Study for the review of the Commission Regulation 2019/424 Ecodesign of Servers and Data Storage Products

2nd Stakeholder meeting

28 September 2023

Introduction

Housekeeping rules of the meeting

- During each sub-session of the presentation, virtual participants will be able to pose written questions or to ask for the floor (type [name organization] + 'floor please' [+topic]). Please write them in the chat when invited to do so by the Chair, starting with the name of your organisation (questions without the organisation name will not be considered).

- The questions will be answered at the end of each sub-session. In case of time constraints, priority in replying to the questions will be given, based on the order in the chat. Everyone remains <u>muted</u> (unless speaking when invited by the Chair)

- **<u>Concise</u>** intervention or question

NB : The chats will not be kept/copied. Please do **not** make comments in the chat area unless invited by the Chair.

Agenda

- Study overview
- Phase 1 review of items a–t
- Draft reports based on Methodology for Ecodesign for Energy related Products (MEErP) :
  - Task 1
  - Task 2
  - Task 3
  - Task 4
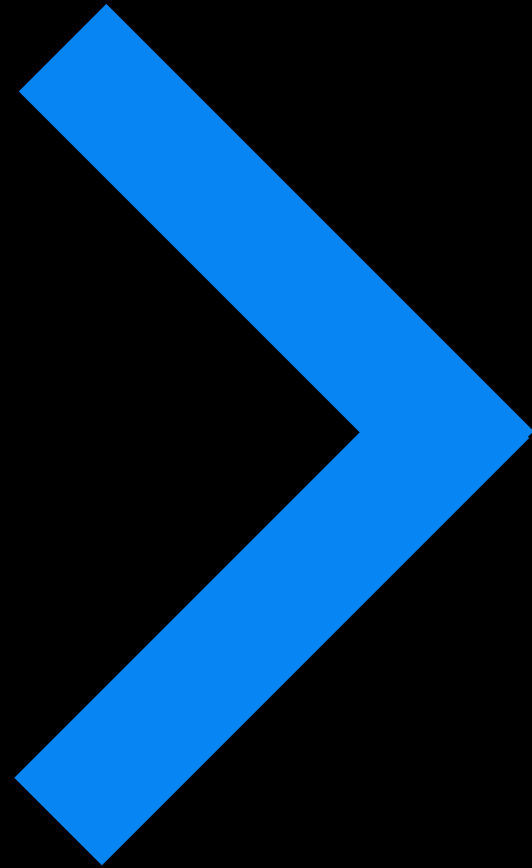
Study overview

Study overview –Scope

Phase 1 – Technical analysis
This involves a detailed assessment of all items raised in the review section of Commission Regulation (EU) 2019/424 plus the other items raised by DG GROW, as well as an update to the Ecodesign frequently asked questions (FAQ).
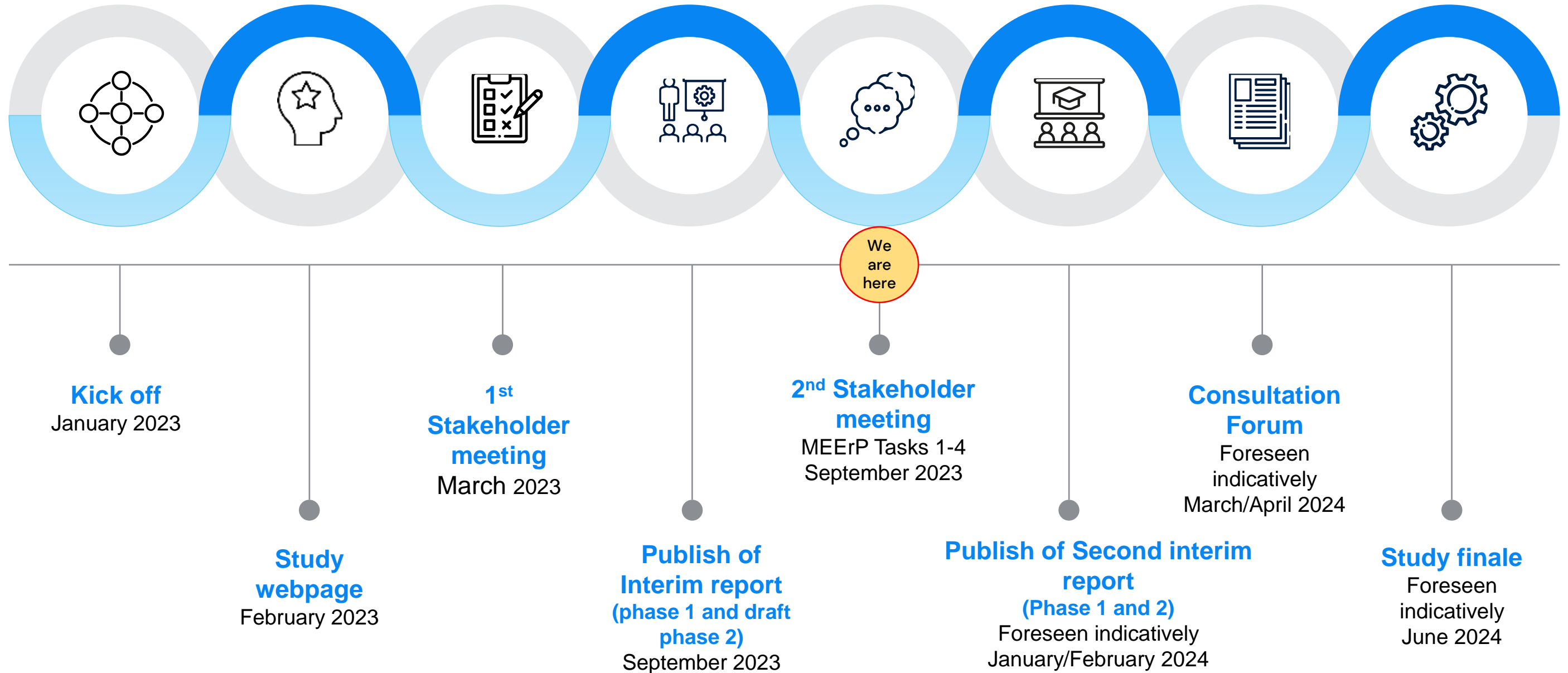
Phase 2- Update of the preparatory study for the server and data storage Regulation
This phase will update the existing preparatory study of Commission Regulation (EU) 2019/424, informed by Phase 1, and further by additional market research, consultation and experience in the EU.

