbines address short-term connection delays, at the cost of fossil dependency, carbon emissions, and, often local opposition. Fuel cells answer the same problem cutting NOx emissions, noise and water consumption [12]. Hyperscalers are helping to drive down the cost of these technologies and are funding R&D into still-emerging solutions such as geothermal energy, small modular reactors and nuclear fusion[13].

- **Some solutions address several constraints simultaneously.** Liquid cooling is one example. Driven by increasing chip density, its adoption now extends beyond AI: it is already used in more than half of all facilities, and 59% of operators plan to adopt it within the next five years[14]. By cutting the number of fans needed to cool the servers, it reduces noise nuisance and delivers water savings estimated at up to 125 million liters per year per site where it replaces an evaporative system [15]. As an illustration, Munters supplies both heat rejection modes, which allows the water-energy trade-off to be tailored to the site.

- **Some themes reach beyond AI, notably grid reinforcement.** It benefits electrical infrastructure equipment makers and integrators, whose demand, beyond data centers, extends to electrification. Schneider Electric, for example, covers medium voltage as well as cooling, and that integration lets it optimize the energy performance of the site as a whole.

### Constraints and solutions providers

| CONSTRAINTS | | FOCUS ON COMPANIES PROVIDING |
|---|---|---|
| GRID CONNECTION | - Connection lead times of 2 to 6 years, and up to 7–10 years in saturated hubs<br>- Pressure on the grid and under-utilization of contracted capacity<br>- Recourse to onsite gas turbines | - Electrical infrastructure equipment and solutions to optimize the existing grid<br>- Storage and flexibility solutions<br>- Fuel cells and low-carbon generation<br>- Retrofitting of sites already connected to the power grid |
| WATER | - Water availability for cooling systems in water-stressed areas<br>- The water-energy trade-off in cooling systems<br>- Refrigerant fluid management | - Direct-to-chip liquid cooling and dry coolers<br>- Hybrid cooling systems able to switch between dry and evaporative mode depending on outside temperature<br>- Advisory on water consumption optimization, treatment and reuse |
| LOCAL ACCEPTANCE | - Constant low-frequency vibration<br>- Pressure on land<br>- Competing energy and water uses | - Acoustic insulation and liquid cooling<br>- The redevelopment of industrial land and sites already connected to the power grid, such as Bitcoin mining sites<br>- Waste heat recovery, capturing the heat produced for other uses such as district heating<br>- Waste management and water treatment |

Source : Sycomore AM

**Limiting risks, supporting good practices**

Physical and social constraints can impact data centers' ability to deploy. For operators, these translate into execution risks. For companies developing solutions, it is an **opportunity. Analysis, engagement, and selection** allow investors to tell one from the other, and to support the scaling of solutions.

**The next half-years will be decisive in that respect**: European regulation tightening, US moratoriums evolving, and the gap between capacity announced and capacity delivered.

Some of the risks and impacts identified in our first publication remain thinly covered, such as electronic waste management and the availability of skilled labor. Companies that address them could turn into new investment opportunities. **At Sycomore, we are watching for the early leaders.**

Contributors: Clémence Bourcet, Anaïs Cassagnes, Erwan Crehalet, Alice Descourtieux and Louis Reinhart



**NOTES AND SOURCES**

[1] International Energy Agency (IEA), Energy and AI, April 2025

[2] International Energy Agency (IEA), Key Questions on Energy and AI, April 2026

[3] Good Job First, Data Center Moratorium Bills Are Spreading in 2026, February 2026 ; US Data Center Moratorium Tracker

[4] The Texas Tribune, Texas will audit up to 300 projects, mostly data centers, after Gov. Greg Abbott's order, August 2026

[5] Europa, Assessment of next steps to promote the energy performance and sustainability of data centres in EU, including the establishment of an EU-wide rating scheme, October 2025 ; CNDCP, Climate Neutral Data Center Pact, June 2025 ; Uptime Institute, The growing PUE advantage of larger data centers, August 2026

[6] In Europe, a study by the think tank Ember estimates average utilisation at 44% of contracted capacity, while ERCOT, the Texas grid operator, measured average peak consumption among sites commissioned between 2022 and 2024 at 49.8% of the capacity requested for grid connection. Sources : Interface, From Chips to Grids, May 2026 ; Gupta C., Mural R., and Pherwani D., Data Centers and Large-Scale Electric Growth: The Virginia and Texas Experiences, April 2026

[7] Blog Equinix, A Guide to Responsible Water Use in Data Centers, March 2026

[8] Uptime Institute, The growing PUE advantage of larger data centers, August 2026

[9] The IEA estimates that a simple text query consumes approximately 0.05 to 0.3 Wh, a reasoning query around 1 Wh, and an agentic task around 50 Wh. Sources : J.P. Morgan, The Long View: Q&A on AI, Energy and Climate, January 2026 ; IEA, Key Questions on Energy and AI, April 2026

[10] Climate Neutral Data Centre Pact, Hasty Imposition of Minimum Performance Standards May Undermine Environmental Progress, July 2025

[11] World Green Building Council, World's leading building and climate organisations launch coalition to green data centres, April 2026

[12] Oracle, Oracle, BorderPlex, and Bloom Energy to Power Project Jupiter with Cleaner, Water-Efficient Fuel Cell Technology, April 2026

[13] On geothermal energy: Ormat, Ormat Technologies Announces the Signing of Geothermal Portfolio PPA of Up to 150 MW to Support Google's Data Center Operations Through NV Energy, February 2026 ; on small modular reactors: IEA, Key Questions on Energy and AI, April 2026 ; on nuclear fusion: World Economic Forum, How AI will help get fusion from lab to grid by the 2030s, December 2025

[14] Although no precise figure is available specifically for AI data centers, liquid cooling adoption is expected to accelerate as new generations of NVIDIA chips increasingly require its adoption. Source : 451 Alliance by S&P Global, Air cooling remains prevalent, but liquid cooling is gaining momentum, November 2025

[15] Microsoft, Sustainable by design: Next-generation datacenters consume zero water for cooling, December 2024