Navigating AI's Thirst in a Water-Scarce World

A Governance Agenda for AI and the Environment

February 2025

NATURE ALPHA

NATURE FINANCE

Navigating AI's Thirst in a Water-Scarce World

A Governance Agenda for AI and the Environment

NATURE ALPHA

NATURE FINANCE

Contents

Authors
Jasper Hajonides[1], Julie McCarthy[2], Konstantina Koulouri[2], Rafael Camargo[1].

Editor
Miles Bell

We would like to extend appreciation to Astrid Wynne (Techbuyer), Kris Shrishak (Enforce), Lucas Joppa (Haveli Investments), Mark Dansie (Open Compute Project), Nicolas Miailhe (PRISM), and Zuzanna Warso (Open Future) – for their insightful recommendations and advice.
We are also grateful to the Omidyar Network for their support for this research.

[1] NatureAlpha, [2] NatureFinance

CONTACT US

Julie McCarthy
julie.mccarthy@naturefinance.net

Konstantina Koulouri
konstantina.koulouri@naturefinance.net

1 Introduction

The rapid growth of the Artificial Intelligence (AI) industry has driven a massive expansion in data centres worldwide, both in terms of number and size[1]. As AI applications become more sophisticated, they require vast amounts of computational power and data storage housed in "hyperscale" data centres. These data centres require substantial energy[2] and water[3] to operate, raising significant sustainability concerns at both local and global levels.

To date, most policy and industry discussions have focused on the energy consumption of this industry, and the need to ensure that it is "green" and "clean."[4] However, data centres have become super-users of fresh water at a time when globally, **demand for fresh water is expected to outstrip supply by 40%[5] by the end of the decade**. In the USA alone, data centres consumed 66 billion litres of water in 2023, with 84% of that servicing hyperscale data centres.[6]

There are growing concerns about water stress in host communities,[3] which have largely been neglected to date. In the Netherlands, for example, farmers have opposed the construction of the country's biggest data centres by *Meta* due to water availability concerns,[7] whilst in Santiago, Chile, a court ruled that *Google* had to revise its construction application with a particular emphasis on rethinking its water-intensive cooling system in a context of prolonged drought and extreme water scarcity.[8]

---

[1] Scott Sinclair, "How 2024 GenAI Investment Will Transform Data Centers," *TechTarget*, January 10, 2024, https://www.techtarget.com/searchdatacenter/opinion/How-2024-GenAI-investment-will-transform-data-centers.
[2] Srini Bangalore et al., "Investing in the Rising Data Center Economy," *McKinsey & Company*, January 17, 2023, https://www.mckinsey.com/industries/technology-media-and-telecommunications/our-insights/investing-in-the-rising-data-center-economy.
[3] Eric Olson, Anne Grau, and Taylor Tipton, "Data Centers Draining Resources in Water-Stressed Communities," *The University of Tulsa*, July 19, 2024, https://utulsa.edu/news/data-centers-draining-resources-in-water-stressed-communities/.
[4] Matt MacFarland et al., "Can AI Become Net Positive for Net-Zero?" *S&P Global*, November 14, 2024, https://www.spglobal.com/esg/insights/featured/special-editorial/can-ai-become-net-positive-for-net-zero.
[5] Fiona Harvey, "Global Water Crisis Leaves Half of World Food Production at Risk in Next 25 Years," *The Guardian*, October 16, 2024, https://www.theguardian.com/environment/2024/oct/16/global-water-crisis-food-production-at-risk.
[6] Sebastian Moss, "Data Centers Consumed 4.4% of US Power in 2023, Could Hit 12% by 2028," *Data Center Dynamics*, December 20, 2024, https://www.datacenterdynamics.com/en/news/doe-data-centers-consumed-44-of-us-power-in-2023-could-hit-12-by-2028/.
[7] Rachel Lerman, "Meta's Data Center in Netherlands Faces Backlash Over Environmental Concerns," *The Washington Post*, May 28, 2022, https://www.washingtonpost.com/climate-environment/2022/05/28/meta-data-center-zeewolde-netherlands/.
[8] Shatabdi Mazumdar, "Water Wars: Court Halts Google Data Center in Chile Amid Climate Controversy," *Digital Infra Network*, March 4, 2024, https://digitalinfranetwork.com/news/water-wars-court-halts-google-data-center-in-chile-amid-climate-controversy/.

There is very little information in the public sphere about the risks and potential impacts of data centres on surrounding communities' energy and water supplies. This is largely because **there are currently no jurisdictions with mandatory disclosure rules** that require AI data centre operators to report on nature-related dependencies, risks, and impacts. This information gap around AI sustainability analysis and disclosure stands in stark contrast to the growing body of guidance and frameworks around nature- and climate-related financial disclosures for other sectors. The gap explicitly impacts a wide range of stakeholders: from those specifically concerned with financial due diligence and nature-related risks regarding investments in the AI sector, to financial regulators and industry operators, to city planners and local communities that are host to AI data centres.

Given that rapid decarbonization of the global economy will increasingly rely on digitization and electrification, AI has a critical role to play in facilitating the net-zero, nature-positive economic transition.[9] The critical challenge the AI industry now faces is to ensure that it is part of the solution and is not a driver of the climate and nature crisis itself.

To help frame a science and fact-based policy dialogue about the sustainability of AI and hyperscale data centres,[10] this report analyses the likely nature- and climate-related risks and impacts of data centres on their host geographies. The report also examines the existing financial and environmental reporting, disclosure and accountability regimes applicable to the sector.

Overall, the report's findings indicate moderate-to-high global environmental risk levels for both the continued operation of existing data centres and the health of natural ecosystems they impact. The **relatively high and widespread level of nature-related risks identified** suggests the urgent need for new mandatory disclosure policies that account for a holistic set of environmental metrics to better manage the sector's dependencies and impacts on nature. This report concludes by recommending a framework to guide a governance agenda for AI and the environment, with the goal of informing policy dialogues focused on protecting nature, climate, businesses and people from the risks of the rapidly scaling AI industry.

---

[9] April Anderson, "How AI Is Making Net Zero Possible," *Forbes*, July 9, 2024, https://www.forbes.com/councils/forbestechcouncil/2024/07/09/how-ai-is-making-net-zero-possible/.
[10] Hyperscale data centres are centres using 5,000 servers or more and devoting at least 10,000 square feet to the operation.
Phill Powell and Ian Smalley, "What is Hyperscale?" *IBM*, March 12, 2024, https://www.ibm.com/think/topics/hyperscale.

2 Analysing the nature-related & climate-related impacts and risks of data centres

Methodology overview

Data pertaining to the use of environmental resources and the impacts of data centres is scarce and often treated as a trade secret. For example, in Oregon, local reporters were only able to obtain data on the water usage of *Google's* data centres when a county circuit court ruled against the corporation - and revealed that a quarter of all the water in the city was being consumed by the facility (nearly triple what it had consumed the several years prior) and two more local data centres were in the planning phase.[11]

In this context of limited data availability and growing concern over environmental impacts, this analysis leverages novel analytic tools and both public and privately available datasets to identify the location of data centres globally and the likely nature- and climate- related impacts and risks of these facilities. We examine a comprehensive dataset of 8,311 unique data centres owned by 2,664 different companies,[12] with a focus primarily on the USA, which accounts for 37% of the total number of data centres globally.

NatureAlpha's NatureSense API[13] is utilised to integrate spatial data on individual data centres with detailed information about the state of water and nature in that location. This analysis focuses on the most material topics for understanding the risks of data centres, with a particular focus on water availability,[14] which measures the physical abundance or lack of freshwater resources (groundwater and surface) and can be used to identify areas of water stress.

---

[11] Kelechukwu Iruoma, "The Oregonian exposes Google and Amazon's massive water use for data centers," *The Reyolds Center,* November 20, 2023, https://businessjournalism.org/2023/11/oregonian-data-centers/.
[12] Different levels of information were available across this global dataset: for approximately 1,381 data centres provide details on square footage, 2,730 disclose whitespace size, 2,673 report capacity information (kWh), and 1,497 facilities include the year each facility became operational.
[13] NatureAlpha provides insights on the nature and biodiversity footprint, risks and impacts of asset-level investment decisions. Their NatureSense API tool is a geospatial engine designed for nature risk assessments. It aligns with the Taskforce on Nature-related Financial Disclosures (TNFD) recommendations.
[14] The data for this metric was compiled by a joint effort of WWF, WRI, and SBTN, using the best available geospatial global datasets to create a more robust and comprehensive metric, and taking a conservative approach to manage uncertainties, by identifying each river basin's maximum risk score from three well-recognised datasets as used in the WRI Aqueduct Water Risk Atlas and WWF Water Risk Filter: 1) Baseline Water Stress, 2) Water Depletion, and 3) Blue Water Scarcity.
Rafael Camargo et al., "State of Nature Layers for Water Availability and Water Pollution to Support SBTN Step 1: Assess and Step 2: Interpret & Prioritize," *Zenodo*, June 30, 2024, https://doi.org/10.5281/zenodo.12702055.

