

EU regulatory overview

Towards a holistic data center energy efficiency metric



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EU regulatory Overview

(Data center sustainability)

Deutscher Bundestag
20. Wahlperiode
Drucksache 20/6872
17.05.2023

Gesetzentwurf der Bundesregierung

Entwurf eines Gesetzes zur Steigerung der Energieeffizienz und zur Änderung des Energiedienstleistungsgesetzes

A. Problem und Ziel

In Dezember 2020 haben die EU-Mitgliedsstaaten beschlossen, das EU-Klimaziel zur Senkung der Treibhausgas für das Jahr 2030 im Einklang mit dem Übereinkommen von Paris und Ziel 13 „Umgehend Maßnahmen zur Bekämpfung des Klimawandels und seiner Auswirkungen zu ergreifen“ der Agenda 2030 für nachhaltige Entwicklung auf mindestens 55 Prozent gegenüber 1990 anzuheben. Die Europäische Kommission hat zur Umsetzung dieses neuen Ziels den Entwurf einer neuen EU-Energieeffizienzrichtlinie als Teil des „Fit for 55“-Pakets am 14. Juli 2021 vorgelegt. Bei ihrem Vorschlag hat sich die EU-Kommission daran orientiert, welchen Beitrag die Steigerung der Energieeffizienz an der Erreichung der EU-Klimaziele leisten soll. Auch der Rat der Europäischen Union, das Europäische Parlament und die Europäische Kommission haben dabei sich zur Neuformulierung des EU-Energieeffizienzrahmens im Trilog geeinigt. Mit dem Vorschlag werden gegenüber der geltenden EU-Richtlinie die Energieeffizienzziele deutlich verschärft. Der Entwurf des Gesetzes enthält die folgenden wesentlichen

weiter ausgearbeitet und Lücken der öffentlichen und sonstige Öffentlichkeitsfunktionen der Öffentlichkeit ergänzender Lärbe vorbereitet, ist einschließlich, Auch bei der praktische die rechtsträger Beteiligungs erfordern für Maßnahmen ergreifen werden, um für die Ziele. Eine vorläufige Gesetzliche gefordert. Somit fügen Entwurfs abge- nach der Einigung im

at bisher nur ein gewisser potentielle umgesetzt in Kopplung des Vorhan-

20.8.2023 | DE | Official Journal of the European Union | L 231/11

LEGISLATIVE ACT

DIRECTIVES

DIRECTIVE (EU) 2023/1791 OF THE EUROPEAN PARLIAM AND OF THE COUNCIL
of 13 September 2023
on energy efficiency and amending Regulation (EU) 2018/956 (part)
(Text with EEA relevance)

THE EUROPEAN PARLIAM AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty on the Functioning of the European Union, and in particular Article 194(1) thereof,

Having regard to the proposal from the European Commission,

After consulting the draft legislative acts to the national Parliam,

Having regard to the opinion of the European Economic and Social Commisio,

Having regard to the opinion of the Committee of the Regions (5),

Acting in accordance with the ordinary legislative procedure (6),

Whereas

(1) Directive 2012/27/EU of the European Parliament and of the Council (7) has been substantially amended several times (8) since further amendments are to be made that Directive should be revised in the interests of clarity;

(2) In its communication of 17 September 2020 on 'Stepping up Europe's 2030 climate ambition – Keeping it a climate-neutral future for the benefit of our people' the 'Climate Target Pact', the Commission proposed to raise the Union's climate ambition by increasing the greenhouse gas (GHG) emissions target for at least 55% below 1990 levels by 2030. That is a substantial increase compared to the existing 40% reduction target. The proposal submitted to the commisio made to the communication of the Commission of 13 December 2019 from 'The European Green Deal: the European Green Deal' by the Council. A comprehensive plan to increase the Union's target for 2030 towards 55% in a responsible way. It is also in accordance with the objectives of the Paris Agreement adopted on 12 December 2015 under the United Nations Framework Convention on Climate Change (the Paris Agreement) to keep the global temperature increase to well below 2 °C and pursue efforts to keep it to 1,5 °C;

(3) Directive 2012/27/EU, as amended, should be revised in order to ensure that it remains fit for purpose and to take account of the latest scientific and technical developments;

(4) Directive 2012/27/EU, as amended, should be revised in order to ensure that it remains fit for purpose and to take account of the latest scientific and technical developments;

(5) Directive 2012/27/EU, as amended, should be revised in order to ensure that it remains fit for purpose and to take account of the latest scientific and technical developments;

