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A sustainable data center does not start with a promise, but with verifiable evidence

The rapid growth of artificial intelligence makes data centers an increasingly important part of our economy and society, writes Marco Verzijl in a response to the article "How To Investigate Data Centers' Impacts". Virtually every digital service, from electronic health records and financial transactions to cloud software and generative AI, relies on physical IT infrastructure. Behind every digital application are servers, storage devices, network components, cooling systems and energy supplies.

However, this physical reality often remains underexposed in the public debate. There is a lot of talk about the economic opportunities of AI, digitalisation and cloud technology, but considerably less about the question of how much energy, water, raw materials and

infrastructure are needed for this. Even less attention is paid to the question of how efficiently these resources are actually used.

The Pulitzer Center published the research guideline *How To Investigate Data Centers' Impacts* on July 2, 2026. The publication is primarily intended for journalists, but in my opinion it should be mandatory reading for policymakers, administrators, investors, data center operators and major users of digital infrastructure. The central message is clear: do not adopt claims about sustainability, energy, water, employment and economic added value without independent verification.

I fully endorse that starting point. Not because data centers are by definition undesirable, but precisely because they have become indispensable. Essential infrastructure deserves a mature assessment framework based on up-to-date measurements, traceable data and independent verification.

Data centers have become industrial infrastructure

The time when a data center was mainly seen as a building with a few server rooms is behind us. The rise of generative AI has fundamentally changed the scale, power density, and energy needs of data centers.

AI systems make extensive use of powerful GPUs and other specialized processors. This not only increases the total electricity consumption, but also the power per server and per rack. At the same time, cooling is becoming more complex and the importance of grid connections, emergency power supplies and local energy infrastructure is increasing.

The International Energy Agency found that data center electricity consumption increased by about 17 percent globally by 2025. In data centers specifically focused on AI, the growth was even higher. This is considerably faster than the growth of total global electricity demand.

Data centers should therefore no longer be assessed exclusively as real estate or as an ICT facility. They are industrial energy users that are part of a broader chain of electricity production, transport, cooling, digital processing and heat dissipation.

This also means that the social assessment must go beyond the question of how many megawatts a data center connects. We need to know what happens to that electricity, how much digital performance it delivers and what social value there is in return.

The discussion should not be about for or against data centers

The public debate is often reduced to two camps. On the one hand, there are parties that present data centers as a necessary engine of innovation and economic growth. On the other side are parties that mainly point to energy consumption, water consumption, noise, space consumption and pressure on the electricity grid.

This contradiction does not help us any further.

The Netherlands and Europe need digital infrastructure. Without data centers, there are no digital government services, no modern hospitals, no financial services, no industrial automation, and no European AI capacity. If we do not organize our digital infrastructure ourselves, we will become even more dependent on foreign technology companies and infrastructure providers.

The relevant question is therefore not whether we need data centers. The relevant question is:

Which data centers do we need, for which applications, at which locations and at what demonstrable social and energy performance?

That question can only be answered if we have reliable and comparable data.

Self-reporting is not yet proof

The Pulitzer Center rightly warns against the indiscriminate adoption of sustainability claims. Data center operators regularly publish figures on renewable energy, Power Usage Effectiveness, water savings and CO_2 reduction. Such data can be valuable, but only when it is clear how it has been measured, what system boundaries have been used, and whether it can be independently verified.

For example, a percentage of green electricity does not automatically mean that a data center is physically powered by renewable energy every hour. This can take the form of certificates or contractual compensation on an annual basis. At times when insufficient solar or wind energy is available, the actual electricity demand may still be met by other sources.

Emergency power supplies are also part of the full picture. A data center can present a sustainable profile for its regular electricity purchase, but at the same time have large quantities of diesel or gas-fired emergency generators. These facilities are understandable from a continuity perspective, but must be included in the assessment of emissions, local air quality and total environmental impact.

Transparency therefore means more than publishing a sustainability report. True transparency requires that figures:

- be based on current measurements;
- come from known and registered measuring points;
- have clear definitions and system boundaries;
- be comparable over several periods;
- be traceable to source data;
- and can be independently verified.

Without these conditions, sustainability remains too much of a communicative concept.

PUE is useful, but only tells part of the story

The best-known indicator of data center efficiency is Power Usage Effectiveness, or PUE. This value compares the total energy consumption of a data center with the energy consumption of the existing IT equipment.