The carbon emission intensity of data centres is presented using data from research conducted on the environmental footprint of these facilities in the USA[15]. However, it should be noted that the sector has seen a substantial growth in energy intensity demand since this underlying data was collected in 2021.[16] The analysis also looks at additional nature metrics, around water pollution,[17] drought risk,[17] and proximity to Protected Areas[18] and Key Biodiversity Areas,[19] to provide a more comprehensive look at nature-related risks and impacts of data centres.

Water availability risk and carbon emissions of existing data centres

Results show that **45% of data centres globally are located in river basins where water availability is a high risk**. As data centres have a continuously high demand for water, locating them in water scarce regions represents a serious concern for businesses, people and nature, which all depend on those shared freshwater resources. One major contributor to high water consumption in data centres is the limited reuse of water during cooling. Fresh water partially evaporates during cooling, while the remaining water becomes wastewater. This wastewater often contains contaminants like dust, chemicals, and minerals that reduce cooling efficiency if reused. As a result, **many data centres cannot fully recycle wastewater**, leading to greater reliance on freshly supplied resources.[20] In the context of rapid global warming—likely beyond 1.5C—and growing global water scarcity, it is imperative to have all the necessary information required to consider the public interest dimensions of where data centres are located and the potential for water stress and competition with affected communities and ecosystems.

The analysis also highlights several regions of particular concern from a water availability risk perspective where data centres are already located. For example, analysis of the Colorado River basin in the United States raises alarms around water availability. The substantial number of data centres and the nearly 5 GWh of combined computing power capacity indicates constant high water demand within a region already experiencing water scarcity.

---

[15] Md Abu Bakar Siddik, Arman Shehabi, and Landon Marston, "The Environmental Footprint of Data Centers in the United States," *Environmental Research Letters* 16(6), May 21, 2021, https://vtechworks.lib.vt.edu/server/api/core/bitstreams/484c56d7-9557-4c71-ad47-84ab67a21bad/content.
[16] Laila Kearney, "US data-center power use could nearly triple by 2028, DOE-backed report says," December 20, 2024, https://www.reuters.com/business/energy/us-data-center-power-use-could-nearly-triple-by-2028-doe-backed-report-says-2024-12-20/.
[17] Samantha Kuzma et al., "Aqueduct 4.0: Updated Decision-Relevant Global Water Risk Indicators," *World Resources Institute*, August 16, 2023, https://doi.org/10.46830/writn.23.00061.
[18] Protected Planet "Explore the World's Protected Areas," *Protected Planet*, accessed December 2, 2024, https://www.protectedplanet.net/en.
[19] Key Biodiversity Areas, "Key Biodiversity Areas: keep nature thriving," *Key Biodiversity Areas*, accessed December 2, 2024, https://www.keybiodiversityareas.org/.
[20] Wesley Spindler, Luna Atamian Hahn-Petersen, and Sadaf Hosseini, "Circular Water Solutions for Sustainable Data Centres," *World Economic Forum*, November 7, 2024, https://www.weforum.org/stories/2024/11/circular-water-solutions-sustainable-data-centres/.

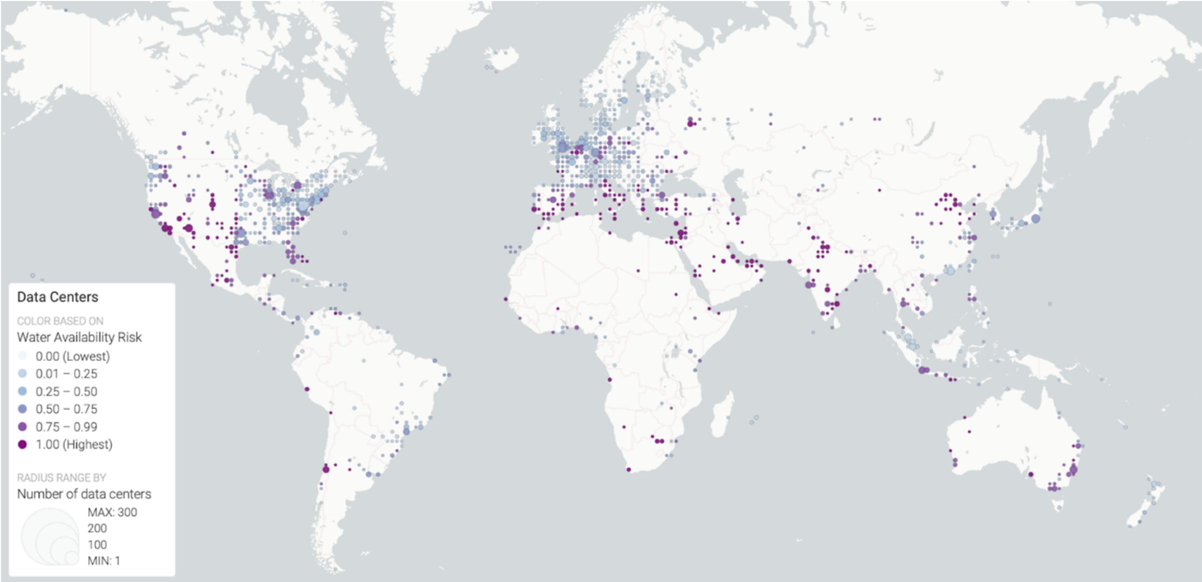


Figure 1. Spatial distribution of data centre locations globally. *Dark purple dots represent data centres located in river basins facing highest water availability risk. The size of the dots indicates the number of data centres at those locations.*

Other river basins, as defined by the World Meteorological Organisation[21], facing similar challenges include the Australian East Coast, the Mississippi River basin (USA), the United Kingdom East Coast, and the US West Coast. Additionally, several countries such as India, Germany, Japan, Indonesia, Portugal, China, Mexico, and Spain also demonstrate notable water-availability concerns, with high power capacity data centres relying on significant amounts of scarce freshwater resources to function.

Looking at the USA specifically, there are several states that stand out as having high levels of water demand and associated water availability risk, as well as high data centre presence. **Figure 2** below shows Virginia (VA) as the state with the highest number of data centres, the largest installed power capacity, and the greatest carbon emission intensity. That said, the most critical concerns for both climate (carbon emissions) and water availability risk are found in Texas (TX) and Arizona (AZ), which host large numbers of data centres and rank second and third in installed power capacity. Other states of concern include Illinois (IL), Nevada (NV), and California (CA), due to their substantial data centre presence, high water demand (estimated water footprint), and associated water availability risk.

[21] Koblenz (ed), "WMO Basins and Sub-Basins / Global Runoff Data Centre," *Federal Institute of Hydrology*, 2020, https://grdc.bafg.de/products/basin_layers/wmo_basins/.