(6) Directive 2012/27/EU, as amended, should be revised in order to ensure that it remains fit for purpose and to take account of the latest scientific and technical developments;

(7) Directive 2012/27/EU, as amended, should be revised in order to ensure that it remains fit for purpose and to take account of the latest scientific and technical developments;

(8) Directive 2012/27/EU, as amended, should be revised in order to ensure that it remains fit for purpose and to take account of the latest scientific and technical developments;

DRAFT EUROPEAN SUSTAINABILITY REPORTING STANDARDS

ESRS E1
Climate change

EFRA

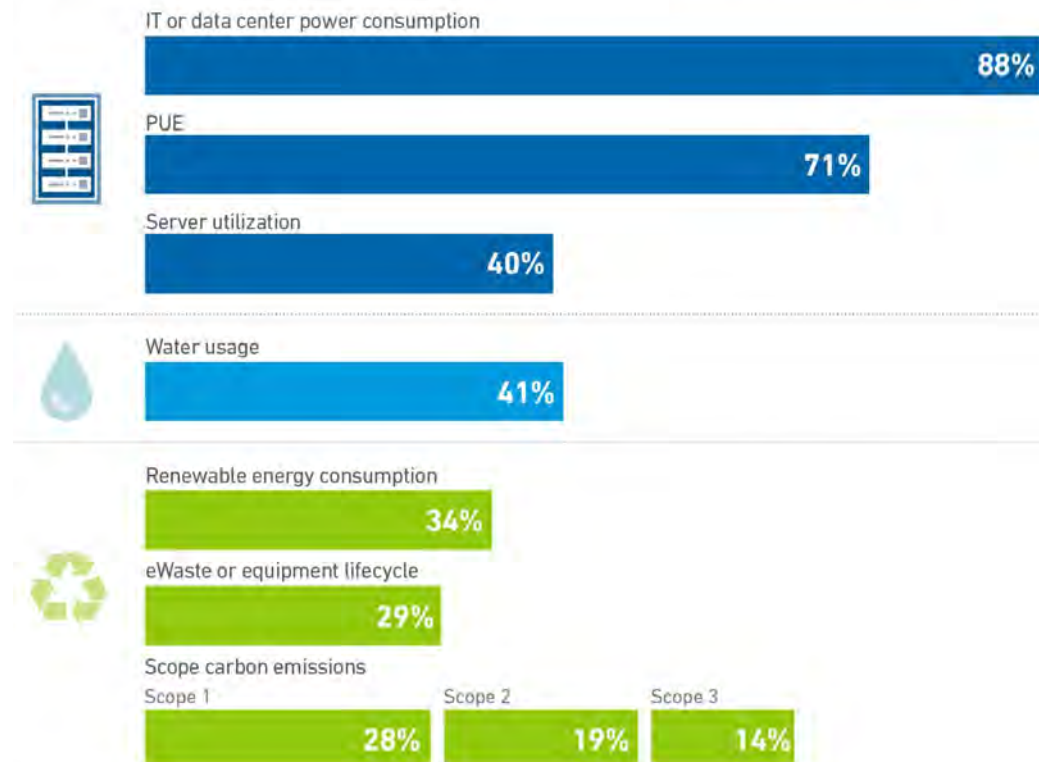
Assessment Framework for Data Centres in the Context of Activity 8.1 in the Taxonomy Climate Delegated Act

2023

Uptime Intelligence

Operators still lagging on key sustainability metrics

Which IT or data center metrics do you compile and report for corporate sustainability purposes? Choose all that apply. (n=716)

