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INTELLIGENCE UPDATE

IT power utilization thresholds can incentivize server efficiency

Dr. Tomas Rahkonen 3 Mar 2026

IT power utilization is the ratio of the average annual power used by IT equipment to its potential maximum power demand. It is increasingly being considered for data center-related regulations, including draft French tax regulations (see *France sets strict PUE and WUE thresholds as tax incentive*) and EU Lot 9 eco-design requirements for servers and data storage products sold in the EU.

Increasing IT power utilization can help improve data center efficiency in several ways:

- It allows the facility to operate closer to its engineered design load, where electrical and mechanical systems (e.g., UPS, transformers, switchgear, chillers, cooling towers) achieve optimal efficiency, supporting attainment of the target PUE.
- It helps maximize utilization of provisioned utility capacity (electrical grid interconnection and contracted demand), improving infrastructure return on investment and minimizing stranded electrical capacity (see *Are data centers reserving too much grid power?*).
- It can correlate with increased utilization of the work capacity of the IT infrastructure (CPU, memory, network and storage components). Power utilization that is specific to servers increases with CPU utilization, which in turn improves overall energy efficiency by maximizing computational throughput per watt.

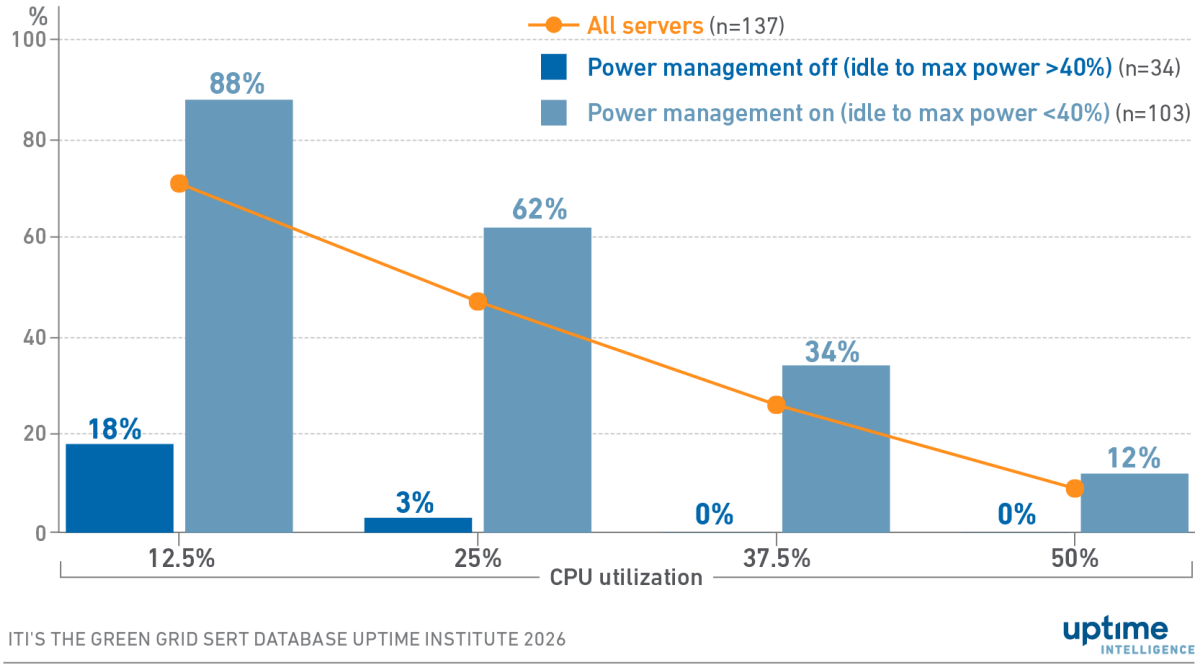
However, the IT power utilization value depends on the definition of maximum power and on the use of IT equipment power management functions. Establishing a minimum IT power utilization threshold may inadvertently discourage the use of server power management features, incentivizing increased equipment operational power usage rather than optimizing overall energy performance.

To evaluate this risk, Uptime Intelligence analyzed ITI's The Green Grid Server Energy Efficiency Database (SEED) data for 137 server configurations using 2023 (Generation 4) AMD and Intel CPUs. Maximum power demand was defined as the highest measured power demand of the seven CPU worklets at 100% performance. Operational power demand at each CPU utilization level was the highest measured demand for those worklets at the specific utilization interval.

The power utilization ratio was calculated by dividing the interval power demand by the maximum demand. The value was assessed against a minimum power utilization threshold of 55%, which is the minimum threshold in the proposed French regulation L'accise sur l'électricité. The idle power was divided by the maximum power demand to calculate each server's idle-to-maximum power ratio; configurations with a ratio below 40% were classified as having power management functions enabled. Server idle power was taken from SEED.

The results indicate that servers with power management enabled are significantly more likely to fall below the applied >55% power utilization threshold than servers without power management (see **Figure 1**). These servers have a higher performance per watt value than those without power management enabled and do more work at a lower power utilization value. When minimum power utilization thresholds are set for incentives or minimum performance standards, they can unintentionally incentivize operators to disable server energy efficiency features.

Figure 1 Percentage of analyzed server configurations failing to reach 55% power utilization threshold



ITI'S THE GREEN GRID SERT DATABASE UPTIME INSTITUTE 2026

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The finding is intuitive: servers with and without power management consume similar power at high CPU utilization, but power management significantly reduces power consumption at lower utilization levels (lowering power utilization).

Another issue for IT power utilization is how to define "maximum power demand". The definition should not be left open, because different interpretations can produce significantly different results.

Maximum power could refer to the nameplate power of the installed IT infrastructure (the EU Energy Efficiency Directive's "installed IT power"), the maximum power demand of a configuration as estimated using the manufacturer's power calculator or the power capacity allocated by the data center to IT equipment. These approaches can lead to very different utilization values.

If nameplate power is used to define "maximum server power," few (if any) data centers would meet a 55% utilization threshold. In contrast, if maximum power demand is based on a manufacturer's power model, a data center may be able to meet the designated threshold.

Imposing minimum power utilization requirements on the data center level also creates challenges for colocation data center operators, who have limited visibility into tenants' equipment power demand and infrastructure usage. Many IT operators have proven reluctant to share the capacity and network data required under the EU's EED. Without this tenant information, colocation providers cannot calculate the aggregated IT power utilization metric.

Uptime Intelligence welcomes initiatives to increase the utilization of installed IT capacity. However, efforts to improve the use of allocated power should not undermine the efficient operation of the IT infrastructure. Policies that directly encourage higher server CPU utilization should be better aligned with this objective.

ABOUT THE AUTHOR

Dr. Tomas Rahkonen

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Dr. Rahkonen is the Research Director Sustainability, Europe at Uptime Institute. Rahkonen has spent the last 25 years in positions within the telecommunications, mobile communications, and data center sectors globally, and most recently served as the CTO of Flexenclosure, where he managed the design and delivery of prefab data centers across four continents.

TRahkonen@uptimeinstitute.com

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