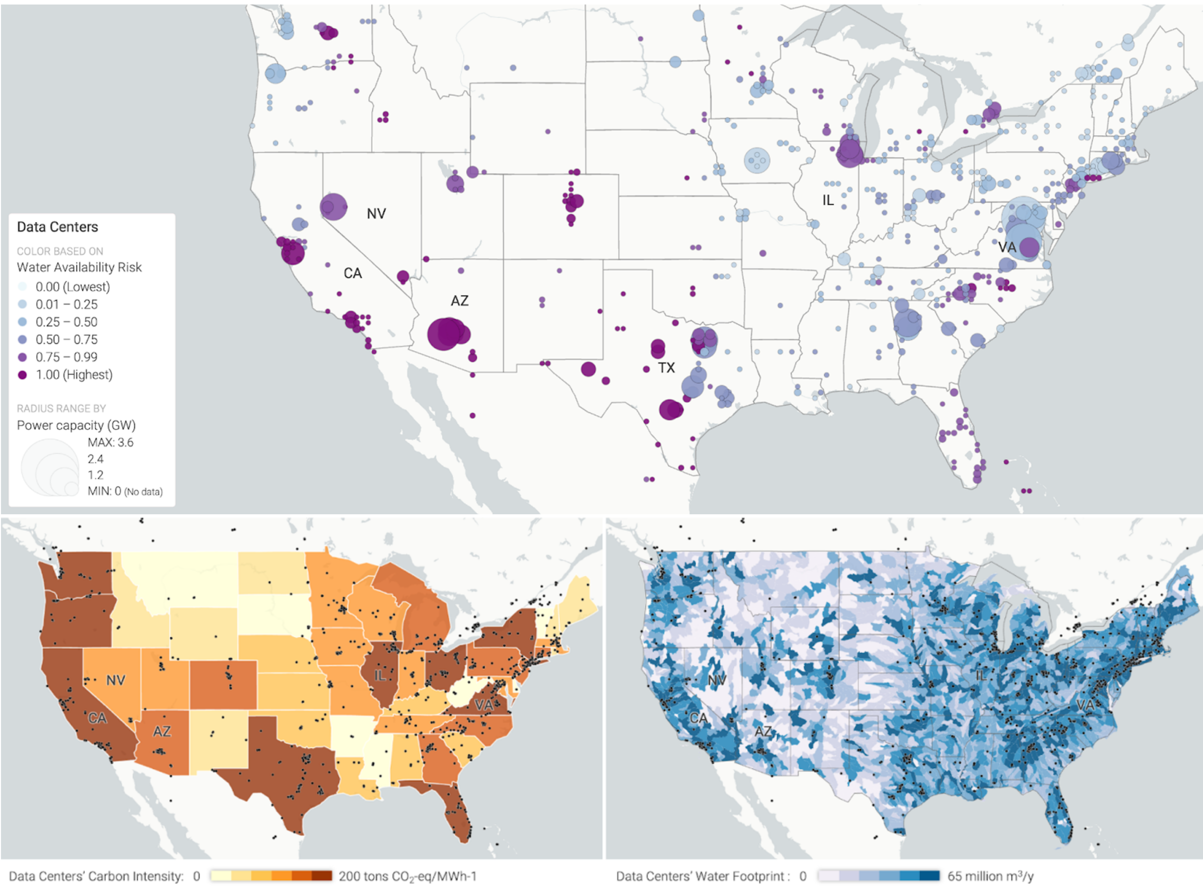


Figure 2. Top: *Spatial distribution of data centre locations in the United States. Dark purple dots represent data centres located in river basins facing highest water availability risk. The size of dots indicates the combined power capacity of data centres at those locations.* Bottom-left: *USA data centres' carbon intensity at state level.* Bottom-right: *USA data centres' water footprint at river basin level.*

Figure 2 (bottom-right) depicts the direct and indirect water footprint of data centres across the USA. Direct water consumption makes up approximately 25% of a centre's total consumption and is the amount of water consumed directly by the centre to operate. Indirect water consumption can represent up to 75% of the centre's total consumption, and includes the water consumed indirectly through electricity generation to supply power to the centres and electricity generation to power the water and wastewater services used by the data centre.[22]

The significance of indirect water consumption varies according to the types of power generation used to supply the centre with energy and to power other services used by the facility.[23] Hydroelectric and coal-fired plants typically have much higher water intensities compared to wind, solar, geothermal, or natural gas power plants. The average water consumption for data centres in the USA is currently estimated at 7.1 m^3 per MWh.[15]

[22] Nathalie Cruchet and Alexandra MacDiarmid, "Data Center Water Usage," *Submer*, November 21, 2023, https://submer.com/blog/datacenter-water-usage/.
[23] Bora Ristic, Kaveh Madeni and Zen Makuch, "The Water Footprint of Data Centres" *Sustainability, 7(8)*, August 18, 2015, https://doi.org/10.3390/su70811260.

However, the full range is actually 1.8 to 105.9 m^3 per MWh, because the type of energy source servicing the facilities can have a large impact on their water requirements.

Power sources associated with data centres and water utilities can also be used to estimate the CO_2 emissions associated with the data centre. The carbon intensities are grouped at a state level and displayed in **Figure 2** (bottom-left)**.** Critically, 56% of the energy powering data centres is currently derived from fossil fuels.[24] This results in a carbon intensity that is approximately 48% higher than the national average carbon intensity of energy production across all US states.[25]

By analysing the data centre properties and local interactions with water availability and ecosystems, we show the critical importance of three key indicators – **type of energy source, water consumption, and water availability risk** – which should be regarded as integrated metrics for disclosure regimes in policy development. Only by looking at the interplay of all three is it possible to determine the holistic set of concerns around direct and indirect water impacts for these facilities.

Additional nature-related risks

Results also show that **55% of data centres globally are in river basins with high risk of water pollution**. High risk of water pollution means that large portions of the available water in the region may not be fit for use, which increases the stress on clean water resources, and exacerbates water availability risk. Furthermore, **47% of data centres globally are in river basins with high drought risk**,[26] which means that many data centres will be reducing the resilience of local freshwater ecosystems or public supply during critical periods.

In terms of biodiversity-sensitive locations, **68% of data centres are located within 5 km of a designated Protected Area or a Key Biodiversity Area (KBA)**. Clean and available water is vital for the health and resilience of these areas as these places often harbour unique ecosystems and species that depend on reliable water sources for survival. Adequate water quality ensures the proper functioning of aquatic and terrestrial habitats, supports biodiversity by maintaining the ecological balance, and safeguards critical ecosystem services, such as water purification, regulation of water flows, nutrient cycling, and carbon storage. Without clean and sufficient water, these areas face heightened risks of habitat degradation, species loss, and diminished ecosystem services and capacity to support both wildlife and human communities that rely on these natural systems.

---

[24] Gianluca Guidi, Francesca Dominici, Jonathan Gilmour, Kevin Butler, Eric Bell, Scott Delaney, and Falco J. Bargagli-Stoffi, "Environmental Burden of United States Data Centers in the Artificial Intelligence Era," *arXiv*, November 14, 2024, https://arxiv.org/abs/2411.09786.
[25] Specifically, carbon intensity is 548 grams of CO_2e per kWh, compared to the US national average across all US states of 369g CO_2e per kWh.
[26] Water availability risk assesses long-term access to sufficient water resources (chronic risk), while drought risk focuses on short-term, extreme reductions in water availability due to specific climatic conditions (acute risk).

Data centre growth trends and future demands for water

In recent years, we have seen an increase in the size and energy usage of data centres across the world. According to the International Energy Agency, data centres consumed around 460 TWh in 2022, accounting for nearly 2% of total global electricity demand.[27] This figure is projected to grow by 2.4% per year on average until 2030. In the USA, data centres consumed 4.4% of the nation's power in 2023 and could hit 12% by 2028.[6] **Figure 3** indicates that increasingly large data centres are being built, with a median capacity of new facilities consistently above 10MW over the past years.[28]

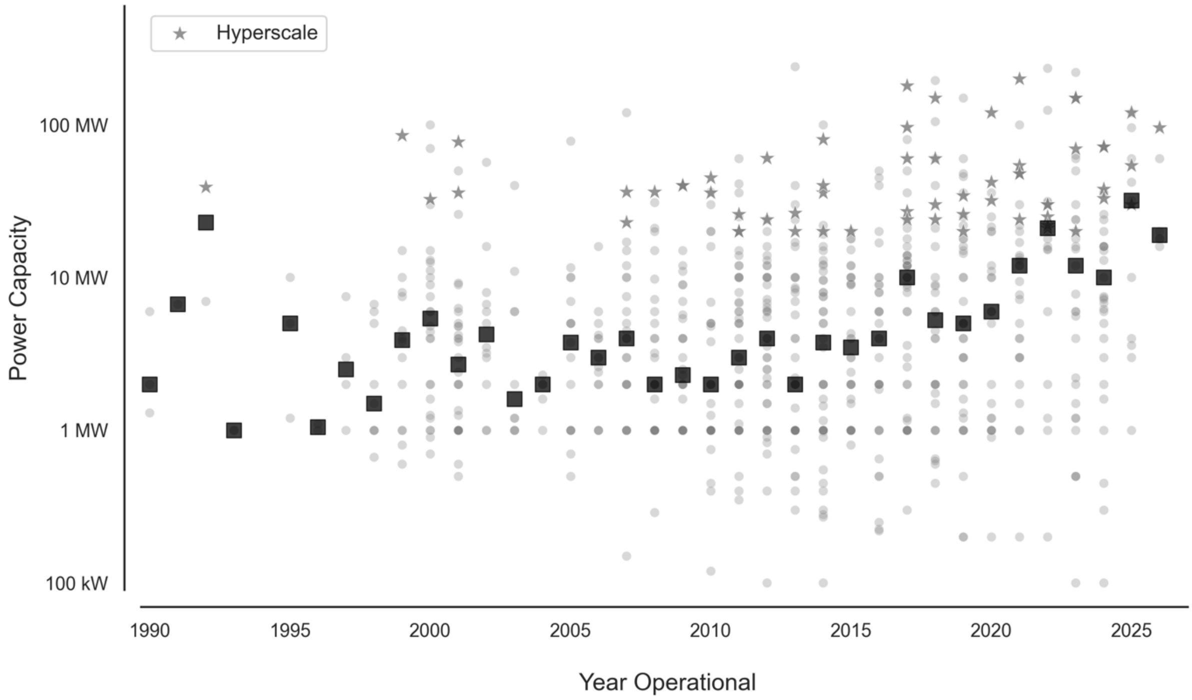


Figure 3. New data centre capacity since 1990. *Plot shows how data centres that became operational in recent years—or will become operational in the near future—have increased capacity compared to older data centres. Individual data centres are displayed as grey dots. Star symbols are used for hyperscale data centres with more than 10,000 square metres of space for equipment racks and more than 20MW capacity. The median capacity of all data centres that became operational in each year is displayed as a square.*

With the increasing demand for computing power, planning is underway for more, even larger, data centres in the coming years. In an attempt to estimate future risk to water availability, we performed a non-exhaustive review of news articles and identified several projects and their potential locations (see Annex 1). These locations were then assessed both in terms of their baseline water stress and the projections of water stress[16] (using a *2030 Business As Usual scenario* (SSP3 and RCP7.0)).