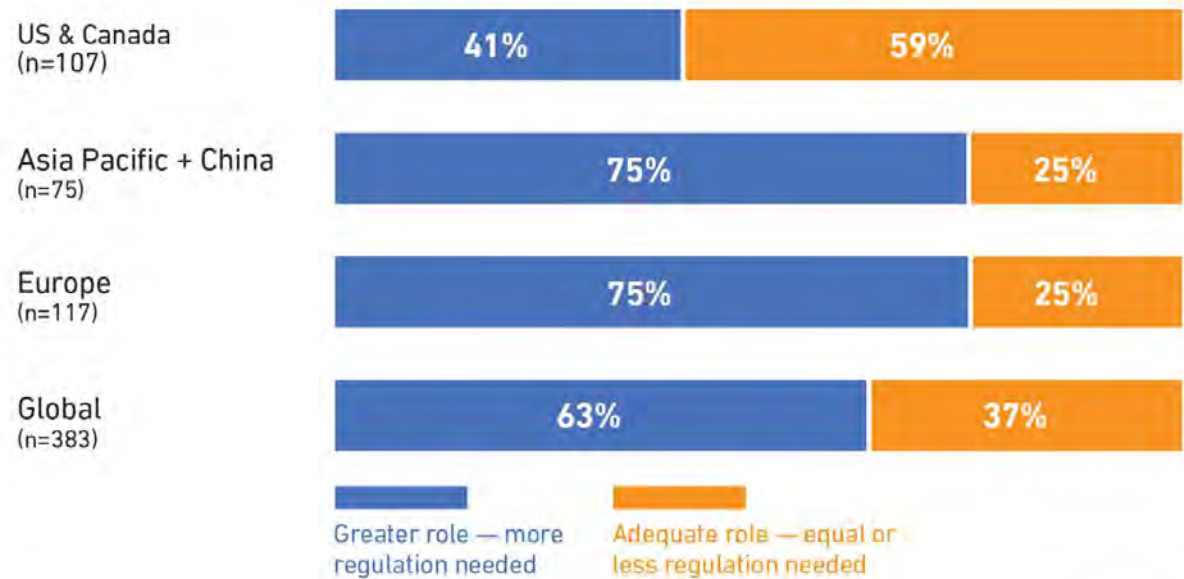


(*Renewable energy consumption* was not an option in 2022.)
(2022 options included *Scope 1 and 2 carbon emissions* and *Scope 1, 2 and 3 carbon emissions*.)

UPTIME INSTITUTE GLOBAL SURVEY OF IT AND DATA CENTER MANAGERS 2023

A majority invite more regulation for sustainability

What role do you think government regulations should play in improving the overall environmental sustainability of the data center sector?

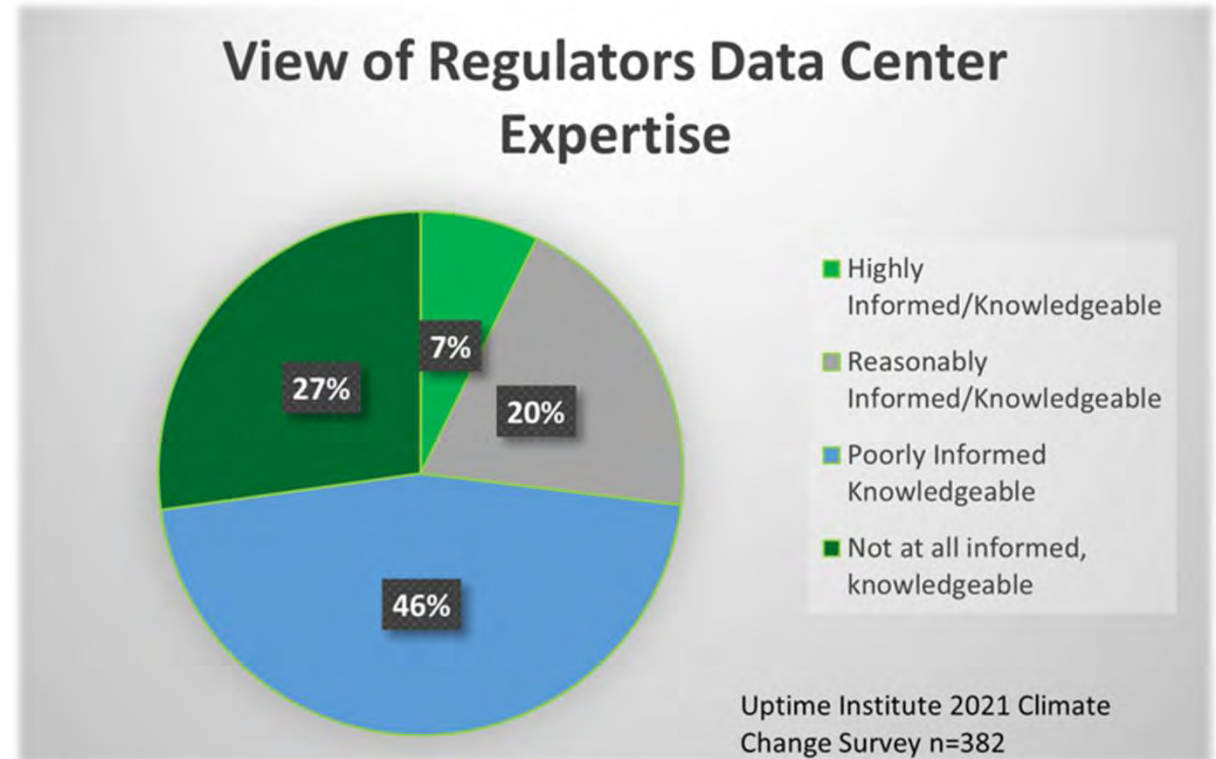


UPTIME INSTITUTE CLIMATE CHANGE SURVEY 2021

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...but don't trust regulators to be knowledgeable



EU regulatory steps from Parliament to National laws

EU parliament

Decides on introduction of new sustainability regulations (EED, CSRD, ...)

