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What you measure, you can improve; You have to be able to prove what you improve

Sustainable digitization does not start with a claim, but with insight. Only when we know where energy, capacity and raw materials are used can we make targeted improvements. And only when the improvement has been recorded with reliable data can we demonstrate that sustainability has actually taken place.

The digital sector is facing a paradox. We want to digitize more, automate more and use more Artificial Intelligence, while at the same time increasing the pressure on electricity grids, data center capacity, raw materials and water. That is precisely why it is no longer enough to talk only about green electricity, efficient cooling or newer hardware.

The central question should be: what digital performance do we achieve with the resources we use – and how do we know that this performance will actually be delivered with fewer resources after an optimization?
The one-liner "You can only make what you can measure more sustainable" thus remains the basis. But the next phase of sustainable digitization requires a second step: what you measure, you can improve. You have to be able to prove what you improve.

1. Measuring is not an end point, but the beginning of sustainability

Measuring is sometimes confused with reporting. That is too narrow an approach. A report can show how much energy an organization has used, but does not yet say why that use arose, what digital value was in return and where improvement is possible.
A usable measurement model must therefore fulfil three functions: providing insight into current use, indicating where waste or underutilisation is located and, after an intervention, demonstrating whether the expected improvement has actually been achieved.
This means that sustainable digitalisation cannot be assessed from a single KPI or a single technical layer. The entire digital chain must be connected: from energy and physical infrastructure via hardware and software to workloads, applications and ultimately digital output.
What you measure, you can improve. You have to be able to prove what you improve.

2. PUE has brought us a lot, but it doesn't tell the whole story

The data center sector has made great strides in energy efficiency in recent decades. Power Usage Effectiveness (PUE) has made an important contribution to this. By visualizing the relationship between the total energy consumption of a data center and the energy consumption of IT, it became clear how much energy was needed for cooling, power conversion and other facility infrastructure.
What became measurable could be improved. Cooling systems became more efficient, UPS systems improved, temperature regimes were adjusted and operators started to look more critically at losses in the infrastructure.
But an excellent PUE says nothing about whether the IT equipment itself is being used sensibly. A server that is mostly idle continues to cause waste, even when it is in a highly efficient data center. A poorly utilized GPU cluster will not become sustainable because the cooling is exceptionally efficient.
The next step is therefore essential: not only measuring how efficiently energy reaches IT, but also measuring what IT then does with that energy.

3. Four layers of measurement for sustainable digitalisation

To move from separate sustainability measurements to a coherent evidence model, four layers must be connected:

1. Infrastructure	2. Hardware	3. Softwar
Energy, cooling, PUE, water, heat, capacity and location.	Servers, CPU, GPU, memory, storage, idle, utilization en levensduur.	Applicatio latency, ar

The force does not arise within one layer, but in the connection between the layers. Only then can we demonstrate, for example, that lower power consumption did not come at the expense of performance, or that better GPU utilization actually led to less energy per inference request.

4. Layer 1 – measuring what the infrastructure is doing

At the infrastructure layer, the data center sector is relatively mature. We measure total energy input, IT load, cooling energy, losses in the electrical chain, temperature, water consumption, heat production and increasingly also the use of residual heat and the load on the local electricity grid.

However, the next step is to become less dependent on annual averages. For optimization, it is more interesting to know what the infrastructure is doing when a specific workload is running. What happens to efficiency at 20%, 50% or 90% IT load? What does an AI spike really cost? And can a workload be shifted to a time or location where energy is more available?

Therefore, "measurement by design" is relevant for concepts such as SOLOdc and SOLOAI. Measurability should not be an extra layer that is added afterwards to meet reporting obligations, but an integral part of the design.

For SOLOAI, this means that the infrastructure for AI inference is not designed exclusively around maximum power density. The goal is a modular, future-proof environment in which energy, cooling, IT load and workload can be connected from the start. The engineering principle "less is more" fits in emphatically with this: not building heavier because it is technically possible, but realizing just enough infrastructure to deliver the required digital performance safely, efficiently and flexibly.

You can only make what you can measure more sustainable – so measurability must be part of the infrastructure itself.