[27] Eren Çam et al. "Electricity 2024" *International Energy Agency*, May 2024, https://www.iea.org/reports/electricity-2024.
[28] 10 MW is the equivalent of powering approximately 10,000 homes or simultaneously charging 5,000 electric cars.

Figure 4 below, shows that in Cheyenne (Wyoming, USA), where *Meta* has plans for a hyperscale data centre, water stress is already greater than 200%. This means that the total water withdrawals in the host river basin are more than twice as much as the available renewable water resources, representing a significant water availability concern in the medium term. Regions being in water stress greater than 100%, as in Cheyenne, is usually due to the high reliance on groundwater resources, which may not be replenishing at a sufficient rate to meet ongoing demand.

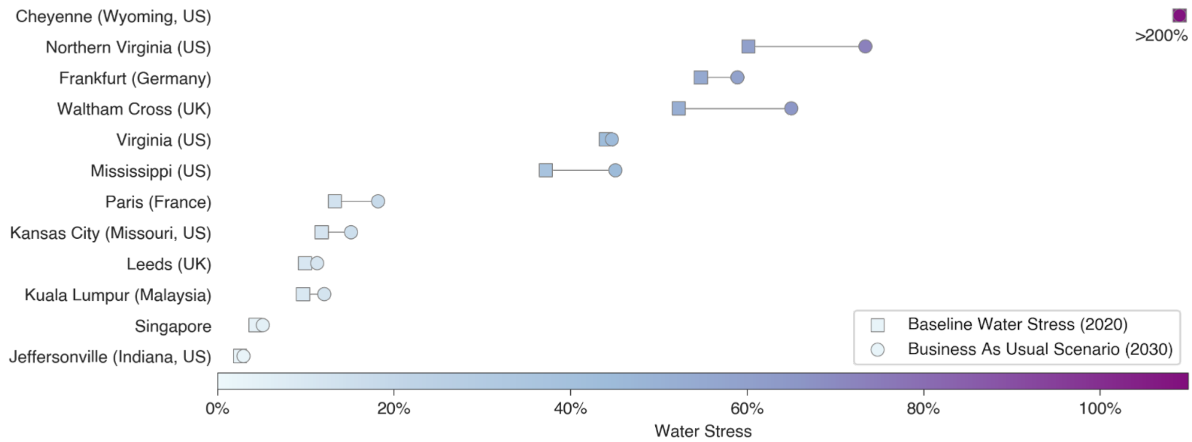


Figure 4. Water stress at future data centre locations. *Potential locations of future data centres and projected change in water stress in the host river basins, between baseline (2020) and Business As Usual Scenario by 2030. Based on the World Resources Institute definitions, water stress refers to the ratio of water withdrawals to available renewable water resources.*

Northern Virginia (USA) and Frankfurt (Germany), potential locations for *Digital Realty*, and Waltham Cross (UK), a potential location for *Google*, are all currently experiencing water stress above 50%, with this figure projected to increase by 13 percentage points for Northern Virginia and Waltham Cross and by 4 percentage points for Frankfurt by 2030. Certain regions in Mississippi (USA), where *Amazon Web Services* is considering new data centres, are also expected to experience an 8% percentage point increase in water stress by 2030. These figures are particularly concerning given that locations with a score of 40% or more (based on the thresholds as defined by the World Resources Institute) are considered to be at high-risk of water stress.[16]

In January 2025, *OpenAI* announced that the buildout of the $500 billion Stargate Project would begin in Texas. This will see the construction of a new generation of data centres for AI in a state where, not only is water availability risk significant, but the electric grid is increasingly fragile.[29]

[29] Ed Hirs, "After 4 Years And Billions Of Dollars, The Texas Grid Is Not Fixed," *Forbes,* December 9, 2025, https://www.forbes.com/sites/edhirs/2024/12/09/after-4-years-and-billions-of-dollars-the-texas-grid-is-not-fixed/.

Key insights from analysis

The rapid growth of data centres worldwide is putting significant pressure on scarce environmental resources, particularly fresh water, and associated ecosystems. Local populations, or even local political leaders, may not be aware of the extent and nature of the environmental risks presented by these data centres, and the potential for public backlash that may emerge in the coming years as a result. Given the large number of facilities that have already been constructed in highly water stressed regions, it is feasible that concerns around water availability and drought, both present and projected, are not being taken into account in planning decisions for new facilities.

Below is a summary of key takeaways from the analysis for policymakers to consider from a public interest perspective, to better protect nature, climate, businesses and people in the context of generative AI's explosive growth.

- While compute for AI is growing and some dedicated AI data centres exist today, most data centres serve multiple purposes, making it difficult to isolate the environmental impact specifically attributable to generative AI versus other computing services. There is a need for reporting regimes to disclose comprehensive information on how much compute data centres are currently dedicating to AI training and deployment.
- 45% of data centres globally are in river basins with high water availability risk and therefore contribute to scarcity pressures on businesses, people, and nature. 55% of data centres globally are in river basins with high water pollution risk, and 47% are in river basins with high drought risk. 68% of data centres are in close proximity to environmentally sensitive locations. These figures indicate an urgency to consider nature-related dependencies, risks and impacts for existing and new facilities.
- Relevant indicators for reporting requirements of the state of nature, as well as impacts from and risks to AI hyperscale data centres, include water availability,[14] water pollution,[14] drought risk,[16] and proximity to Protected Areas and Key Biodiversity Areas.
- Findings indicate a particular and significant relationship between three main indicators—type of energy source, water consumption, and water availability risk—which, when assessed in combination, provide a holistic insight into the water impacts of AI hyperscale data centres.
- Data centre projects need to consider both current and future local water availability to ensure the continuity of their operations, as well as fresh water supply to local communities and the environment.

3 Today's environmental policy landscape and disclosure initiatives for AI

At present, the global landscape of legislation, regulations, frameworks and guidelines addressing the AI industry and data centres is quite nascent and fragmented. Although specific policies to deal with the environmental impacts of AI and its material infrastructure are slowly emerging—particularly around sustainable energy—there has not been a concerted effort to holistically and globally address nature dependencies, impacts, and risks for the sector.

European Union policies and legislation

The European Union is a leader in developing policies concerning AI and data centres with the EU Green Deal holding an important broader role. **Table 1** provides an overview of the most prominent European policy initiatives related to the AI & date centre industries.

Table 1: Notable EU policies addressing the environmental impacts of the AI industry and data centres.

Policy	Reporting requirements	Relationship	Influence	Type
EU AI Act[30]	First-of-its kind policy to regulate the AI industry and the only such legislation in existence. Includes energy consumption reporting requirements and, for high-risk systems, an obligation to account for direct or indirect harms to the environment. Key reporting details rely on standardisation which, to date, has not been actualised. Voluntary codes of conduct might be drafted for "assessing and minimizing the impact of AI systems on environmental sustainability." [31]	Direct influence on the AI industry	Climate & Nature	Act (currently no mandatory compliance)
Energy Efficiency Directive (EED)[32]	Data centres above 500kW need to report on energy consumption, power utilisation, temperature, cooling efficiency ratios, water	Direct influence on data centres	Climate & Water	Directive (Mandatory compliance)

[30] European Parliament, "European Parliament Resolution on Data Centers and Sustainability," *European Parliament TA-9-2024-0138-FNL-COR01*, April 19, 2024, https://www.europarl.europa.eu/doceo/document/TA-9-2024-0138-FNL-COR01_EN.pdf.
[31] Zuzanna Warso and Kris Shrishak, "Hope: The AI Act's Approach to Address the Environmental Impact of AI," *Tech Policy Press*, May 21, 2024, https://www.techpolicy.press/hope-the-ai-acts-approach-to-address-the-environmental-impact-of-ai/.
[32] European Commission, "Energy Efficiency Directive (revised)," *European Commission*, September 2023, https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficiency-targets-directive-and-rules/energy-efficiency-directive_en.