Deliverables

1. Report on Phase 1 and updated preparatory study (Phase 2).

2. Working documents on the revised Ecodesign Regulation for servers and data storage products (draft revised Ecodesign Regulation and explanatory memorandum)

3. Update of the 'Commission guidelines: Ecodesign frequently asked questions (FAQ) on servers and data storage products'.

Study overview – milestones & timeline

We are here

Kick off
January 2023

Study webpage
February 2023

1st Stakeholder meeting
March 2023

Publish of Interim report
(phase 1 and draft phase 2)
September 2023

2nd Stakeholder meeting
MEErP Tasks 1-4
September 2023

Publish of Second interim report
(Phase 1 and 2)
Foreseen indicatively
January/February 2024

Consultation Forum
Foreseen indicatively
March/April 2024

Study finale
Foreseen indicatively
June 2024

Phase 1 report: Technical Analysis – Article 8 of Regulation 2019/424

Phase 1 – Overview of review items

Items listed in Article 8 of Regulation 2019/424:

a) to update the specific ecodesign requirements on server active state efficiency;
b) to update the specific ecodesign requirements for servers on idle state power;
c) to update the definitions or the scope of the Regulation;
d) to update the material efficiency requirements for servers and data storage products, including the information requirements on additional critical raw materials (tantalum, gallium, dysprosium and palladium), taking into account the needs of the recyclers;
e) to exempt server appliances, large servers, fully fault tolerant servers and network servers from the scope of the regulation;
f) to exclude resilient servers, High Performance Computing (HPC) servers and servers with integrated APA from the ecodesign requirements set out in Annex II point 2.1 and point 2.2 of Regulation 2019/424;
g) to set specific ecodesign requirements on the Processor Power Management Function of servers;
h) to set specific ecodesign requirements on the operating condition class;
i) to set specific ecodesign requirements on the efficiency, performance and power demand of data storage products.

Further items to be analysed:

j) on material efficiency aspects:
a. the provisions on disassemblability of certain components, also considering advancements in standards (mandate M/543) since the publication of the regulation;
b. an analysis of the benefits of the information requirements under Regulation 2019/424 already covering cobalt in the batteries and Neodymium in the hard disks;
k) analysis of the benefits of the information requirements under Regulation 2019/424 on the operating conditions of servers and data storage products;

l) an analysis of the standards, and of their relevance for regulatory purposes, developed/under development under the standardisation request M/573, 'Commission implementing decision C(2021)14 of 12.1.2021 on a standardisation request to the European standardisation organisations in support of Regulation (EU) 2019/424 as regards ecodesign requirements for servers and data storage products';
m) Technological, market and regulatory evolutions affecting the environmental performance/aspects of data centers, and how they would reflect at product specific level, for servers and data storage products;
n) The technical and economic feasibility and relevance of product specific requirements on liquid cooling systems/solutions
o) The technical and economic feasibility and relevance of product specific requirements on waste heat recovery systems/solutions
p) The technical and economic feasibility and relevance of product specific requirements on the standby-readiness of servers (for instance allowing to move to and from idle mode in a fast and seamless manner), if not covered by the analysis on the Processor Power Management Function
q) The technical and economic feasibility and relevance of product specific requirements on DC (direct current) power supply for servers
r) The technical and economic feasibility and relevance of product specific requirements related to:
    a. the availability of information (temperature, (fan) speed, etc..) for open data exchange about the input/output air flow data of the server/data storage product, and/or
    b. the capability to enable external overriding of the internal fan speed control, in view of potential synchronisation of the product cooling system with the data center cooling system2.
s) The technical and economic feasibility and relevance of introducing an energy label for servers and data storage products, including a label and a detailed product information sheet comprising targeted indicators for the different possible uses of the product (*e.g.* as webserver, disk server, database server, file/disk server, etc.)
t) Other topics, as emerged from consultations with stakeholders.

Methodology

- Consultation with stakeholders
  - Stakeholder meeting
  - Qualitative questionnaire (Industry collated response (TGG) and 18 more responses)
  - Quantitative questionnaire (Industry collated response (TGG) and 2 more responses)
- 1–1 calls
- ICF expertise
- SERT data

To answer the queries set out in Phase 1, the research team consulted with stakeholders through the first stakeholder meeting, qualitative and quantitative questionnaires, and direct 1–to–1 calls.

From this feedback, along with ICF's expertise and datasets from the Energy Star programme, the items a) to t) were answered.

For each theme, the report details the background to be aware of in the theme, develops the stakeholder feedback and research results, makes recommendations to policymakers on next steps for Ecodesign and sets out in which sections of the Ecodesign preparatory study will be updated (phase 2).