5. Layer 2 – measuring what the hardware actually does

After the infrastructure comes the hardware layer. This is where the distinction between energy use and useful energy use becomes visible. A server can use power without doing any substantial work. CPUs can be largely idle, memory can be structurally oversized, and GPUs can wait for data or workloads.

That is precisely why metrics are needed that show not only the absolute energy consumption, but also the relationship between energy and activity. The Server Idle Coefficient (SIC) has been developed from this perspective to show which part of the energy consumption of servers is related to idle behavior and thus to potentially avoidable waste.

The Save Energy Foundation can play an independent role in this domain. The foundation focuses on promoting measurement methods, KPIs, verification and certification of IT energy efficiency. This is important, because measurement methods only gain value when definitions are repeatable, comparable and verifiable.

When idle consumption and underutilization become visible, concrete options for action arise: consolidate, improve power management, adjust workload placement, use hardware for longer or prevent unnecessary new capacity from being purchased.

6. Layer 3 – software and workloads: the next big efficiency boost

Software seems intangible, but every digital action ends in physical resources. Every database query, API call, virtual machine, container, AI prompt, and token uses CPU cycles, GPU cycles, memory, storage, network capacity, and therefore energy.

An efficient data center can run inefficient software. An efficient server can run a poorly designed application. A highly efficient accelerator can run an AI model that is much larger than necessary for the task at hand. That's why sustainable IT can never just be an infrastructure issue.

The Sustainable Performance Alliance – a coalition of HighTech Innovators, Sciante.net, Zirrow and Blis Digital – is interesting precisely because different disciplines are brought together in one improvement cycle.

Sciante.net can provide insight into where capacity is being used or wasted from performance, application chains, workload analysis and resource utilization. HighTech Innovators contributes knowledge about sustainable software, cloud architecture and technical optimization. Blis Digital adds software, data and AI engineering. Zirrow connects the relevant data and makes the effects of measures measurable and demonstrable.

As a result, it does not stop at signaling that an environment is inefficient. The alliance can make the step from measuring to analyzing, from analyzing to technical improvement and then measuring again to determine whether the intervention has really had an effect. *Measure - > analyze - > optimize - > measure again - > prove.*

7. AI inference makes measurement even more urgent

Artificial Intelligence makes this discussion more urgent. AI inference can demand a lot of compute, but general statements about "the energy use of AI" are hardly useful without context. Consumption depends on model size, hardware, precision, batching,

prompt length, output length, latency requirements, serving software and occupancy rate of accelerators, among other factors.
For sustainable AI, we therefore need to measure closer to the actual digital output. Think of joules per token, Wh per 1,000 tokens, energy per inference request, tokens per kWh, GPU utilization per workload or energy per successful task within an agreed performance or quality level.
The most important step is then the link with the infrastructure. This creates a chain from socket to token: electricity -> infrastructure -> server -> accelerator -> model -> workload -> application -> output.
For example, it can be seen that a smaller specialized model for a given task delivers almost the same functional value with substantially less compute. Or that better batching increases GPU utilization. Or that a workload should be shifted to another location or a different time.
Sustainable AI is therefore not a marketing term but an engineering discipline, in which energy and performance are jointly optimized.

8. Layer 4 – the layer of evidence: from claim to demonstrable improvement

Even when infrastructure, hardware and workloads are measurable, one crucial question is still missing: can we prove that an improvement has actually taken place?
To achieve this, measurement boundaries, source data and baselines must be clear. Is a number really measured or theoretically calculated? Which period is being compared? What performance was in relation to energy consumption? Is the workload similar? And can a customer, auditor, investor or regulator draw the same conclusion?
That is where Zirrow's position lies as a layer of evidence. Not as another generic sustainability dashboard, but as a vendor-independent layer in which real data on energy, efficiency, infrastructure, IT performance and workloads is brought together.
The layer of evidence must make visible what happened before and after a measure. A strong sustainability claim is not then: "our energy consumption has decreased by 12%", but: "for a comparable digital workload, with at least the same agreed performance, energy consumption has decreased by 12%."
That is the difference between reporting and proving. You have to be able to prove what you improve.

9. Different roles, one measurement chain

A credible ecosystem requires different roles. Not every party has to perform the same function. It is precisely a clear separation between coalition formation, methodology, technical optimization and evidence that increases reliability.