PUE is useful for assessing how much energy is used for cooling, power distribution, and ancillary installations, among other things. But PUE says nothing about whether the IT equipment itself is used efficiently.

A data center can have an excellent PUE, while a significant portion of servers are barely doing productive work. From a building engineering perspective, the data center then seems efficient. From a social and energetic perspective, there can still be considerable waste.

A simple comparison makes this clear. An economical truck that drives around almost empty will continue to be used inefficiently. The fuel consumption per kilometre driven can be low, but the energy consumption per tonne transported is unfavourable. The same applies to data centers: it's not just the efficiency of the facility that counts, but also the amount of useful digital performance that is delivered with the energy used.

Therefore, in addition to facility indicators, we also need to look at:

- the actual utilization of servers and processors;
- the proportion of energy used for productive workloads;
- the relationship between energy use and transactions, users or calculations;
- unused or oversized IT capacity;
- the performance per kilowatt hour;
- and the efficiency of individual applications and AI models.

This is becoming increasingly important, especially with AI. Training or using two models for a similar task can result in very different energy use. Measuring the energy consumption of the building alone is then insufficient. Ultimately, we need to be able to assess how much useful AI performance per unit of energy is delivered.

From green electricity to demonstrable chain performance

A data center does not stand alone. It is part of a chain that starts with energy generation and ends with a digital service or business process.

A credible assessment should therefore take into account, as a minimum:

1. the origin and availability of the electricity;
2. losses during transport and conversion;
3. the energy consumption of cooling and supporting installations;
4. the utilisation of the IT equipment;
5. the efficiency of applications and workloads;
6. water use;
7. the use or removal of residual heat;
8. the lifespan and circularity of hardware;

9. and the final social or economic output.

The Pulitzer Center, for example, points out that water use doesn't just happen on location. Electricity production can also have a water component. A cooling system with very low direct water consumption can also require more electricity. As a result, an improvement in one indicator can lead to a deterioration in another.

This illustrates why individual sustainability claims are dangerous. A data center cannot credibly be classified as sustainable on the basis of one favorable KPI. A coherent performance picture is needed in which energy, water, IT performance, emissions and heat use are jointly assessed.

Residual heat must be measurably useful

Residual heat is regularly mentioned as an advantage of data centers. In theory, the heat from servers can be used for homes, greenhouses, swimming pools or industrial processes. In practice, utilization is not always easy.

The temperature of the heat, the distance to customers, the continuity of the heat demand and the costs of infrastructure determine the feasibility. In addition, it is important who is responsible for investments and operational risks.

A connection that is technically present does not mean that heat is actually put to good use.

Therefore, it is not only necessary to report how much heat is theoretically available, but above all:

- how much heat is actually supplied;
- at what temperature;
- for how many hours per year;
- to which customers;
- which other energy source is avoided as a result;
- and what part of the total residual heat is recovered.

European regulations now recognise the importance of this measurability. Reported data centers must measure energy consumption, water input and reused heat, among other things, according to established methodologies. The regulations also emphasize that measuring points and measuring equipment used must remain traceable for at least ten years.

That is an important step. But reporting alone is not enough. The reliability and comparability of the underlying data must also be guaranteed.

Economic claims must be fully calculated

The economic contribution of data centers also deserves a balanced assessment.

During construction, large data center projects provide a lot of employment. After commissioning, the number of direct jobs usually decreases considerably. Moreover,

these are often specialist positions for which employees are not always available locally. The Pulitzer Center therefore advises to distinguish between temporary construction employment, structural employment and indirect economic effects.

In addition, public investments must be taken into account. Think of expanding the electricity grid, adapting roads, making land available, tax benefits and the use of licensing authorities.

The question is not only how much a data center invests, but also:

- which public facilities are needed for this;
- what grid capacity is reserved;
- which other companies or housing projects may have to wait as a result;
- how much structural tax revenue is realised;
- how much local economic activity is created;
- and what public risks are left behind when a project is delayed or terminated.

An investment of billions of euros sounds impressive, but is not in itself proof of social value. The full cost-benefit ratio must be made visible.

Look at the full lifecycle

A strong point of the Pulitzer publication is that it assesses data centers not only during the operational phase. The authors distinguish between the proposed phase, the construction phase, the operational phase and the phase of dismantling or abandonment of infrastructure.

This life-cycle approach is essential.