	usage, heat utilisation, energy reuse, water usage efficiency and use of renewable energy. Data centres with a total rated energy input exceeding 1MW also need to recover their waste heat or at least prove that they cannot.[33]			
Regulation on Eco-design Requirements for Servers and Data Storage Products[34]	Mandates data centres to integrate benchmarks on energy efficiency, material circularity (repairability, upgradability and recyclability requirements for server and data storage products), and information requirements, inter alia, on the operating conditions class/temperature.[35]	Direct influence on data centres	Climate & Circular economy	Regulation (Mandatory compliance)
EU Code of Conduct for Data Centres (EU DC CoC)[36]	Perhaps the most thorough initiative addressing data centres. Includes over 100 best practice guidelines relating to equipment and services, cooling, power equipment, building location, use of water sources and monitoring.[37] Recommends environmental practices such as locating the infrastructure near a source of fresh water subject to local environmental regulation, capturing rainwater and grey water, and measuring and reducing water consumption, particularly in areas that experience water scarcity. The Code is linked to the EU Taxonomy,[38] one of its requirements being that data centres will be audited based on the EU CoC for data centre best practice.	Direct influence on data centres	Climate & Water	Code (Voluntary)

[33] Venessa Moffat, “Data Centre Sustainability Regulation: The timeline that requires immediate action,” *Techerati,* November 12, 2022, https://www.techerati.com/features-hub/data-centre-sustainability-regulation-the-timeline-that-requires-immediate-action/.
[34] European Commission, “Commission Regulation (EU) 2019/424 laying down ecodesign requirements for servers and data storage products pursuant to Directive 2009/125/EC of the European Parliament and of the Council and amending Commission Regulation,” *EUR-Lex*, March 15, 2019, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32019R0424.
[35] ICF, “Review Study: Commission Regulation on the Ecodesign Requirements for Servers and Data Storage Products, accessed January 22, 2025, https://eco-servers-review.eu/about/index.html.
[36] European Energy Efficiency Platform, "Data Centres Code of Conduct," *European Commission*, July 25, 2016, https://e3p.jrc.ec.europa.eu/communities/data-centres-code-conduct.
[37] Mladen Majstorovic, “The European Code of Conduct for Data Centres,” *Stulz,* accessed January 22, 2025, https://www.stulz.com/newsroom/detail/the-european-code-of-conduct-for-data-centres-1-3/.
[38] European Parliament and Council, "Taxonomy Regulation," *EUR-Lex*, June 18, 2020, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32020R0852.

Corporate Sustainability Reporting Directive (CSRD)[39]	Mandates reporting on companies with over 500 employees that do business in the EU. Reporting for data centres covers power usage effectiveness, renewable energy factor, power capacity effectiveness, IT equipment energy efficiency for servers, IT equipment utilization for servers, energy reuse factor, cooling efficiency ratio, carbon usage effectiveness, and water usage effectiveness.[40] The European Sustainability Reporting Standards (ESRS)[41] provides the framework for reporting under the CSRD.	Implied influence on the AI industry	Climate & Water	Directive (Mandatory compliance)
Corporate Sustainability Due Diligence Directive (CS3D)[42]	Set to increase corporate accountability for value chain impacts and will be enforced in 2027. Establishes corporate due diligence duty to identify and address potential and actual adverse human rights and environmental impacts in a company's value chain. Also sets out an obligation for large companies to adopt and put into effect, through best efforts, a transition plan for climate change mitigation.[43] Has the potential to address the relationship between the AI industry and data centres and obligate large companies to adopt transition plans.	Implied influence on the AI industry	Climate & Nature	Directive (Mandatory compliance in 2027)

[39] European Parliament and Council, "Corporate Sustainability Reporting Directive," *EUR-Lex*, December 14, 2022, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32022L2464.
[40] Jad Jebara and Simon Rowley, "How data centres can prepare for 2024 CSRD reporting," *Data Centre & Network News,* accessed January 22, 2025, https://dcnnmagazine.com/features-list-2022/how-data-centres-can-prepare-for-2024-csrd-reporting/.
[41] European Commission, "Commission Adopts European Sustainability Reporting Standards," *European Commission*, July 31, 2023, https://finance.ec.europa.eu/news/commission-adopts-european-sustainability-reporting-standards-2023-07-31_en.
[42] European Parliament and Council, "Corporate Sustainability Due Diligence Directive," *EUR-Lex*, June 13, 2024, https://eur-lex.europa.eu/eli/dir/2024/1760/oj.
[43] European Commission, "Corporate Sustainability Due Diligence", *European Commission,* accessed on January 22, 2025, https://commission.europa.eu/business-economy-euro/doing-business-eu/sustainability-due-diligence-responsible-business/corporate-sustainability-due-diligence_en#what-are-the-obligations-for-companies.

Policy gaps at EU level

Though the EU has been at the forefront of spearheading the existing AI & data centre policy landscape (through the policies set out in **Table 1)**, there are shortcomings in these initiatives that demonstrate the limited integration of nature and climate considerations in the regulation of the AI sector. Whilst European environmental legislation, such as the **Water Framework Directive** and the **Habitats Directive**, remain applicable to new developments impacting important habitats water bodies, industry focussed legislation is less rigorous.

The **EU AI Act** has received significant criticism for its inability to address environmental concerns. The environmental measures covered by the Act fall short[40] of capturing all the significant nature-related risks of the AI industry and only mandate minimal reporting for high-risk systems and for General Purpose AI (GPAI). The Act avoids addressing wider environmental impacts of the AI sector by stating that voluntary codes of conduct might be drafted for "assessing and minimizing the impact of AI systems on environmental sustainability." Important factors such as water consumption and water availability are completely absent and details on exact environmental reporting metrics are still unspecified. Worryingly, the Act states that AI systems which have not undergone a conformity assessment could be deployed for "exceptional reasons of (..) environmental protection," if permitted by law enforcement authorities or civil protection authorities.[29]

The regulations directly addressing data centres, the **Energy Efficiency Directive (EED)** and the **Regulation on Eco-design Requirements for Servers and Data Storage Products,** provide more detailed reporting requirements for environmental metrics. However, such policies do not help reveal the specific impacts of AI training and deployment, since data centres are used for multiple tasks beyond AI. Moreover, these policies do not include any provision for understanding the impact of water usage on the host geography, let alone additional nature risks. For example, the EED includes two metrics on water—total water consumption and water use efficiency (WUE)—**but such data is not directly linked to local water availability and thus does not reflect the risks to host geographies**. It is also worth noting that, despite the Regulation on Eco-design's targeting of material circularity, recycling technologies to recover every single critical material do not yet exist, and lifecycle assessment (LCA) methods are unreliable due to inadequate supply chain data.[44]

The **EU Code of Conduct for Data Centres (EU DC CoC)** is perhaps the most thorough effort to establish benchmarks for the industry and is set to become the de facto standard for measuring and improving energy efficiency. However, the code is voluntary and imposes no legal requirements on data centre operators.

[44] Astrid Wynne, "What is the circular economy and how are we seeing a shift to this module?", *Intelligent Data Centres 13*, accessed January 13, 2024, https://viewer.joomag.com/intelligent-data-centres-issue-13/0316288001583485213/p30?short=.

Other broader sustainability policies such as **CSRD** and **CS3D** are mostly designed to be sector-agnostic, having a catch-all effect on several industries. Whilst the International Standards Organisation (ISO) has introduced a globally standardised set of KPIs within the ISO/IEC 30134 series to assist with reporting metrics under **CSRD**, including metrics focussing on energy and one metric around water (WUE),[45] there is a lack of specificity for the AI sector and a lack of holistic reporting metrics, which renders existing guidance insufficient for reflecting the real impacts and risks for nature.

There are also significant gaps concerning supply chain impacts. For the AI sector specifically, downstream activities include all companies that develop AI (e.g. *Google, Amazon*), whereas upstream activities include companies providing the infrastructure for AI (data centres, chip manufacturers etc.). The life-cycle assessment methods currently used rely on a patchwork of information (for example, there is heavy data on steel but not on networking devices) and, most importantly, these methods do not address whether practices across the AI value chain and related product life cycles operate within planetary boundaries.[46] This is particularly important as climate and nature risks have implications beyond data centres, for example on the production of semiconductors and the availability of critical minerals. There are already areas such as Taiwan where water scarcity is threatening the semiconductor industry.[47]

Unfortunately, in the one place where they currently exist at scale (the EU), mandatory AI policies adopt a narrow-sighted perspective that draws on single-issue metrics such as energy requirements and, to a lesser extent, greenhouse gas emissions, water usage, geographic location, and circular economy impacts. As such, they overlook potentially important aspects pertaining to the sustainability of the AI sector, namely, environmental problems that stretch beyond AI development and the operations of data centres, such as water availability risk, habitat degradation and ecosystem services disruption. Although efforts like the EU's **CS3D** are focused on value chain reporting requirements, it is worrying that it will not come into force until 2027, considering the rapid development of AI and its demands on data centre infrastructure.