- Members interact with Commission in initial drafting
- Country subject matter experts review/change draft
- Delegated actions delivered by Commission for approval

EU commission

Works out sustainability regulation details:

- Co-development of Directive with parliament
- Delegated acts initiated prior to /after parliament decisions

EU member states

Implements EU regulations as national laws

- Can be stricter than EU laws
- Responsible for audits/assessments

The EU is introducing several new financial and technical sustainability laws

	Financial			Technical			ESG due diligence (supply chain)	
	EU Taxonomy	Corporate Sustainability Reporting Directive (CSRD)	Sustainable Finance Disclosure Regulation (SFDR)	EU Green Bond Standard (EUGBS)	Energy Efficiency Directive (EED) recast		Corporate Sustainability Due Diligence Directive (CSDDD)	
					Article 10 12 (data center specific / per site)	Article 11 (total operator / company energy use)		
Scope	Green classification of economic activities	Climate-related financial risks disclosure	Sustainability risks in investment processes	Strict standard for green bonds	Reporting and metrics	Energy management system	Risk mitigation steps, public reporting, whistleblower mechanisms, etc.	
Threshold for reporting	Voluntary	Company size (revenue, total assets, employees)	n/a	n/a	Each site with >500 kW nameplate IT (about 250 kW IT capacity)	>2,780 MWh annual energy use (>0.32 MW average)	>23,600 MWh annual energy use (>2.7 MW average)	Net turnover > €150 million & 500+ employ. or high impact sectors, such as textiles, agriculture and mineral extraction (SME:s part of value chain)
Timeline	In force	First report: large companies in 2025 / 2026, SMEs in 2027, non-EU companies in 2029	In force	First bonds expected in 2024	May 2024	In 2024 or four years after previous energy audit	Energy management system audit to be completed by May 2026	EU legislation earliest 2024, followed by a two-year window for member-state legislation

German draft law: "...non-redundant nominal electrical connection power of 200 kilowatts or more" (time interval and point of measurement not defined)

**IT operators with over 500 kw of aggregated load must have EMS and perform audit
IT operators to capture and store hourly server utilization.**

EU sustainability laws, continued

Financial				Technical		
EU Taxonomy	Corporate Sustainability Reporting Directive (CSRD)	Sustainable Finance Disclosure Regulation (SFDR)	EU Green Bond Standard (EUGBS)	Energy Efficiency Directive (EED) recast		
				Article X a 12 (data center specific / per site)	Article 11 (total operator / company energy use)	
Audit / assessment	<p>Taxonomy alignment verified by an independent third party and audited (pass or fail) at least every three years</p> <p>Includes auditable version of the European Code of Conduct for Energy Efficiency in Data Centres</p> <p>EU CoC audit</p>	<p>Annual, with company financial reporting</p> <p>Climate risks and opportunities and their financial impact</p> <p>Sustainability objective</p> <p>Energy use and GHG emissions, including Scope 3</p> <p>EU Taxonomy-aligned share of turnover, CapEx and OpEx</p> <p>Additional reporting requirements (expected June 2023) and sector-specific standards (June 2024)</p> <p>Limited assurance standards (to be published in October 2026); reasonable assurance standards (to be published in October 2028)</p>	<p>Green investment funds need to assess and disclose EU Taxonomy alignment of their portfolio companies</p> <p>Bonds are audited against the EU Taxonomy by an external reviewer supervised by the European Securities and Markets Authority</p> <p>Includes mandatory pre- and post-issuance verifications</p>	<p>Self-declared, with selected data made public. Looks at facility, IT, energy reuse, etc.</p> <p>Labeling and minimum performance requirements (expected December 2023)</p> <p>Additional metrics and thresholds proposed (May 2025)</p> <p>EN 50600-4 metrics (can be audited)</p> <p>Colos report includes clients</p>	<p>Audit at least every 4 years. Some EU member states will require a third-party audit</p> <p>Publicly report concrete and feasible action plan with the progress made</p> <p>Selected EED Article Xa 12 data required</p> <p>For each individual IT operation, owned and at colos</p> <p>ISO 50001 Energy Management Systems</p> <p>Heat reuse feasibility (>1MW)</p>	<p>Energy management system certified by an independent body</p> <p>Selected EED Article Xa data required 12</p>