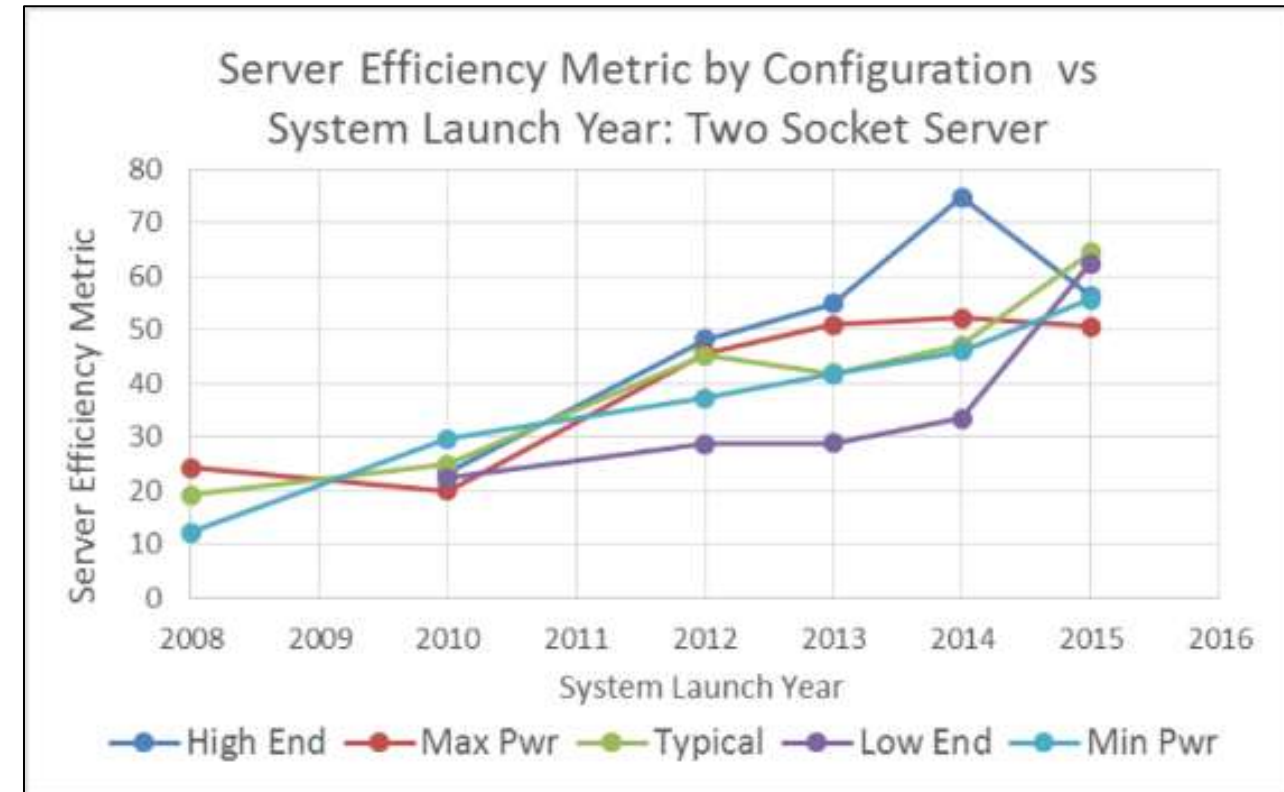This presentation focuses on the recommendations only

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Updating current Ecodesign requirements
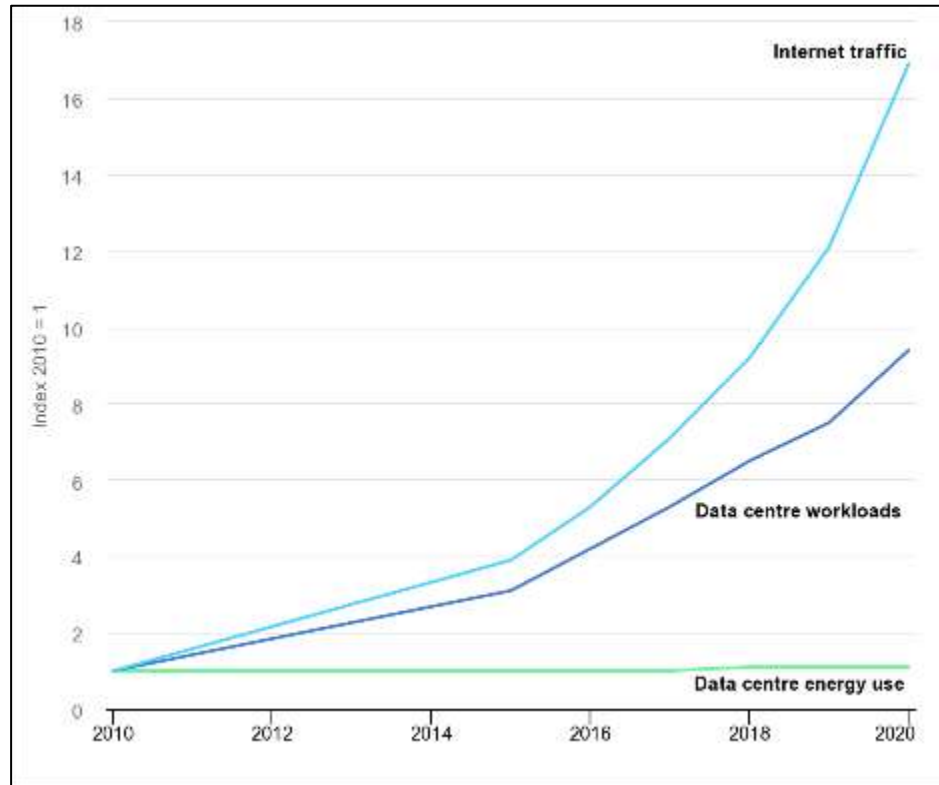
Global trends in internet traffic, data centres workloads and data centre energy use, 2010-2020*