---

[45] Rajan Sodhi, "How CSRD and EED Are Reshaping Data Center Sustainability Reporting," *Hyperview*, December 12, 2023, https://www.hyperviewhq.com/blog/how-csrd-and-eed-are-reshaping-data-center-sustainability-reporting/.
[46] Astrid Wynne (Techbuyer), Life-Cycle Assessment Methods, [Personal interview], November 29, 2024 (unpublished).
[47] Kevin Zhang, "How Water Scarcity Threatens Taiwan's Semiconductor Industry," *The Diplomat*, September 19, 2024, https://thediplomat.com/2024/09/how-water-scarcity-threatens-taiwans-semiconductor-industry/.

Policies outside the EU

Looking outside of the EU, voluntary frameworks, guidelines and recommendations for the AI industry have been developed in other jurisdictions (see Annex 2). However, these only indicate high-level and general alignment with existing initiatives in the context of the climate and biodiversity crises. For example, the Artificial Intelligence Environmental Impacts Act[48] in the USA will create a voluntary framework for AI developers to report environmental impacts; the Generative Artificial Intelligence Guidelines[49] in Saudi Arabia includes a guideline on social and environmental benefits; and the OECD Recommendations of the Council on Artificial Intelligence[50] includes a principle on the pursuit of inclusive growth, well-being, sustainable development and environmental sustainability with AI.

The **lack of a meaningful governance architecture for AI and the environment beyond the EU** is pronounced, and alarming. Given the need for large amounts of land, energy and water, AI companies will increasingly look to a wider range of countries to construct data centres, particularly in the global south. It is therefore crucial to see stronger regional and international governance efforts emerge to ensure that communities and political leaders have the information and frameworks to assess the potentially serious nature- and climate-related risks and impacts that accompany AI data centres.

Sustainable finance and due diligence initiatives

There is a growing global recognition of the material financial risks posed by biodiversity loss and nature degradation. For example, the Kunming-Montreal Global Biodiversity Framework (GBF) [51] emphasizes the integration of biodiversity considerations into financial decision-making by calling on large transnational companies and financial institutions to monitor, assess, and disclose dependencies, impacts and risks on biodiversity associated with their operations, supply and value chains, and portfolios.

Globally, regulatory frameworks are evolving in response to this trend. Some of the policies already mentioned, such as CSRD, the EU Taxonomy, and European Sustainability Reporting Standards, are part of the shift towards internalizing nature into financial decision-making. Other global initiatives, such as the Global Reporting Initiative and the Science-Based Targets Network (SBTN) incorporate approaches to evaluating dependencies and impacts on nature.

---

[48] Edward J. Markey, “Artificial Intelligence Environmental Impacts Act of 2024,” *Senate of the United States,* February 1, 2024, https://www.markey.senate.gov/imo/media/doc/artificial_intelligence_environmental_impacts_act_of_2024_-_020124pdf.pdf.

[49] Saudi Data and Artificial Intelligence Authority (SDAIA), “Generative Artificial Intelligence Guidelines,” *SDAIA*, January, 2024, https://sdaia.gov.sa/en/SDAIA/about/Files/GenerativeAIPublicEN.pdf.

[50] Organisation for Economic Co-operation and Development (OECD), “Recommendation of the Council on Artificial Intelligence,” *OECD Legal Instrument No. 0449, May 3, 2024,* https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0449.

[51] Convention on Biological Diversity (CBD), “Kunming-Montreal Global Biodiversity Framework,” *CBD,* December 19, 2022, https://www.cbd.int/gbf.

One of the most notable initiatives in this space is the Taskforce on Nature-Related Financial Disclosures (TNFD) which has created a framework for companies and financial institutions to assess, manage, and disclose both their dependencies on nature and biodiversity, as well as the impacts of their activities on ecosystems.

The EU Code of Conduct is linked to the EU Taxonomy,[52] one of its requirements being that data centres will be audited based on the EU CoC for data centre best practice. The Code's ties with the EU Taxonomy are important because it links best practice with finance flows to direct capital towards investments that support sustainability.

With the gradual move towards greater norms of sustainable finance, linking AI sustainable best practices and proactive disclosure on key environmental metrics with financial due diligence practices and investment incentives is a critical strategy to advance the sector's sustainability credentials. The financial risks to the AI and data centre sectors from nature-related risks, such as water availability, could significantly impact companies, their clients, and investors. Becoming water resilient could significantly influence corporate strategic decisions and corporate valuations and may result in new opportunities and cost advantages.[53]

Key takeaways from analysing existing AI policy and disclosure initiatives

The existing policy landscape—primarily at the EU level—demonstrates a partial and incomplete integration of nature considerations for the AI and data centre sectors. Beyond the EU level, there is no meaningful policy integration of nature-related risks for AI and data centres whatsoever. Below is a summary of key takeaways from analysing existing AI governance and disclosure policies.

- The EU has led the way in introducing AI and data centre environmental policies, with much more limited efforts at governance and regulation in other jurisdictions. It is therefore crucial to see stronger regional and international governance efforts given the growing global presence of AI data centres in most regions of the world.
- Existing policies only address single-issue metrics with a primary focus on energy requirements and a lesser emphasis on greenhouse gas emissions, water usage and circular economy impacts. Provisions for additional nature-related indicators – such as water availability, water pollution, drought risk and proximity to biodiversity hotspots is necessary.
- Further research and data are also needed to capture the material supply chains of AI development and understand the actual lifecycle and nature related dependencies, impacts and risks of its infrastructure parts and inputs, such as networking devices and critical mineral resources.

---

[52] European Parliament and Council, "Taxonomy Regulation," *EUR-Lex*, June 18, 2020, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32020R0852.
[53] Rama Variankaval et al., "The Future of Water Resilience," *J.P. Morgan*, October, 2024, https://www.jpmorgan.com/content/dam/jpm/cib/complex/content/investment-banking/erm-jpm-water-report/JPM_ERMSI_Report_Future_of_water_resilience.pdf.

- Most data centres serve multiple purposes, making it difficult to isolate the environmental impact specifically attributable to AI versus other computing services. There is a need to develop reporting regimes that produce comprehensive information on how much compute and resources data centres are currently dedicating to AI training and deployment.
- Regulations do not provide communities with easy access to the kinds of data and impact analysis required to enable them to make informed decisions. More efforts are necessary to consider ex ante actions before construction approvals, such as conducting a water availability risk assessment or considering future local water availability, to inform transparent public debates.
- Policy discussions often focus on generative AI, however smaller AI models designed to operate on local devices might be more suitable for certain applications and could have a lower environmental impact. Further research is needed to explore the potential benefits and environmental effects of more frugal AI models. Additionally, more energy-efficient and sustainably designed data centre cooling systems should also be developed & promoted.[54]
- With the gradual move towards greater norms of sustainable finance, linking AI and data centre best practices and proactive disclosure on key environmental metrics with financial due diligence practices and investment incentives is critical for advancing the sector's sustainability requirements.

Overall, this analysis shows that **a nascent and fragmented governance architecture for hyperscale data centres and the AI industry's impact on the environment is currently emerging** from an ad hoc assortment of data centre regulation (e.g. EED), AI policies (e.g. EU AI Act) and corporate/ financial policies (e.g. CSRD, EU Taxonomy). Future governance efforts should focus on the nexus of these three pathways in order to capture the value chain of AI training and deployment and also consider the broader impacts of the sector in the context of the climate and nature crises. The importance of moving beyond the EU to a comparable set of rules and standards defined globally (which could manifest regionally and nationally) to address the nature and climate related risks and impacts of AI is paramount in the coming years.

[54] Microsoft, "Datacenter Cooling," *Microsoft,* May 2023, https://datacenters.microsoft.com/wp-content/uploads/2023/05/Azure_Modern-Datacenter-Cooling_Infographic.pdf.

4 Recommendations

In the move towards a net-zero future, the AI industry and data centres are set to be key growth avenues for renewable energy.[55] In a progressively electrified and digitized economy, hyperscale data centres and AI capabilities will become crucial for decarbonised transition pathways. Creating strategies, metrics and standards for where to locate this infrastructure, and specifications to manage climate and nature risks and related performance and disclosure standards will ensure the AI sector's contribution to a nature-positive economy.

The current policy landscape demonstrates a partial and ad hoc integration of nature considerations for this sector, suggesting a more holistic and global framework needs to be developed to account for critical environmental concerns. Given the rapid pace of data centre development, policies urgently need to be developed that not only address the data centre sector, but also the AI sector and its upstream and downstream activities more broadly. If the environmental impact of the industry is significant and material to businesses, economies and communities, then it should be treated as a systemic risk with obligations for reporting and risk management.