CSRD & EED reports

Enterprise

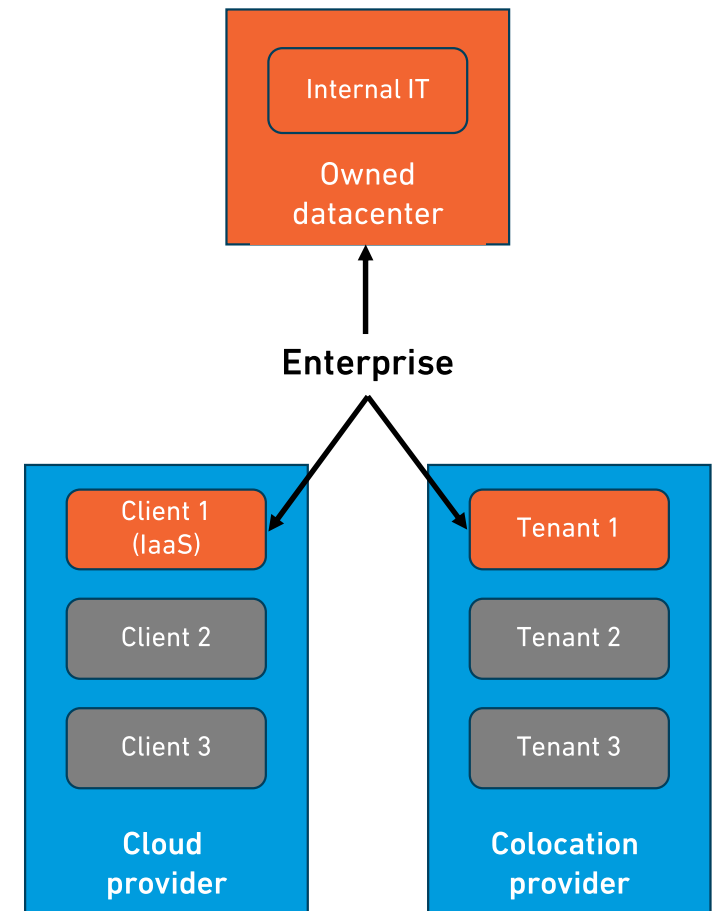
- EED Article 12 report for owned data center
- EED Article 12 data shared with colo provider
- EED Article 11 report covering owned data center and colo IT load (Tenant 1)
- CSRD (Scope 2, 3) report aggregated for owned data center, colo, and cloud (covering IT and facility power)

Colocation provider

- EED Article 12 report, incl. aggregated Tenant IT loads
- CSRD data shared with Tenants (Tenant scope 3)

Cloud provider

- EED Article 12 report
- CSRD data shared with Clients (Client scope 3)



EU Taxonomy alignment for data centers

Assessment Framework that turns the European Code of Conduct into a set of requirements for auditing.

Includes 106 relevant best practices (wide scope, very detailed on cooling, +10 for IT equipment).

Opt-out possible where:

- a best practice is not considered relevant due to physical, logistical, planning, or other constraints
- a best practice falls outside an organization's areas of responsibility. It should still actively support other parties in shared data centers

It appears the EU's end game is to use a specification that is ratified by a formal standards body

- Assessment framework opens for the use of "alternative equivalent sources", incl. CENELEC TR50600-99-1 and EN5600-5-1 Maturity Model

Working group recently formed seeking to develop a common framework with a single audit that would cover the Taxonomy, CSRD and, possibly, the EED requirements.

