



JULY 6, 2026

No sustainable AI without measurable evidence

AI is often presented as something abstract. As software. Like intelligence in the cloud. But the reality is physical. AI runs on data centers, GPUs, power grids, cooling, water, raw materials, chips, cables, buildings and ultimately waste streams. The "cloud" is not a cloud, but infrastructure. And infrastructure has a footprint.

UNU-INWEH's recent report on the environmental costs of AI shows exactly what the debate should be about in the coming years. Not only about innovation, productivity and geopolitical autonomy, but also about energy use, CO₂ emissions, water consumption, land use, raw materials and ewaste. The report states that AI is not just a digital technology, but a material system with measurable environmental costs. These costs are still too often insufficiently visible.

As far as I'm concerned, that's where the core lies: what we don't measure, we can't control. And what we don't measure traceably, we can't trust.

Not against AI, but for maturity

Let one thing be clear: this is not a plea against AI. AI will play a huge role in healthcare, education, industry, security, energy, science and public services. The question is not whether we will use AI. The question is under what conditions.

A mature AI sector cannot rely solely on promises about efficiency, green energy or future optimizations. A mature sector provides insight into its impact. Not in general marketing language, but with concrete data.

How much energy is used? Where is that energy generated? What is the carbon footprint? What is the water consumption? What is the impact of cooling? How long does hardware last? What happens to depreciated equipment? What assumptions are used? And who checks whether those figures are correct?

That is not a brake on innovation. This is a precondition for credible innovation.

Measuring CO₂ alone is insufficient

In many sustainability discussions, the impact of technology is reduced to CO₂. That is understandable, but now too limited. The UNU-INWEH report emphasizes that AI not only has a carbon footprint, but also a water and land footprint. A solution that is "low in CO₂" on paper can still weigh heavily on water use or space requirements. So "low carbon" is not automatically "low water" or "low land".

This is important for the Netherlands and Europe. We are dealing with grid congestion, scarce space, pressure on drinking water, nitrogen discussions, energy security and a growing need for digital sovereignty. In such a context, we cannot afford to make decisions based on half information.

Anyone who wants to build, operate or finance AI infrastructure must be able to demonstrate what the actual load is. Not just on average over a year. Not only on the basis of theoretical PUE values. Not only on the basis of green certificates. But traceable, operational and controllable.

From measurement to traceable measurement

Measuring sounds simple, but in practice it is not. A lot of sustainability data is still too general, available too late or not sufficiently linked to the real load on systems. With AI, that problem becomes greater. Energy consumption differs per model, per workload, per location, per time, per type of output and per way in which users interact with systems.

The report points out that the environmental costs of AI are not only determined by training large models, but also by its daily use: inference. Once models are rolled out widely, billions of daily interactions could cause the majority of energy use.

That is why measuring at the data center level alone is not enough. We need to move towards measurement methods that can link energy consumption and environmental

impact to workloads, applications, customer environments and usage patterns. Not to punish users, but to provide insight.

A simple text task has a different impact than image generation. Summarizing an internal report is different from generating videos en masse. And using a light model is different from using the heaviest model as standard.

Traceable measurement means that you not only present a final number, but can also explain how that number came about. Which source data was used? Which measuring points? Which period? Which allocation method? What assumptions? Which hardware? What energy mix? What corrections? What margin of uncertainty?

Without this traceability, sustainability claims remain vulnerable. This creates exactly the risk that we already know from other sectors: green language without hard substantiation.

Verification and certification become necessary

The next step is verification. A market in which parties publish their own impact figures without independent testing will never be fully trusted. Not by customers, not by financiers, not by governments and ultimately not by society.

Therefore, measuring, traceable measurement, verification, and certification must become an essential part of the AI infrastructure chain. Not as a bureaucratic appendix afterwards, but as an integral part of design, operation and reporting.

Certification does not have to mean that a new jungle of rules is created. It can actually help to reduce complexity. A good standard makes it clear what data is needed, how it is measured, how it is checked and how it is made comparable. This prevents each party from using its own definition of "sustainable AI".

This shifts the debate from claims to evidence. From intentions to achievements. From promises to demonstrability.

We don't want more regulatory pressure, but we do want real transparency

It is important to formulate this clearly: the solution is not automatically more regulatory pressure. Companies are not waiting for extra forms, duplicate reports or unworkable compliance requirements. Innovation should not get caught up in paper obligations.

But the alternative cannot be that the market completely controls itself. Practice shows that markets mainly report what is commercially beneficial by themselves. Lobbying apparatuses will emphasize innovation, competitiveness, economic growth and geopolitical necessity. These are relevant points, but they should not serve as an excuse to ignore the real environmental impact.