Recommendations for a comprehensive framework

Based on the findings of this report, it is recommended that frameworks informing future policies and initiatives targeting sustainable reporting for the AI sector should include:

Energy use and emissions: AI models require extensive computational power, which translates into high energy consumption and, depending on the energy source, high carbon emissions. Sectoral guidance would enable companies to understand and disclose their energy sources and emissions impacts transparently, especially as AI models scale up. Guidance would differentiate reporting to account for energy use during model training and deployment separately. This is particularly important given the large variance in energy usage depending on the data centre's function, and likewise, the trend towards "edge computing" where deployment facilities are increasingly located near cities to reduce data latency.[56]

Water use for cooling: The AI sector is highly dependent on water resources for cooling. Guidance could lead data centres to assess the environmental impact of their water use, especially in water-stressed areas, to consider the future availability of water, and to disclose conservation measures. As presented, potentially relevant missing indicators include baseline water availability, water pollution, and drought risk. Emphasis should be placed on the relationship between three main indicators—type of energy source, water consumption, and water availability risk—to holistically assess the water impacts of AI hyperscale data centres and to account for direct and indirect water usage.

---

[55] Madeline Ruid, "The AI Boom Is Creating Opportunities for Renewables and Power Infrastructure," *Global X ETFs*, June 4, 2024, https://www.globalxetfs.com/ai-boom-is-creating-opportunities-for-renewables-and-power-infrastructure/.
[56] PWC, "Edge data centers: Riding the 5G and IoT wave," *PWC,* July, 2019. https://www.pwc.com/us/en/industries/capital-projects-infrastructure/library/assets/pwc-edge-data-centers.pdf.

Supply chain impacts: AI relies on hardware with substantial rare earth and mineral dependencies. Guidelines could expand on existing efforts to encourage responsible sourcing of electronic components and enhance supply chain transparency, thus incorporating dependencies, risks and impacts stemming from upstream activities.

Biodiversity footprint: As demand for AI grows, the land footprint of new data centres and associated infrastructure may expand. Sectoral guidance would promote responsible land use, helping avoid unnecessary habitat disruption and biodiversity loss. Identifying protected areas and Key Biodiversity Areas, and whether proposed developments are within the impact risk zone of these sites, would address potential impacts on particularly significant species and habitats.

Waste management: Data centres generate electronic waste (e-waste), primarily from outdated or broken equipment. New guidance could expand on existing policies and encourage responsible e-waste management and recycling, minimizing pollution and resource depletion from improper disposal.

Physical and transition risks: As climate and nature risks increase, AI upstream activities (e.g. data centres, semiconductors production) face risks from extreme weather events (e.g. water scarcity, fires, flooding). Guidance could help assess these physical risks and encourage proactive planning and resilience-building for infrastructure. In a context where IPCC science anticipates 2 to 3°C warming by the end of the century, anticipating and planning for risks like extreme heat and drought in the context of rapid AI data centre growth becomes essential to its viability.

Such a holistic set of indicators and metrics would help the AI sector move towards more nature-positive practices, enhance transparency, and strengthen resilience to nature-related risks. This would also align the AI industry with global sustainability targets, making them accountable to investors and stakeholders concerned about environmental impacts.

Potential pathways for incorporating sustainability

The drive to develop a framework for sustainable reporting requirements for the AI sector should not work in isolation from other global and local policy efforts and regulatory frameworks. There are different potential pathways for incorporating sustainability considerations for the AI sector:

- **Global norms:** A set of global principles and standards around sustainable AI development could be attached to global agreements, such as the Paris Agreement, Global Biodiversity Framework, or the G20 high-level commitments, which could drive national or regional efforts in developing voluntary or mandatory reporting requirements.
- **National and/or regional regulation:** National and/or regional bodies could develop and adopt regulations for sustainable disclosure requirements on the AI industry. Within the EU, for example, the transition of the EU CoC best practices for data centres into an assessment framework under the CSRD could align with the above outlined areas, as data centre facilities are one of the upstream activities of the AI sector.

Additionally, the evolution of the ESRS to include sector-specific standards (anticipated to be adopted by June 2026) could take the initiative by developing an AI sector-specific guidance to include the areas highlighted above, or work in tandem with a new initiative developing an AI reporting guidance framework. More broadly, national and regional mandatory regulation on AI and the environment needs to extend beyond the EU, to ensure meaningful domestic protection of critical ecosystem services and the communities and economies that rely on them in every region of the world.

- **Global financial frameworks:** The relatively new TNFD disclosure framework could provide a timely anchor to consider what kinds of financial and environmental data would be material to industry, government and communities for corporations and investors in the AI sector to report on. Promisingly, TNFD is in the process of being taken up by the International Sustainability Standards Board (ISSB) and turned into an IFRS reporting standard, which offers the opportunity to mainstream AI disclosure and reporting guidance into global accounting standards. TNFD could supplement its recently launched sectoral guidance to include a specific set of recommendations for the AI sector as an important first step.

- **Local regulation:** Local communities could adapt their processes for considering hosting data centres, with assessments of whether there are sufficient resources to service the infrastructure before it is approved and the potential for integration with other local infrastructure (e.g. heat reuse). New best practices around local development planning, AI environmental performance standards and approvals should ensure full public access to information about potential nature and climate impacts and include open discussions as part of the debate and approval process. This would help ensure transparency and a full cost benefit analysis in environmentally fragile locations.

- **AI industry-led initiatives:** Regulatory and/or financial reporting frameworks could have knock-on effects on industry-led certifications, such as the Open Compute Project's (OCP) Ready Program, which helps colocation data centres meet the requirements of hyperscale data centres, or the iMasons Climate Accord carbon accounting and reduction initiative.

5 Conclusion

Given the high level of nature-related dependencies, impacts, and risks for the AI sector, there is an urgent need for more holistic and globally aligned disclosure regimes to account for urgent environmental concerns. In the absence of global and national norms and standards around nature and climate protection, AI’s unchecked growth has the potential to create irreparable harm to ecosystems and communities, with environmental, economic and peace and security implications extending well beyond local borders.

There are some encouraging efforts by policymakers—especially in Europe—to develop and regulate reporting standards and best practices for AI and the environment, considering the explosion of the industry and hyperscale data centres. These initial efforts must be further advanced and consolidated to holistically encompass all climate and nature dependencies, impacts and risks, and be replicated across all parts of the world.

In a global context, aligning with broader norms of sustainable finance by linking best practices and metrics with financial due diligence practices is an important near-term strategy to advance the AI sector’s sustainability requirements. Analysis of the impact of both existing data centres and planned hyperscale data centres on the environment, with a focus on local fresh water availability and other ecosystem health indicators, shows that the impact on nature from the AI sector is stark. As the world moves rapidly towards exceeding safe levels of planetary warming, investors, policy-makers and communities continue to ignore the nature and climate related risks of explosive AI growth at their peril. The policy and industry disclosure recommendations within this report provide a way forward for responding to the urgent questions around the environmental sustainability of the AI sector.

6 Annexes

Annex 1

Table 1. Summary of potential new data centres around the world

Digital Realty future data centre projects: Frankfurt (Germany), Paris (France), Northern Virginia (US) Construction of 10 data centres with approximately 500 MW of potential IT load capacity. Source link
Amazon Web Services future data centre project: Kuala Lumpur (Malaysia) AWS is planning to invest an estimated $6.2 billion (approximately MYR 29.2 billion) in Malaysia through 2038. Source link
Google future data centre project: Kansas City (Missouri, US) Construction of a $1bn data centre in Kansas City, Missouri. Source link
Meta future data centre project: Cheyenne (Wyoming, US) Meta has unveiled plans to develop a hyperscale data centre in Cheyenne, Wyoming. Source link
Microsoft future data centre project: Leeds (UK) Microsoft unveiled plans to construct an AI-focused data centre on the site of a former power station in the northern city of Leeds. Source link
Princeton Digital Group future data centre project: Singapore Singapore's Princeton Digital Group plans to double the capacity of its data centres in three years to meet surging demand from global artificial intelligence developers. Source link
EdgeCore future data centre project: Virginia (US) In Virginia, EdgeCore has purchased 120 acres of land in the Culpeper Technology Zone and plans to develop a 1.4 million sq ft data centre campus. Source link
Amazon Web Services future data centre project: Mississippi (US) AWS has announced plans to invest $10 billion to build two data centre complexes in Mississippi. Source link
Meta future data centre project: Jeffersonville (Indiana, US) Meta plans to build an $800 million data centre campus in Jeffersonville, Indiana. Source link
Google future data centre project: Waltham Cross (UK) Google owner Alphabet announced investment in a new data centre set to be located at Waltham Cross, London, UK. Source link