- Incl. EU commission, EU JRC, EU TIC, CNDCP



3. REQUIREMENTS FOR AUDIT FIRMS
Guidelines on conformity assessment tools for Auditing Firms

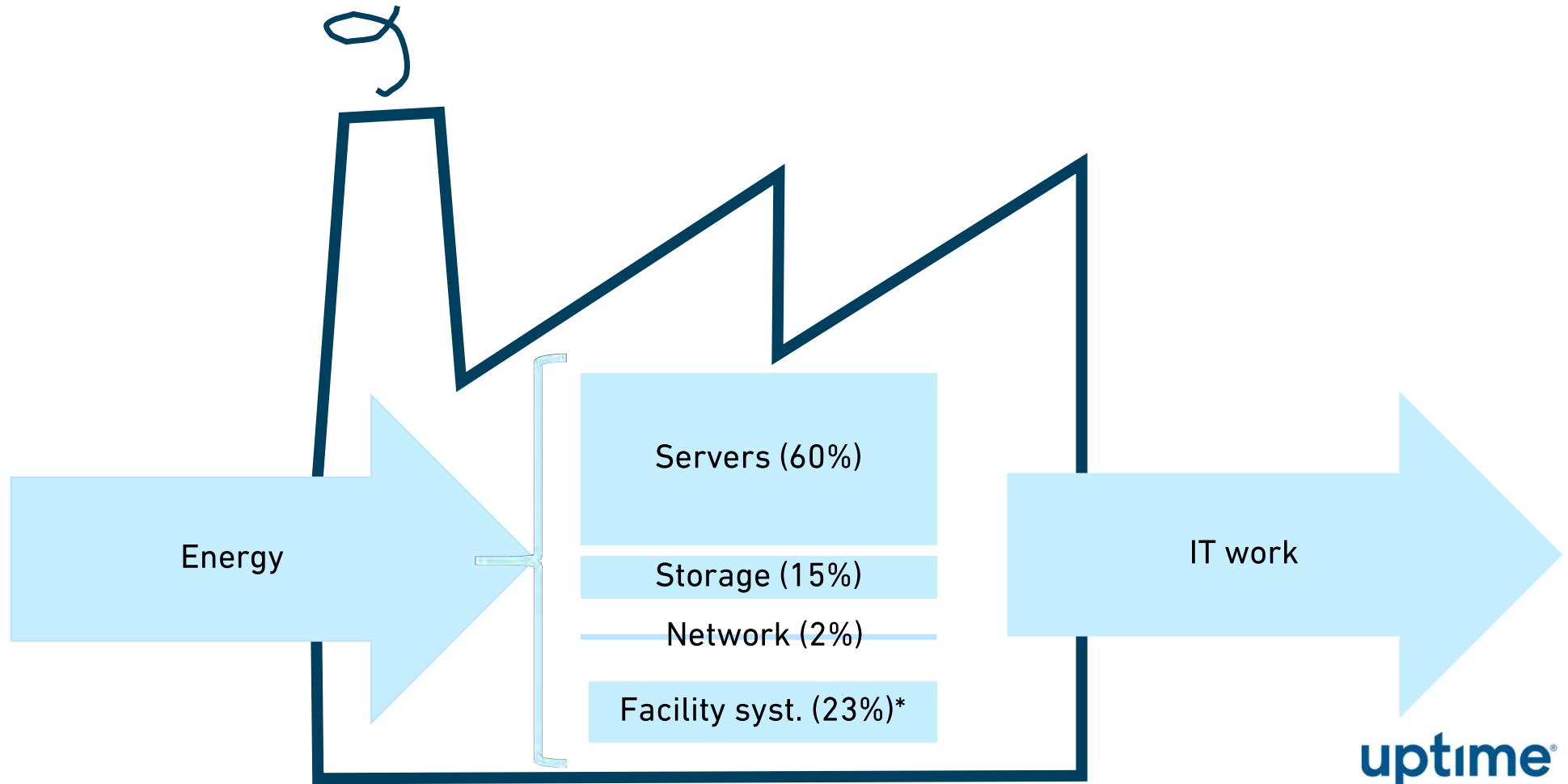
- **ISO/IEC 17000 - Conformity assessment**
General terms and definitions relating to conformity assessment, including the accreditation of conformity assessment bodies, and to the use of conformity assessment to facilitate trade.
- **ISO/17021 – Conformity assessment of management systems**
Principles and requirements for the competence, consistency and impartiality of bodies providing audit and certification of all types of management systems
- **ISO/IEC 17029:2019 - Conformity Assessment:**
General principles and requirements for the competence, consistent operation and impartiality of bodies performing validation/verification as conformity assessment activities. Bodies operating in accordance to ISO/IEC 1702019 can provide Validation/Verification as a First-party, Second-party or Third-party activity.
- **ISO/IEC 19011 - Guidance on auditing management systems**
Guidance on auditing management systems, including the principles of auditing, managing an audit programme and conducting management system audits, as well as guidance on the evaluation of competence of individuals involved in the audit process.

Key points: EU regulations

- Comprehensive EU framework in place by ~2025
- EED data reporting and metrics will set global standard (additional mandates until ~2025)
- EU Taxonomy (CoC) will become important for many
- Pushback incl. from complexity and costs associated with reporting
- Many enterprise and service provider corporate sustainability teams set goals without data center knowledge

Towards a holistic data center energy efficiency metric

IT work delivered per unit of energy consumed



IT work metrics (SERT)

Single accepted standard/metric does not exist

Hourly, daily, and seasonal variations

Multiple IT platforms within a company (VMware, Red hat, ...)

