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**POLICY BRIEF ON
POWERING EUROPE'S DIGITAL TRANSFORMATION:
A ROADMAP TO GREENER DATA CENTERS**

Lead authors: Philipp Hacker, Kai Ebert, Nicolas Alder, Vlad C. Coroamă, Ralf Herbrich

Contributors: Bran Knowles, Lynn Kaack, Alejandro Saucedo

The Association for Computing Machinery (ACM) is the world's longest established professional society of individuals involved in all aspects of Computing. It annually bestows the ACM A.M. Turing Award, often popularly referred to as the "Nobel Prize of Computing." ACM's Europe Technology Policy Committee ("Europe TPC") is charged with and committed to providing sound **technical information** to policy makers and the general public in the service of sound public policymaking. Europe TPC is pleased to provide this policy brief on the 16th of May, proposing **five recommendations** for policy makers to **enable more efficient and greener data centers in the European Union**.

Executive Summary

International developments in Singapore, California, or Australia and even China, alongside the German Energy Efficiency Act, indicate a shift toward more proactive and effective strategies in green data center regulation. They show that mandatory standards and customer-level reporting are both feasible and advantageous. These measures can drive efficiency gains even in countries with a substantial data center footprint and ambitions for further expansion. In this context, ACM Europe identifies several [gaps](#) in the current version of the European data center reporting scheme. The table below summarizes them, together with suggested paths towards their mitigation.

	Problem/Gap	Recommendation
A	Absence of Binding EU Efficiency Targets	Introduce binding power usage efficiency targets, renewable quotas, and incentives; disclose energy/water use and water quality metrics; require AI operators to offset excess energy demand by investing in green energy; introduce a workable energy reuse quota.
B	Incomplete Coverage of Facilities	Lower reporting threshold to 300 kW; apply tiered obligations for mid-sized/small data centers.

C	Limited Water Control Measures	Set water usage efficiency benchmarks; incentivize advanced cooling; align AI Act and Energy Efficiency Directive on water/GHG reporting.
D	Restricted Public Access to Detailed Data	Create an anonymized EU registry with granular data; prioritize actual measurements over estimates.
E	Uncertain Long-Term Roadmap	Plan for dynamic load management; integrate advanced strategies for AI-related peak energy use.

Recommendations

Data centers serve as the essential infrastructure for modern digital activities, in particular the resource-intensive needs of state-of-the-art AI applications. As the deployment of AI expands across various sectors, data centers face increasing pressure to provide adequate computational power. However, these operations come at a steep environmental cost, including [high](#) and [very dense energy consumption](#), significant [water usage for cooling](#), and the attendant [greenhouse gas \(GHG\) emissions](#).

Most recently, the Commission's [AI Continent Action Plan](#) has promised a rapid expansion of data centres within the European Union, including so-called "[gigafactories](#)." This initiative strengthens the Union's strategic and technological autonomy. However, policy-makers must ensure that construction and operation comply with strict sustainability standards to remain consistent with the European Green Deal and the climate-neutrality target for 2050.

In recent years, policymakers within the European Union (EU) have moved to regulate data centers more systematically, recognizing that future climate commitments depend on managing this rapidly expanding sector. The Energy Efficiency Directive (EU 2023/1791, EED) and the Delegated Regulation (EU 2024/1364) represent two pillars of this regulatory agenda. They aim to impose standardized reporting mechanisms for large data centers and set the stage for future performance standards. This short paper offers a succinct examination of the existing EU rules, explores international frameworks and Germany's transposition as examples of a more effective approach, and provides policy recommendations to bolster data center regulation for achieving sustainability goals throughout the EU and UK.

Problem A: Absence of Binding EU Efficiency Targets

Despite requiring extensive reporting on energy consumption and associated metrics, the EED and its Delegated Regulation do not set enforceable limits on data center energy usage or Power Usage Effectiveness (PUE) levels. Without minimum performance standards, many operators may continue current practices, leading to minimal improvements in efficiency.

Recommendation 1: Thresholds, Renewable Quotas, Incentivisation Framework

- Bringing EU legislation closer to an efficiency model adopted, e.g., in the [German transposition](#) of the EED would yield more consistent environmental outcomes across Member States. [Similarly](#), in Singapore, new data centers have to meet a PUE of [1.3 or lower](#); in Australia, 1.4 or lower; and in California and China, 1.5 or lower. In the EU, binding PUE targets could be phased in over a five-year period, using tiered thresholds according to data

center age and capacity. Similarly, mandatory renewable energy quotas would push operators to accelerate the integration of green energy sources and reduce reliance on fossil fuels.