The market is not going to solve this by itself. Not because all market parties are malicious, but because the incentives are wrong. Transparency takes effort. Complete measurability can lead to uncomfortable outcomes. Independent verification limits the

scope for non-binding claims. And as long as customers, financiers, regulators and citizens do not demand hard transparency, incomplete reporting will remain the easy route.

That is why it is time for society to demand transparency. And yes, where necessary, the government must support, structure and make that transparency enforceable.

The role of the government: not determining everything, but setting the rules of the game

The government does not have to prescribe which AI applications may or may not be used. The government also does not have to take the place of the entrepreneur, developer or data center operator. But the government does have a role in determining the rules of the game.

That role consists of four parts.

First: standardization. There must be unambiguous definitions for energy use, CO₂ impact, water use, land use, residual heat utilisation, hardware lifespan and ewaste in relation to AI infrastructure.

Secondly, transparency obligations. Large AI providers, cloud providers, and data center operators are required to report on their actual impact in a similar way. Not only at group level, but where possible also per region, type of infrastructure and workload category.

Third: independent verification. Figures that are socially relevant must be verifiable. This requires auditable measurement chains, data quality, traceability and certification.

Fourth: safeguarding public interests. Energy, water, space and digital infrastructure are not purely private topics. They touch on public services, affordability, security of supply, sustainability and sovereignty.

That is not an anti-market approach. On the contrary. Clear rules of the game actually create a fairer market. Parties that actually invest in efficient, transparent and sustainable infrastructure will no longer be lumped together with parties that are especially good at marketing.

Financiers and customers must also take their responsibility

It is not only governments that are in charge. Banks, investors, pension funds, public buyers and large corporate clients must also play their part.

Anyone who invests in AI infrastructure must treat energy, water and land impact as material risks. The UNU-INWEH report highlights that AI's environmental costs depend not only on how much electricity is used, but also on where that electricity is generated and what energy sources are used for it.

In concrete terms, this means that no investment decision is made without insight into grid capacity, energy source, cooling, water impact, residual heat potential, choice of location, hardware cycle and reporting quality. No green bonds or sustainable finance

based on general sustainability claims alone. No public tenders in which "sustainability" is a paragraph, but no measurable criterion.

Customers must do the same. Ask not only where the data is located, but also what the use costs in terms of energy and water. Don't just ask if the supplier is "green", but how that was measured. Don't just ask for compliance, but for proof.

Transparency is also a matter of trust

The social acceptance of AI will not only depend on privacy, security and ethics. The physical impact will also play a role. Citizens will increasingly ask questions about data centers, power consumption, water consumption, space consumption and the distribution of burdens and benefits.

That is justified. If the benefits of AI mainly end up with technology companies, large companies and wealthy regions, while the burden falls on local communities, electricity grids, water sources and raw material chains elsewhere, a legitimacy problem arises. UNU-INWEH therefore emphatically places AI in the context of governance and justice: the benefits and costs of AI are not automatically fairly distributed.

Transparency is not a technical detail. It is a social condition. People don't have to be against AI to be able to ask: what does this really cost us?

From sustainability claim to layer of evidence

In the coming years, we need to move towards a layer of evidence under AI. A layer in which energy consumption, efficiency, CO₂, water, land, residual heat and hardware impact are not calculated incidentally, but are measured structurally. A layer in which data can be traced back to sources. A layer in which independent verification is possible. A layer in which certification ensures comparability and trust.

This requires cooperation between technology companies, data center operators, measurement companies, auditors, standardization institutes, scientists, government, financiers and civil society organizations.

The aim should not be: more reporting for the sake of reporting. The aim must be: better decision-making. Because good data makes better choices possible. Where do you place infrastructure? Which workloads do you run where? When do you use which model? How do you use residual heat? How do you prevent peak loads? How do you manage energy efficiency? How do you make sovereign AI infrastructure sustainable and controllable?

Conclusion: no AI without demonstrability

AI will continue to grow. The question is whether this growth is taking place blindly, or demonstrably justified.

We must prevent AI from making the same mistake as previous waves of growth in technology: first scale up, then discover what the real social costs are. The time of non-

binding sustainability claims is over. The next phase requires measurability, traceability, verification and certification.

Not because we want to stop innovation. Precisely because we take innovation seriously. Real progress requires not only smart models, but also honest measurement data. Not only about computing capacity, but also about responsibility. Not only about ambition, but also about proof.

The market will not do this by itself. The lobby is not going to ask this automatically. That is why society must demand transparency — and the government must ensure that this transparency does not remain non-committal.

AI can only grow sustainably, reliably and socially accepted if we are willing to make its true costs visible. Not tomorrow, but now.