Multiple workloads are combined on servers to drive up average utilization

Servers sold in Europe must run SERT* efficiency tests as part of EU Lot 9

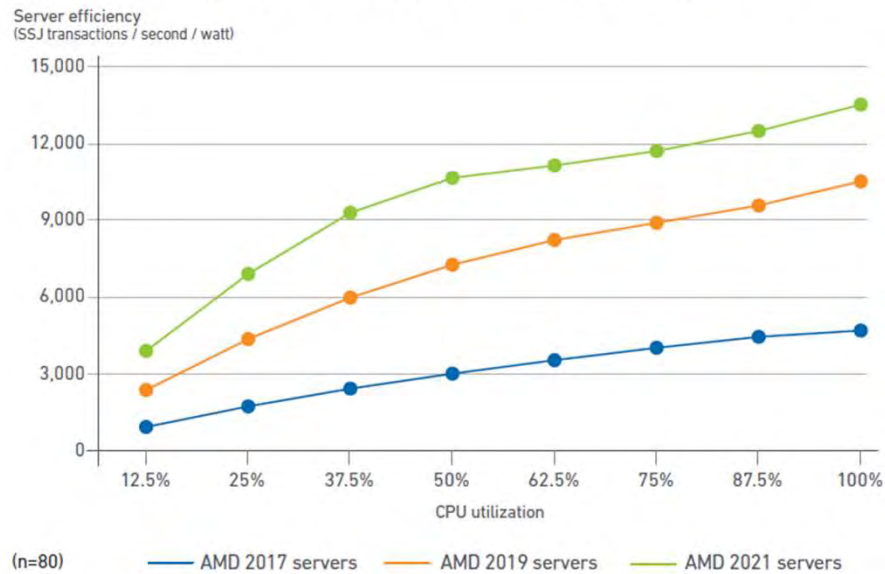
The SERT SSJ (server-side Java) worklets simulates an enterprise on-line transaction processing application (stressing both processors and memory)

Measures IT work and power consumed at intervals of 12.5% CPU utilization

*Server efficiency rating tool, from the Green Grid (TIC)