- EU institutions should introduce financial or operational incentives for data centers outperforming baseline requirements, such as access to cheaper green power contracts. At the same time, operators could be required to disclose to each customer the specific share of energy and water usage attributable to that customer's workloads. AI developers and other service clients would then be better positioned to differentiate among hosting providers based on sustainability performance.
- AI and data center operators should be required to partially, and increasingly, offset their growing demand by funding equivalent new renewable sources, preventing the depletion of green energy for other sectors. In Singapore, for example, such requirements are already part of [data center regulation](#). In the EU, they could be introduced in a time-staggered fashion that gives industry time to adapt; as the technology matures, fourth-generation nuclear reactors can be re-considered for offsetting, too.
- Proportionate and workable energy reuse quota, e.g. for excess heat, should be introduced at the EU level.

Problem B: Incomplete Coverage of Facilities

The current 500 kW threshold (a relatively modest benchmark) still excludes a substantial number of smaller or mid-sized data centers, which in aggregate may account for considerable energy consumption. Partial reporting undermines the reliability of overall sustainability assessments. As big operators are more likely to be transparent, smaller data centers risk slipping under the radar entirely.

Recommendation 2: Broaden the Scope to Smaller Data Centers

- Lowering the 500 kW threshold to 300 kW—or potentially even lower—would significantly improve data collection. A tiered approach could impose lighter but still meaningful reporting obligations on mid-sized or small facilities, thus building a more accurate macro-level picture of the sector's total environmental footprint.

Problem C: Limited Water Control Measures

Although operators must report water usage, there is no obligation to actively reduce water consumption or apply state-of-the-art cooling systems. Countries more prone to droughts may see an [outsized impact](#), in part due to [data centers for AI](#); this highlights the need for more stringent water-management standards at the EU level, a topic the [Commission](#) is now [looking into](#) as part of its upcoming Water Resilience Strategy.

Recommendation 3: Strengthen Water Efficiency and Usage Targets

- Regulations should go beyond mere reporting by establishing benchmarks for water usage effectiveness (WUE) and incentives for advanced cooling systems. Benchmarks should reflect direct consumption, but increasingly include indirect consumption (e.g., large-scale hydro-power plants) as appropriate and feasible. Again, in [Singapore](#), clear steps are undertaken to bring data center WUE below 2.0 m³/MWh. In the EU, grants, tax credits, or other support might spur retrofitting and modernization, thereby reducing water-intensive cooling methods. This shift would be particularly beneficial in regions experiencing increasing water scarcity.
- The AI Act and the EED should align to make water consumption and indirect GHG effects, for instance from AI-enabled fossil fuel exploration, subject to mandatory reporting. Clear thresholds need to be set for the reporting of indirect effects, though.

Problem D: Restricted Public Access to Detailed Data

While aggregated performance indicators become publicly available, the full dataset—including detailed consumption and efficiency metrics—generally remains inaccessible outside authorized

regulatory channels. Researchers, civil society organizations, and smaller companies thus face challenges in independently verifying or benchmarking data centers' sustainability records.

Recommendation 4: Enhance Transparency and Public Availability of Data

- A central EU registry, with appropriate data anonymization, should be put in place to enable granular reporting (server-level PUE, water usage in cubic meters, etc.) while safeguarding trade secrets. This would allow independent researchers and advocacy organizations to conduct robust assessments of data centers' environmental performance, reinforcing market pressure on operators to innovate.
- While estimates may be acceptable as a fallback, actual measurements using existing hardware instruments should hold primacy. This mitigates the risk of under-reporting or guesswork.

Problem E: Uncertain Long-Term Roadmap

Given the rapid evolution of high-capacity AI workloads and the ambitious goals in the AI Continent Action Plan, peak energy demands in data centers may outstrip any temporary gains made through basic efficiency improvements. Regulatory focus on progressive enhancements—backed by better enforcement tools—remains lacking at the EU level, even though the European Commission is required to publish further proposals by 2025.

Recommendation 5: Prepare for Future AI Energy Demands

- As AI applications continue to expand, data centers require more sophisticated electricity management strategies, including load shifting and dynamic allocation of workloads to off-peak times or to sites with surplus renewable energy. Policymakers should plan to integrate these advanced strategies into the legal framework—particularly to accommodate the intense load spikes generated by training large AI models or handling massive inference volumes.

Conclusion

Data centers have emerged as a crucial focus for policymakers seeking to align Europe's digital transformation with the EU's climate ambitions. Despite the progress made through the Energy Efficiency Directive (EU 2023/1791) and Delegated Regulation (EU) 2024/1364, the current regime relies heavily on data disclosure and thus falls short of establishing definitive targets or binding thresholds. This is all the more important given the announcements in the AI Continent Action Plan. International developments as well as the German Energy Efficiency Act point to a more proactive and effective strategy, demonstrating that mandatory standards and customer-level reporting are both viable and beneficial for driving efficiency gains even in countries with a large data center presence and significant ambitions for expanding them.

By introducing enforceable efficiency benchmarks, lowering the reporting threshold, strengthening water-management obligations, and improving transparency, EU regulators can move toward a more effective framework capable of handling the rapidly escalating demands of AI. Such reforms are not only possible but urgent, ensuring that Europe's data centers evolve into more sustainable, resilient infrastructures commensurate with the digital economy's long-term needs and the dual transformations in AI and climate.