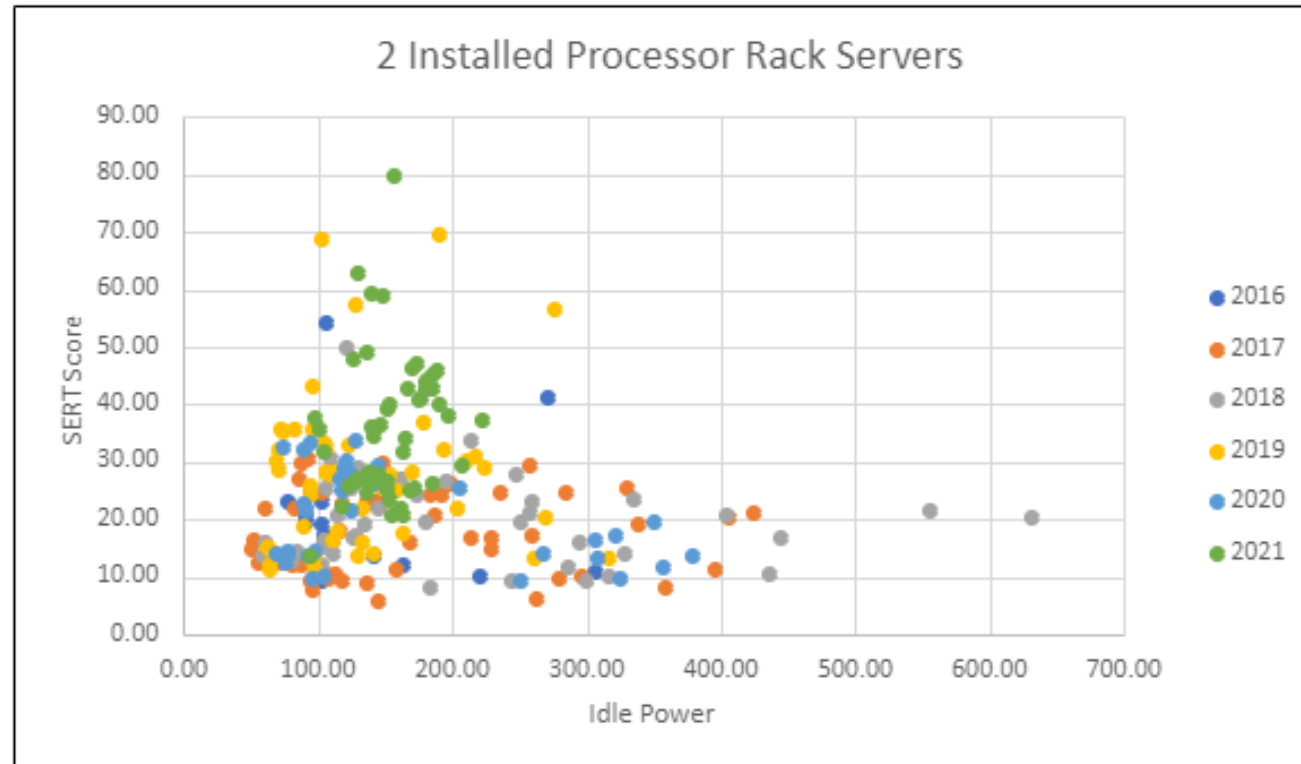**SERT active efficiency metric improvements with new system introductions**

Updating current Ecodesign requirements

DRAFT RECOMMENDATIONS:

- To use active efficiency as defined by SPEC SERT for EU Ecodesign server requirements.

- To use a score for typical server configuration (for server configuration families) which provides a much closer representation of performance efficiency of the final purchased product in a family (instead of min/max performance). This can be used as a reference for the active efficiency minimum energy performance standard.

- The current regulation sets out aggressive internal power supply efficiency requirements for servers, to the extent that the implementation of the 80 Plus efficiency titanium levels for the internal power supplies was postponed until January 2023. This attests to the fact that there is no room for additional stringency at this time.

Updating current Ecodesign requirements

2 Installed Processor Rack Servers

Legend: 2016, 2017, 2018, 2019, 2020, 2021

SERT score over idle power for the entire data set

DRAFT RECOMMENDATIONS:

- To explore further how to avoid implementing maximum idle power requirement, as it has the potential to remove the highest performing devices, and hence drive increased overall consumption in data centres – see also data needs

- All systems to possess the ability to report their utilisation in real time

Data requested on the utilisation rates for servers

The study team had limited access to data relating to the utilisation rate of servers. There is expected to be different averages depending on the server application

Regulation definitions and scope

c) to update the definitions or the scope of the Regulation;

e) to exempt server appliances, large servers, fully fault tolerant servers and network servers from the scope of the regulation;

f) to exclude resilient servers, High Performance Computing (HPC) servers and servers with integrated APA from the Ecodesign requirements set out in Annex II point 2.1 and point 2.2 of Regulation 2019/424.

DRAFT RECOMMENDATIONS (main points):

- Align product definitions with ENERGY STAR, EPEAT, ISO/IEC 21836:2020 and ETSO EN 303 470
  - an update should be considered for the definitions of resiliency under the resilient server definition and the High-Performance Computing (HPC) servers as these do not align with ENERGY STAR
  - definitions specifically for resilient servers' recovery section and HPC servers should be updated to align with the latest industry standard

- Include the following definitions:
  - Storage Heavy Server (SHS), Hyperconverged Server, Data storage definitions should also be updated in line with SNIA Emerald taxonomy, clarify definition of servers with integrated APA

- Include server appliances into the regulation, with specific exclusions for energy efficiency requirements set out in Annex II point 2.1 and point 2.2 of Regulation 2019/424

- Maintain the exclusion for large servers

- Include fully fault tolerant servers, and hyperconverged servers into the regulation, with an exemption granted for energy efficiency requirements set out in Annex II point 2.1 and point 2.2, where these products are not yet in the test standard scope.

- Create a definition in order to ensure that server configurations are not inappropriately deemed as "custom made". The regulation has an exemption for the provision of energy efficiency information for custom made servers, the same exemption should be extended for energy efficiency criteria.

- Maintain exemption on network servers and exclusions on energy efficiency metrics (from annex II point 2.1 and point 2.2) granted to High Performance Computing (HPC) servers and servers with integrated APA.

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Data Storage devices performance requirements

i) to set specific Ecodesign requirements on the efficiency, performance and power demand of data storage products.