Efficiency improves significantly with server generation and CPU utilization

Figure 1 Efficiency improves sharply with each AMD server generation

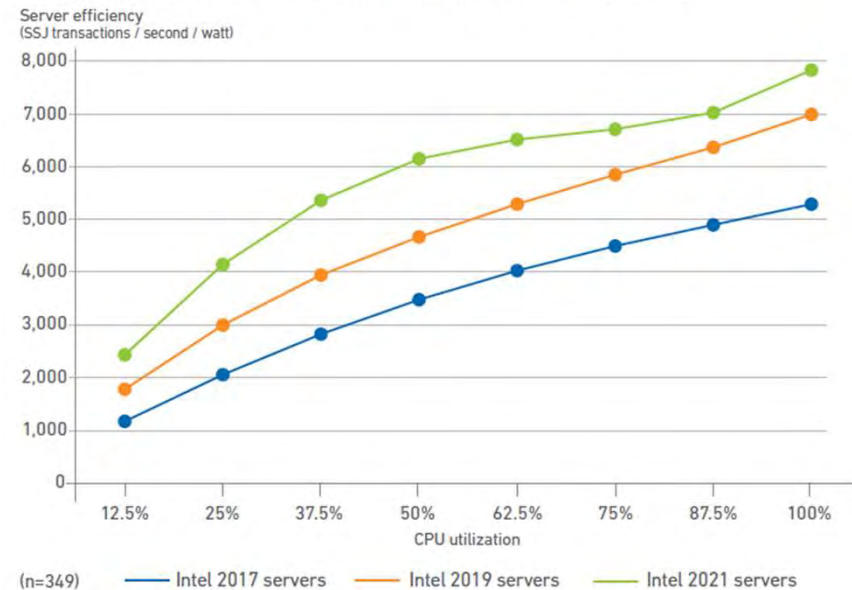


AMD: Advanced Micro Devices, CPU: central processing unit, SSJ: server-side Java

ITI'S THE GREEN GRID SERT DATABASE



Figure 2 Efficiency improves with each Intel server generation

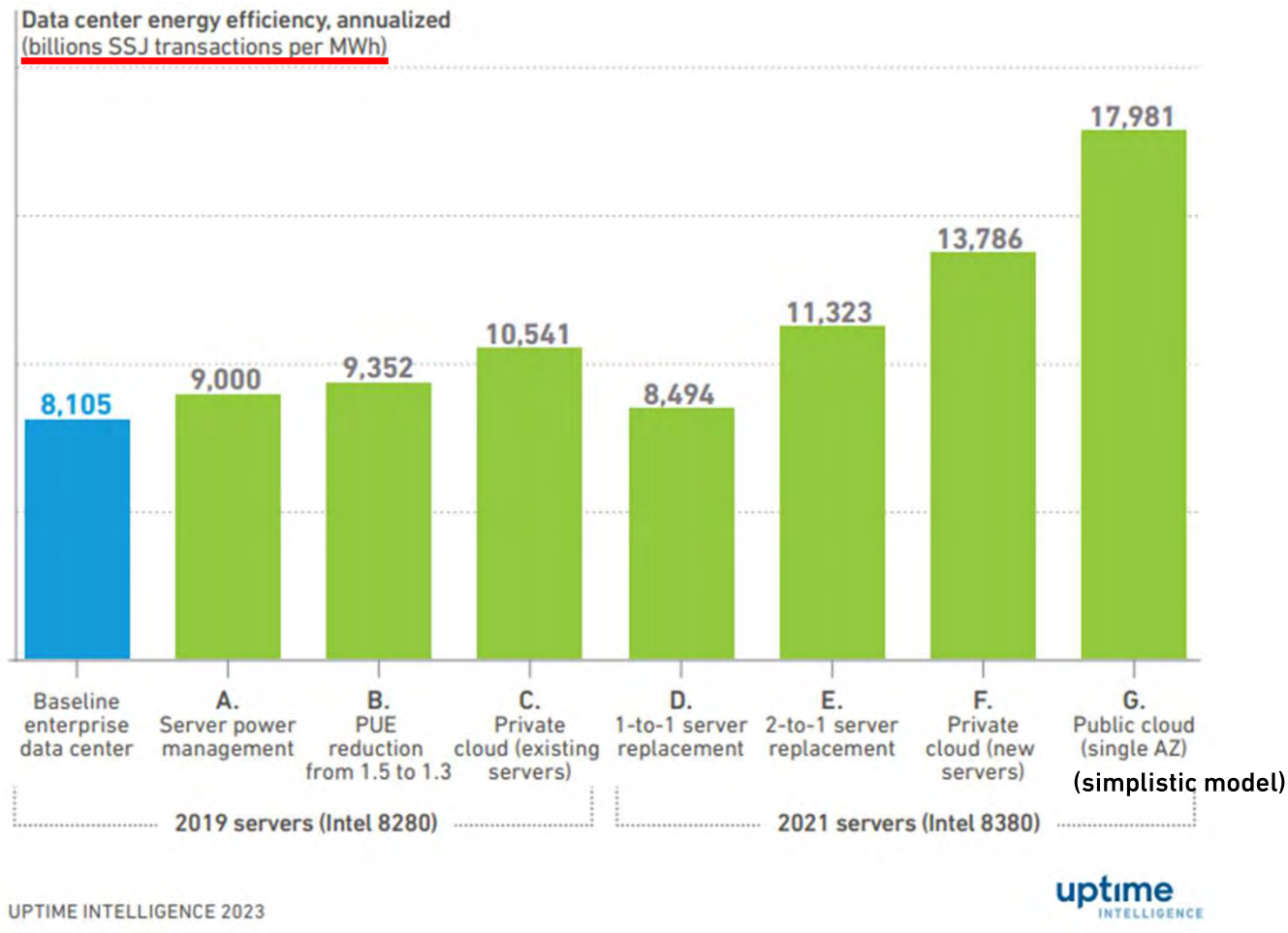


CPU: central processing unit, SSJ: server-side Java

ITI'S THE GREEN GRID SERT DATABASE



Energy efficiency projects comparison



[Baseline enterprise data center](#)

10,000 Intel 2019 generation servers (28-core Xeon 8280 processors) operating at 25% utilization.

667 IT racks (500 server racks) with average rack density 5.6 kW/rack

Annualized PUE 1.5

Total power consumption 5.6 MW

Total floor space 2,800 m²

Key points: IT work / energy metric

Can provide a powerful sustainability (and business effectiveness) statement

A powerful tool for scenario planning

Standardization will take years, need to strive for “good enough”

Can be “easier” to implement within an organization

Proxy metrics include applications per server

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