Annex 2

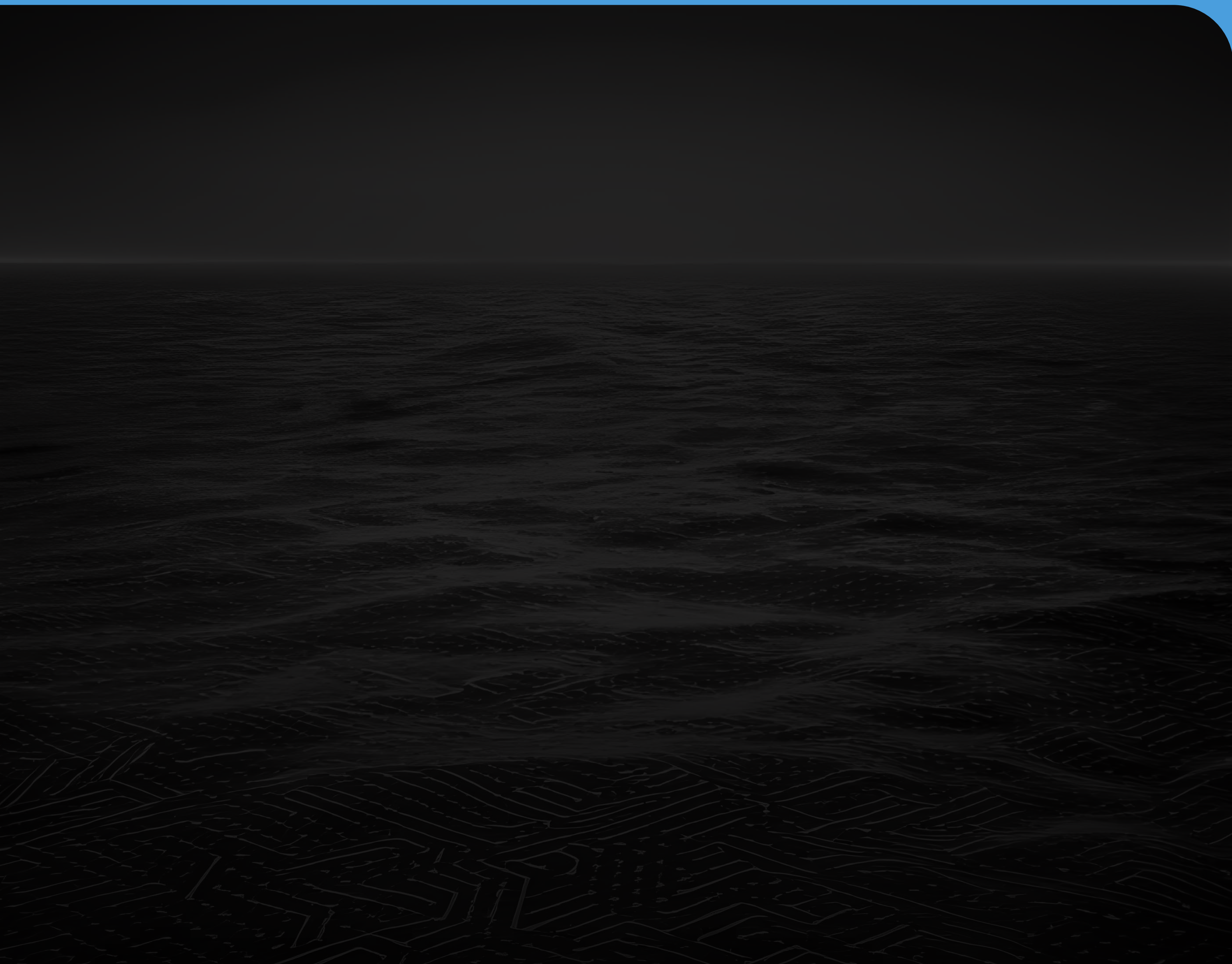
Table 3: Global guidance and frameworks addressing directly or indirectly the AI industry and the data centre sector's environmental sustainability.

Policy	Sustainability component	Relationship	Geography	Influence	Type
Montreal Declaration on Responsible AI	Includes a Sustainable Development principle which states that AI-related hardware and digital infrastructures must aim for energy efficiency, GHG emissions reduction, and minimize the impact on ecosystems relating to its whole lifecycle. (source)	Direct influence on the AI Industry	Canada/ International	Climate & Nature	Principles (Voluntary compliance)
EU Ethics Guidelines for Trustworthy AI	Includes a guideline on sustainable and environmentally friendly AI that also covers AI systems' entire supply chains. (source)	Direct influence on the AI Industry	EU	Climate & Nature	Guidelines (Voluntary compliance)
Artificial Intelligence Environmental Impacts Act	The legislation would direct the National Institute of Standards and Technology to develop standards to measure and report the full range of AI's environmental impacts, as well as create a voluntary framework for AI developers to report environmental impacts. The legislation also requires an interagency study to investigate and measure both the positive and negative environmental impacts of AI. (source)	Direct influence on the AI Industry	USA	Climate & Nature	Act (Voluntary compliance)

OECD Recommendation of the Council on Artificial Intelligence	One of its key principles includes the pursuit of inclusive growth, well-being, sustainable development and environmental sustainability with AI. (source)	Direct influence on the AI Industry	International	Climate & Nature	Principles (Voluntary compliance)
Artificial Intelligence Risk Management Framework: Generative Artificial Intelligence Profile	Helps organizations identify unique risks posed by generative AI and proposes actions for generative AI risk management that best aligns with their goals and priorities. Includes suggested actions to document, measure and estimate the environmental impacts for training, fine tuning and deploying AI models. Additionally, includes suggested actions on verifying the effectiveness of carbon capture or offset programs for GAI training and applications. (source)	Direct influence on the AI Industry	USA	Climate & Nature	Framework (Voluntary compliance)
Brazil's Bill No. 21/2020	Establishes foundations, principles, and guidelines for artificial intelligence development and application in Brazil with an aim to promote the protection and preservation of the environment. (source)	Direct influence on the AI Industry	Brazil	Climate & Nature	Bill (Voluntary compliance)
Generative Artificial Intelligence Guidelines	Includes a guideline on Social and Environmental benefits that promotes the protection of the social good and environmental sustainability. (source)	Direct influence on the AI Industry	Saudi Arabia	Climate & Nature	Guidelines (Voluntary compliance)

New Generation of Artificial Intelligence: Develop Responsible Artificial Intelligence	Provides a framework and action guidelines for AI governance and promotes its social and ecological sustainable development. (source)	Direct influence on the AI Industry	China	Climate & Nature	Framework (Voluntary compliance)
Australia's AI Ethics Principles	Includes a principle on human, societal and environmental wellbeing which promotes accounting for negative impacts throughout the AI system's lifecycle. (source)	Direct influence on the AI Industry	Australia	Climate & Nature	Principles (Voluntary compliance)
EU Water Directive Framework	Water consumption could be addressed and regulated, for data centres built in the EU, through a thorough application of the Water Framework Directive. (source)	Implied influence on the AI industry	EU	Nature (water-specific)	Directive (Mandatory compliance)
Taskforce on Nature-related Financial Disclosures (TNFD)	The TNFD disclosure framework consists of conceptual foundations for nature-related disclosures, a set of general requirements, and a set of recommended disclosures structured around the four recommendation pillars of governance. (source)	Implied influence on the AI industry	International	Nature	Recommendations (Voluntary compliance)
Taskforce on Carbon-related Financial Disclosures (TCFD)	The TCFD recommendations on climate-related financial disclosures are widely adoptable and applicable to organizations across sectors and jurisdictions. The recommendations are structured around four thematic areas	Implied influence on the AI industry	International	Climate	Recommendations (Voluntary compliance)

	that represent core elements of how organizations operate: governance, strategy, risk management, and metrics and targets. (source)				
Federal Trade Commission	Guidelines related to the fairness and transparency of AI systems, which could be argued to extend to AI's environmental impact, at least in the sense that AI systems must not mislead consumers about sustainability claims. (source)	Implied influence on the AI industry	USA	Climate & Nature	Recommendations (Voluntary compliance)
United Nations Global Digital Compact	Includes a commitment to promote environmental sustainability across the life cycle of digital technologies and aim to ensure that digital infrastructure and equipment are sustainably designed for the mitigation of and adaptation to climate change. (source)	Implied influence on the AI industry	International	Climate & Nature	Framework (Voluntary compliance)



Navigating AI's Thirst in a Water-Scarce World

A Governance Agenda for AI and the Environment

February 2025

NATURE ALPHA

NATURE FINANCE