DRAFT RECOMMENDATIONS:

- To align product definitions with ENERGY STAR, EPEAT, ISO/IEC 21836:2020 and ETSI EN 303 470 and SNIA Emerald taxonomy.

- To assess the potential introduction of SNIA's Emerald test method and/or standardised energy and performance reporting requirements specifically for data storage products.

- To keep the power supply efficiency requirements for storage products as they are to align with servers.

- To require the availability of capacity optimisation methods, such as Thin provisioning, data deduplication, compression and delta snapshots.

- To educate consumers about the benefits of energy-efficient storage products and providing guidance on selecting and using such products can drive demand for energy-efficient options

Processor Power Management Function

g) to set specific Ecodesign requirements on the Processor Power Management Function of servers.

DRAFT RECOMMENDATIONS:

- To add new requirements using reliable, accurate, and reproducible methods and aligned with harmonised standards. To incorporate the methods outlined in point 11 and 12 of the US ENERGY STAR specification for computer servers version 4 into an Ecodesign regulation.

- To implement dynamic voltage or frequency scaling to reduce intrusive power management and achieve energy savings in IT devices. To consider the specific needs and requirements of colocation data centre operators who do not own the IT equipment when implementing power management solutions

- To continue the implementation of DVFS and activate reduced power states for idle cores or sockets

- To consider having power management features not only available but enabled as shipped

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Standby-Readiness for Servers

p) The technical and economic feasibility and relevance of product specific requirements on the standby readiness of servers (for instance allowing to move to and from idle mode in a fast and seamless manner), if not covered by the analysis on the Processor Power Management Function.

- Given this functionality is not currently available on the market and that consumer demand for this functionality appears low, we recommend that this functionality is not required at this time. If consumer demand rises to the level that manufacturers begin to develop this functionality in the future, we recommend that this topic be revisited at that time.

Parameters Information Requirements

r) The technical and economic feasibility and relevance of product specific requirements related to:

a. the availability of information (temperature, (fan) speed, etc..) for open data exchange about the input/output air flow data of the server/data storage product, and/or.

b. the capability to enable external overriding of the internal fan speed control, in view of potential synchronisation of the product cooling system with the data centre cooling system.

DRAFT RECOMMENDATIONS:

- To consider alignment with the Energy Star requirement to ensure that servers have an open data exchange of the temperature and fan activity data. The outputs should be open source and usable by all types of energy and data centre infrastructure management software packages.

- To not pursue the investigation of external overriding of server fan due to the legal risk and a lack of evidence to potential environmental benefit.

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Energy Label

s) The technical and economic feasibility and relevance of introducing an energy label for servers and data storage products, including a label and a detailed product information sheet comprising targeted indicators for the different possible uses of the product (e.g., as webserver, disk server, database server, file/disk server, etc.)

Feedback requested on procurement practices

The study team encourages stakeholders to provide insight into the usefulness of energy efficiency information for server procurement teams.

DRAFT RECOMMENDATIONS:

- To include energy efficiency information provided through labelling or information sheets for procurers in the EU.
- To include the "typical server configuration" as a regulation tool for server families in the EU, for MEPS setting and information requirement.
- To engage with procurement professionals in the EU to verify labelling benefits.
- To keep the provision of ASHRAE operating conditions on the information sheet and consider if a label would be useful for data centre operators.
- To investigate a framework providing users with hardware component compatibility in the information sheet to facilitate refurbishment.
- To apply an energy efficiency requirement on data storage products, rather than implementing a labelling scheme.

Material Efficiency (1/2)

d) to update the material efficiency requirements for servers and data storage products, including the information requirements on additional critical raw materials (tantalum, gallium, dysprosium and palladium), taking into account the needs of the recyclers;

j) on material efficiency aspects:

a. the provisions on disassemblability of certain components, also considering advancements in standards (mandate M/543) since the publication of the regulation;

b. an analysis of the benefits of the information requirements under Regulation 2019/424 already covering cobalt in the batteries and Neodymium in the hard disks.

l) an analysis of the standards, and of their relevance for regulatory purposes, developed/under development under the standardisation request M/573, 'Commission implementing decision C (2021)14 of 12.1.2021 on a standardisation request to the European standardisation organisations in support of Regulation (EU) 2019/424 as regards ecodesign requirements for servers and data storage products

DRAFT RECOMMENDATIONS:

- **Reduced material content**
  - to place a request to CENELEC to develop a standard to ensure materials are not wasted in the design and manufacture stages. Furthermore, a standard to determine and declare CO_2 emissions in the manufacturing process can be investigated.
- **Firmware support considerations**
  - to investigate the impacts of making previous versions of the firmware available, without lessening cybersecurity norms. This is to allow for repair and refurbishment activities.
- **Barriers to part harvesting**
  - to include a repair clause which allows for server components to be replaced by legitimate repair professionals.
- **Availability and usability of spare parts**
  - to consider a more innovative approach to part pairing – potentially from parts pairing to be banned, or for parts pairing firmware to be made available to certain repairers to allow for replacement or for manufacturers to provide a free-of-charge parts pairing system to authenticate legitimate repairs.
  - to consider that legitimate repairers to be identified through subscription to a database, as is done for the provisions of indicative weight and disassembly operations under Annex II clause 3.3. Such system should be available for longer than the availability of spare parts.

Material Efficiency (2/2)

Feedback requested on disassembly tools

The study team invites the stakeholders to provide insight into which components cannot be disassembled with class A tools.

DRAFT RECOMMENDATIONS:

- **Availability and usability of spare parts**
    - to require for spare parts to be made available by suppliers for a certain amount of time after a product is placed on the market and for those parts to be fully useable for legitimate repairers
- **Material efficiency requirements for disassemblablity and repair**
    - to require servers and data storage products to be disassemblable by a generalist (Class B), in a workshop environment (Class B), using tools meeting Class A, B or C nomenclature.
    - To update the definition for Class A work environment to ensure that workshop environments consistent with Class B can be hosted at in use sites (which implies Class A work environment).
    - To review Class A tools to not include "tools supplied with the product", as these are rarely available during product repair on site. Information should be made available to ensure that professional repairers know how to disassemble and repair.