During the planning phase, claims about employment, energy, water, space and heat utilisation must be recorded in a verifiable manner. During construction, material use, CO_2 impact and changes in design or budget must be monitored, among other things. During the operational phase, the actual performance should be compared with the original commitments.

The end of life also deserves attention. AI hardware typically has a much shorter economic lifespan than the data center building. Servers, GPUs, batteries, cooling systems and electrical installations are replaced in the meantime. This leads to material flows, electronic waste and new investment rounds.

Therefore, it must be clear in advance:

- how equipment is reused or recycled;
- which parts are modularly replaceable;
- how long the building and technical installations will remain usable;
- who is responsible for decommissioning;
- and what financial provision is made for this.

A truly sustainable data center is not only efficient during the first year of operation. It must be adaptable, measurable, maintainable and reusable throughout its lifespan.

European reporting is a starting point, not an end point

The European Energy Efficiency Directive has introduced an obligation to monitor and report the energy performance of data centers. The European Commission is also working on a rating system and minimum requirements for the sustainability and energy efficiency of data centers.

According to European rules, reporting data centers must provide a series of energy and sustainability indicators every year. This includes total energy consumption, IT energy consumption, water consumption, renewable energy and reused heat.

This is a necessary development. At the same time, we must prevent reporting from becoming an administrative reality in addition to the operational reality.

A number in a database is only valuable when it is clear:

- where it comes from;
- whether it is complete;
- whether the same definition is used everywhere;
- whether estimates and measurements are distinguished from each other;
- whether corrections remain visible;
- and whether an independent party can check the outcome.

The next step should therefore not simply be more regulation. The next step should be better execution, reliable measurement methods and independent verification.

From reporting to certification

For the Save Energy Foundation, this is the core of the task. We are in favour of transparent and practical indicators based on real operational data.

Three levels must be connected to each other.

The first level is the physical infrastructure: energy supply, cooling, UPS systems, water use and residual heat.

The second level is the IT infrastructure: servers, storage, networking, virtualization and hardware utilization.

The third level is the digital output: applications, transactions, users, workloads, and AI performance.

Only when these levels are connected can we determine whether energy is actually used efficiently.

This includes independent certification. Not as an extra paper quality mark, but as a control of the data chain. A certifying party must be able to determine that the data is complete, consistent, traceable and reproducible.

Such a system makes it possible to compare data centers and digital services in a fair way. It helps governments with licensing and procurement. It gives financiers better

insight into technical and sustainability risks. It enables customers to select not only on price and availability, but also on demonstrable energy performance.
And it protects data center operators who really invest in efficiency from competitors who mainly invest in good marketing.

Transparency is not a threat to the sector

It is sometimes argued that extensive disclosure can harm the competitive position of data centers. Of course, business-sensitive data must be protected. But confidentiality must not become an argument for making any form of control impossible.
It is quite possible to have performance independently verified without disclosing all technical or commercial details. In other sectors, financial, safety and quality data are also checked by independent experts.
The same starting point should apply to data centers.
In fact, transparency can actually increase trust in the sector. When operators can demonstrate that they use energy, water and materials efficiently, a factual basis is created for dialogue with authorities and local residents.
This is important at a time when grid congestion, energy prices and spatial planning are increasingly leading to social resistance to new data center projects.

From megawatt to social value

In the coming years, increasing amounts will be invested in AI infrastructure. This also increases the responsibility for demonstrating that the required energy and raw materials are used efficiently.
We must therefore stop assessing data centers solely on installed capacity, square meters, investment amounts and theoretical sustainability claims.
The central indicator should ultimately be:
What demonstrable digital and social performance is achieved with the energy used, the water used, the materials used and the reserved infrastructure?
This requires cooperation between data center operators, IT suppliers, software developers, energy companies, governments, knowledge institutions and independent measurement and certification organizations.
The Pulitzer Center calls on journalists to look through promises and presentations and collect evidence independently. This call deserves to be followed throughout the chain.
Policymakers, investors and buyers should also no longer be satisfied with averages, estimates and self-selected sustainability indicators. They must ask for up-to-date, traceable and verifiable data.
Not to stop the development of data centers and AI, but to ensure that we build the right infrastructure: efficient, future-proof, sovereign and demonstrably responsible.
Because a sustainable data center is not the data center that calls itself sustainable.

A sustainable data center is the data center that can prove its performance independently.