NCDD – the system level

The National Coalition for Sustainable Digitalisation (NCDD) brings together government, business, knowledge institutions and civil society organisations to make digitisation more sustainable. At that level, there are questions that individual companies cannot solve independently: which system boundaries do we use, what data should be made available, how do we compare cloud, colocation and on-premise environments and how do we include software and AI?

The NCDD can thus contribute to a common language, agreements and priorities. The key question remains: what do we want to be able to measure as a sector in order to be able to demonstrably improve?

Save Energy Foundation – independent measurement methods

The Save Energy Foundation can take an independent position on definitions, measurement methods, KPIs, validation and certification. This becomes more important as sustainability data acquires financial, contractual or social value.

The party selling a saving should not be the only one to determine how the saving is calculated. Independent methodology makes benchmarking, remuneration and possibly certification more credible.

Sustainable Performance Alliance – from insight to intervention

The Sustainable Performance Alliance can form the executive bridge between measurement and actual improvement. HighTech Innovators, Sciante.net, Zirrow and Blis Digital bring together complementary knowledge in the areas of software, performance, infrastructure data, AI and technical optimization.

The aim is not only to show where inefficiency exists, but also to determine why it exists, which intervention is useful and then objectively determine what the intervention has achieved.

De evidence layer

Zirrow can connect the data from the different layers into a verifiable layer of evidence. Facility data, server data, GPU telemetry, virtualization, cloud data, workload measurements, application performance, emission factors, and costs can then be put into context.

The value is not in "more data", but in demonstrable correlation between resource utilization, digital performance and improvement.

Measurement by design

SOLOdc and SOLOAI can show how measurability can be built into the physical infrastructure itself. This does not attempt to reconstruct a sustainability story from

separate datasets after the fact; The necessary measuring points and interfaces become part of the technical design.
For SOLOAI, this is particularly relevant because inference workloads change rapidly and IT can be replaced multiple times over the economic life of the infrastructure. A flexible infrastructure with a fixed measurement and evidence architecture makes it possible to compare generations of hardware and workloads.

10. De echte KPI: useful work per resource

Ultimately, we may need to look beyond energy efficiency alone. The key question is how much useful digital performance we achieve with the resources we deploy.
These resources include not only electricity, but also hardware, critical raw materials, water, grid capacity, space, cooling, capital and economic lifespan.
When existing servers are better utilized, new hardware may not need to be purchased. When existing racks handle more useful workload, expansion of data center capacity may be delayed. When AI inference is distributed and sized smarter, not every application needs to be designed around maximum rack density. When hardware can be used meaningfully for longer, not only operational costs decrease, but also the embodied impact of replacement.
That is why "less is more" is more than an engineering principle. It is a sustainability principle: not minimizing at the expense of reliability or performance, but preventing waste by designing and using exactly what is needed.

11. From greenwashing to evidence

"Our cloud is green." "Our AI is sustainable." "Our servers are 30% more efficient." Without baseline, measurement limit and context, such statements mean little.
Thirty percent more efficient compared to what? At which workload? With what occupancy rate? At what performance? Is only chip efficiency measured or the total system? Is infrastructure energy included? And is it theoretical specifications or real data?
A mature digital sustainability market should therefore move towards a simple principle: no sustainability claim without a measurement limit, baseline and evidence.
This shifts sustainability from communication to engineering and governance. Not the most beautiful claim wins, but the demonstrably best improvement.

12. The next phase: from measurement to continuous improvement

In recent years, the sector has mainly made the outside of IT more efficient. Data centers became more economical, cooling improved, renewable energy was given priority and residual heat was emphatically placed on the agenda. That work remains necessary.

However, the next big step increasingly lies in IT itself: better utilization of hardware, more efficient software, smarter workload placement, appropriately chosen AI models, better timing, longer hardware lifespan and an infrastructure that supports these choices. To achieve this, the entire chain must be measurable. Not as a collection of separate dashboards, but as one logical model in which infrastructure, hardware, software and evidence are connected.

NCDD can help form the common agenda and agreements. Save Energy Foundation can contribute to independent methodology and verification. The Sustainable Performance Alliance can translate data into concrete optimization. As an evidence layer, Zirrow can make visible what the intervention actually delivers. And infrastructure concepts such as SOLOdc and SOLOAI can show how "measurement by design" can be applied in practice.