DRAFT RECOMMENDATIONS:

- **Current information provision of cobalt in batteries and neodymium in hard disk**
    - to keep information provision of cobalt in batteries and neodymium within the regulation

- **Information requirements for critical raw materials**
    - to extend CRM reporting requirements to germanium, silicon, tantalum, gold and dysprosium

- **Material composition and recycling capabilities**
    - To investigate the inclusion of a more extensive product datasheet requirement which would track material content at the component level.
    - To include an expected lifetime provision on the information sheet.

- **Networking Equipment**
    - To investigate the potential to review the licensing system for product reuse and refurbishment of networking equipment

*Necessary tools: **Class A:** feasible with no tool; a tool supplied with the product or spare part; or with basic tools (screwdriver, hex key, pliers, spanner), **Class B:** Product group specific tools, **Class C:** other commercially available tools*

Operating Conditions

h) to set specific ecodesign requirements on the operating condition class;

k) analysis of the benefits of the information requirements under Regulation 2019/424 on the operating conditions of servers and data storage products.

- **Setting Ecodesign operating condition requirements**
  - To investigate a requirement for servers to operate at a minimum ASHRAE range of A2. However, the requirement for A2 allowable range is meant to be for temporary temperature fluctuations. Operation should be kept long term within the recommended range. These should also be reviewed in order to ensure that servers can operate reliably at the higher end of the recommended operation range.

- **Provision of ASHRAE operating conditions**
  - To keep the information provision of operating conditions under the ASHRAE nomenclature.

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System Performance Considerations

m) Technological, market and regulatory evolutions affecting the environmental performance/aspects of data centers, and

how they would reflect at product specific level, for servers and data storage products.

DRAFT RECOMMENDATIONS:

- to encourage operation of servers at higher temperatures (up to 27°C), by providing clear information through labelling or information sheet that states that the servers would operates well at these temperatures whilst reducing energy costs.
  - To NOT increase servers operating temperatures above 27°C, as this can result in an increase in total data centre consumption (due to an increase in individual server fan consumption).

Liquid Cooling Systems and Solutions

n) The technical and economic feasibility and relevance of product specific requirements on liquid cooling systems/solutions.

DRAFT RECOMMENDATIONS:

no action is required at this time*.

- to monitor this technology to ensure that if market share grows, the next Ecodesign review will consider regulatory action.

- To include a definition for liquid–cooled servers, to ensure that servers that are only manufactured in liquid cooled versions are exempt from energy efficiency criteria of the regulation.

*The market share is very small and direct liquid cooling is only used in high performance computing currently due to cost and complexity issues

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Waste Heat Recovery Systems and Solutions

o) The technical and economic feasibility and relevance of product specific requirements on waste heat recovery systems/solutions

It is noted that the best way to improve the waste heat recovery measures are to increase the grade of the heat. This could be done either by

1. increasing the operating temperatures of data centres, or

2. by using liquid cooling for improved heat transfer.

DRAFT RECOMMENDATIONS:

1. To not push for server operation at higher temperatures

2. To continue to monitor the development of this technology to mainstream usage.

Direct Current Power Supply for Servers

q) The technical and economic feasibility and relevance of product specific requirements on DC (direct current) power supply for servers.

DRAFT RECOMMENDATIONS:

The current evidence does not support the argument that DC servers are more efficient than AC servers. Therefore, we do not recommend the deployment of DC servers.

DC servers currently are not tested under the SERT testing metric. SPEC could be contacted to develop the testing metric for SERT's next iteration. As DC servers are not covered under the SPEC SERT methodology, they should be exempt from the SPEC SERT active efficiency requirements.

t) Other Topics brought up by stakeholders

1. ICT real time operating condition provision

2. Carbon emissions of the production process

3. Utilisation metric for servers

4. Idle state testing temperature

DRAFT RECOMMENDATIONS:

1. As discussed earlier in the presentation: To require information for the inlet temperature and fan speed of the server. With regards to energy consumption, data transmission and load condition of the CPU, this information can be provided in real time by servers, as it is a requirement under the Energy Star programme. Therefore, a similar requirement could be set for increased performance transparency.

2. The study team will provide estimations of carbon emissions for base case representative products in the Phase 2, Task 5.

3. To review labelling and information requirements to inform consumers on methods to improve utilisation rates of their devices.

4. To remove the requirement for testing idle state power at the higher boundary temperature in order to ensure alignment with the SERT methodology.

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Phase 2 draft reports highlights– Tasks 2-4

Task 1 was covered in the slide discussing 'Regulation definitions and scope'

Task 1 – Scope & Legislation

- Scope as discussed in earlier slide
- Main legislation:
  - **Energy Efficiency Directive (2012/27/EU) and recast (2023)**
    - The Energy Efficiency Directive (EED) strengthens the legal framework for achieving the objectives of the "Fit for 55 package" and "REPowerEU" plan
    - The recast proposal of the EED asks data centres to make information about their energy performance publicly available as well as report it to the Commission. These reporting requirements would apply to all Data Centres, old and new, that have a significant energy consumption.
  - **The WEEE Directive (2012/19/EU)**
    - The objective of the Waste Electric and Electronic Equipment (WEEE) Directive is to promote the collection of waste electrical and electronic equipment and recovery, recycling, and preparation for reuse of this waste. Servers are within the scope of the WEEE Directive
  - Other: The REACH Regulation (No 1907/2006), The RoHS Directive (2011/65/EU), The Electromagnetic Compatibility Directive (EMC) (2014/30/EU), Low Voltage Directive (2014/35/EU), Regulation (EU) No 327/2011 on Ecodesign requirements for fans driven by motors with an electric input power between 125 W and 500 kW: Ventilation Fans and further Directives on electronic communications networks and services

  - Voluntary agreements at EU level: The EU Code of Conduct on data centres, Report on Critical Raw Materials and the Circular Economy

Task 2 – Markets

Sales data at global and EU level

Server market and Shipment data (Statista* and ICF calculations)

	2019	2020	2021	2022	2023	2024	2025	2026	2027
Global server market revenue ($bn)	87.18	91.02	90.94	90.86	90.78	96.04	101.60	107.48	113.70
Global server shipments (million units)	11,74	12,15	12,14	12,13	12,12	12,82	13,56	14,35	15,18
EU server market revenue ($bn)	12,68	13,18	13,10	13,03	12,95	13,63	14,35	15,10	15,9
EU server shipments (million units)	1,71	1,76	1,75	1,74	1,73	1,82	1,92	2,02	2,12
EU percent of global market share	14,55%	14,48%	14,41%	14,34%	14,27%	14,19%	14,12%	14,05%	13,98%

The data shows how the server market is currently expected to grow until 2027. This has changed since 2020, as the covid-19 pandemic slowed sales between 2020 to 2022. The EU share of the global market is approximately 14%, but has been decreasing, despite continued growth of the EU revenue. This is due to the strong growth of the Asian market

*Servers – EU-27 | Statista Market Forecast ; Servers – Worldwide | Statista Market Forecast ; Server shipments worldwide 2020 | Statista; Server market revenue worldwide 2020 | Statista ; End user server spend worldwide 2019–2024 | Statista

As with servers, the data storage market is expected to continue growing until 2027. However unlike for computer servers, the demand for storage did not decrease in 2021–2022 due to the covid-19 pandemic. The EU share of the global market is approximately 14%, but has been decreasing, despite continued growth of the EU revenue. This is due to the strong growth of the Asian market.

Data storage product market revenue data (Statista* and ICF calculations)

	2020	2021	2022	2023	2024	2025	2026	2027
Global data storage market revenue ($bn)	41,15	43,41	45,79	47,92	50,59	53,41	56,38	59,52
EU data storage market revenue ($bn)	6,04	6,32	6,61	6,86	7,18	7,52	7,87	8,23
EU percent of global market share	14,68%	14,56%	14,44%	14,32%	14,19%	14,07%	13,95%	13,83%

Task 2 – Markets

Sales growth rate

The global server market is estimated to grow by 5.79% Compound Annual Growth Rate (CAGR) from 2023 to 2027. For the EU, this growth is forecast to be 5.26% from 2023 to 2027, raising the market share from 12.95$bn to 15.9$bn.

Similarly, the data storage market is expected to continue to grow by 5.57% CAGR globally, and by 4.67% in the EU, from the years 2023 to 2027. The EU market is expected to grow from 6.86$bn to 8.23$bn from 2023 to 2027.

Product Lifetimes

Equipment type	Average economic lifetime (in years)	Average technical lifetime (in years)
Rack-blade, rack-mounted, tower/ standalone and multi-node servers	3 for lease 3 to 5 for primary users Up to 5 to 7 for secondary user	7 – 10
Mainframe servers	7 – 15	20
Data storage products (HDD, SSD and hybrid drives)	5 – 7	15 – 20

Installed base (stock)

Information on the section for installed stock of servers.

The installed stock will be calculated by the study team in Task 5, when the modelling is undertaken. We invite stakeholders to provide sales data to allow us to calculate stock.

Information on the section for installed stock of data storage products.

The installed stock will be calculated by the study team in Task 5, when the modelling is undertaken. This is due to a current lack of available data at the disposal of the study team. We invite stakeholders to provide sales data to allow us to calculate stock

Repair and Maintenance costs (€/product life)

Feedback requested on Repair and maintenance costs data

The study team has not yet been able to accurately determine the repair and maintenance costs for servers and data storage products.

Task 2 – Markets

Purchase prices (excl. VAT) of typical server products in Euros (€) / unit

Product Type		Range of purchase price (€/ unit)
Servers	Number of rackets	
Rack managed	1	800–1500
Rack managed	2	1500– 90500
Tower managed	2	900 –5500
Blade managed	4	4200–14000
Rack resilient	2	5900–8000
Rack resilient	4	4000–85700

Purchase prices (excl. VAT) of typical data storage products

Type of storage system	Range of purchase price (€/ unit)
CAS	118900–243800
DAS	4700–75600
NAS	3300–60600
SAN	5800–43000

Sense checking

Task 3 – Users

Average SERT server score and the average idle consumption from 2016-2021 for 2-socket rack servers
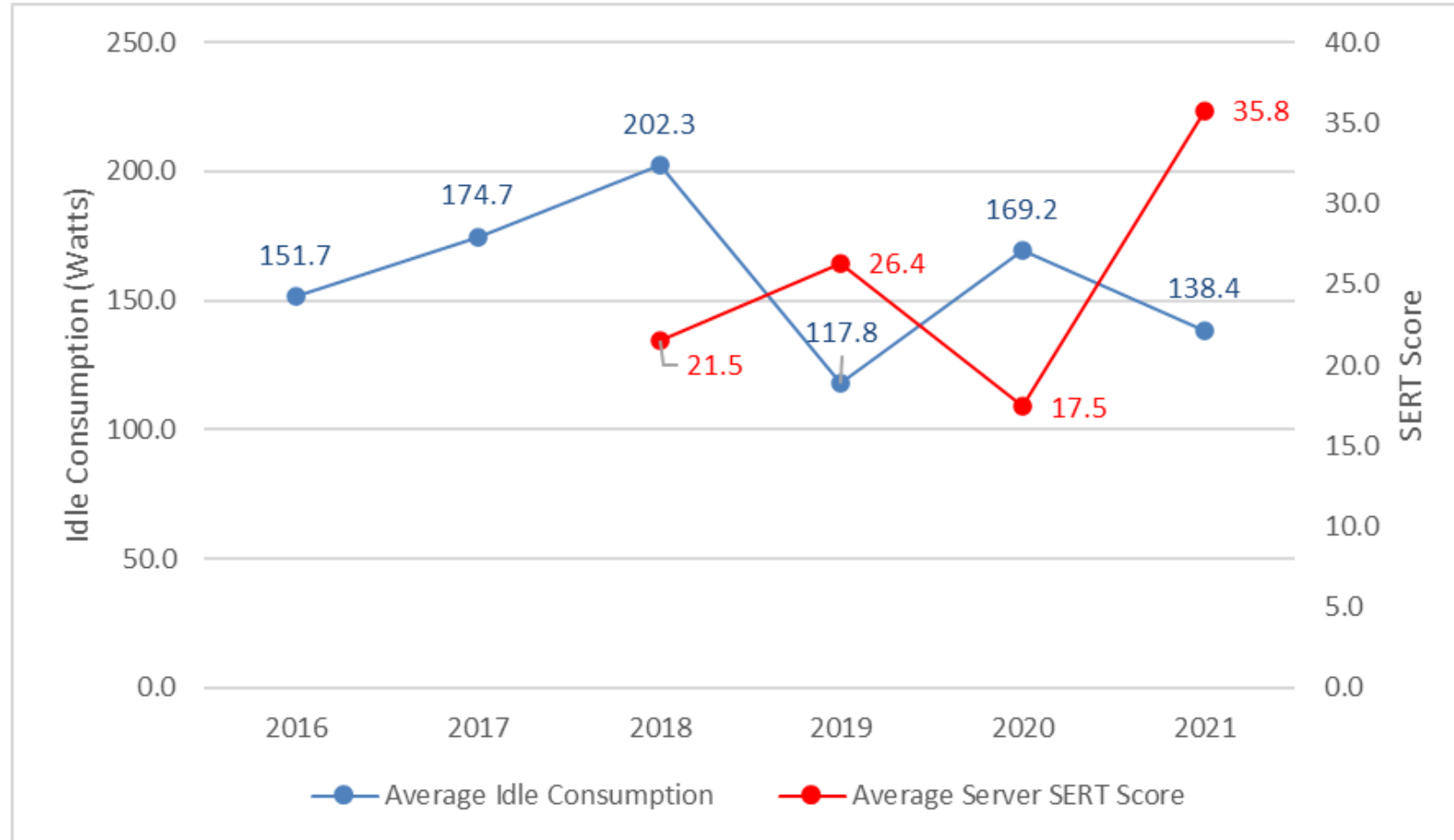
ICF collaborated with The Green Grid, to create a database of SERT output results for 575 unique server families from 2017 to 2022. From this database, the chart on the left is completed for the 2–socket rack servers server category types. These were chosen as they are the most common server configuration.

It shows how the average SERT score has continued to go up, indicating that the server market continues to increase in efficiency. This is driven by an increase in performance capability.

Where the server active efficiency score is increased, the idle consumption is also decreased, as the improved idle score is a component of the final active efficiency score

Task 3 – Users

Data set (SERT)

Entire Data set				
Server Type	# installed Processors	Count in data set	# Families	# of families with Typical Configs
Rack	1	152	57	37
Rack	2	247	90	70
Rack	4	58	19	17
Tower	1	30	10	7
Tower	2	23	7	6
Blade	2	77	25	24
Blade	4	22	8	7
	Total	609	216	168

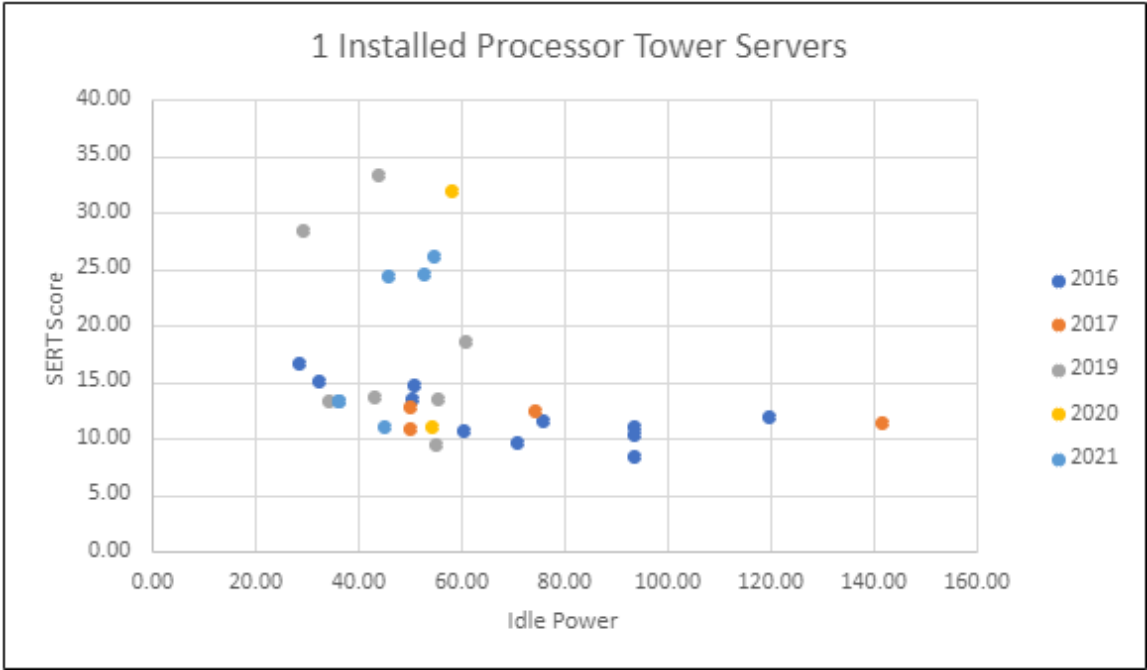The table serves as a key and shows the number of models in each of the charts presented.
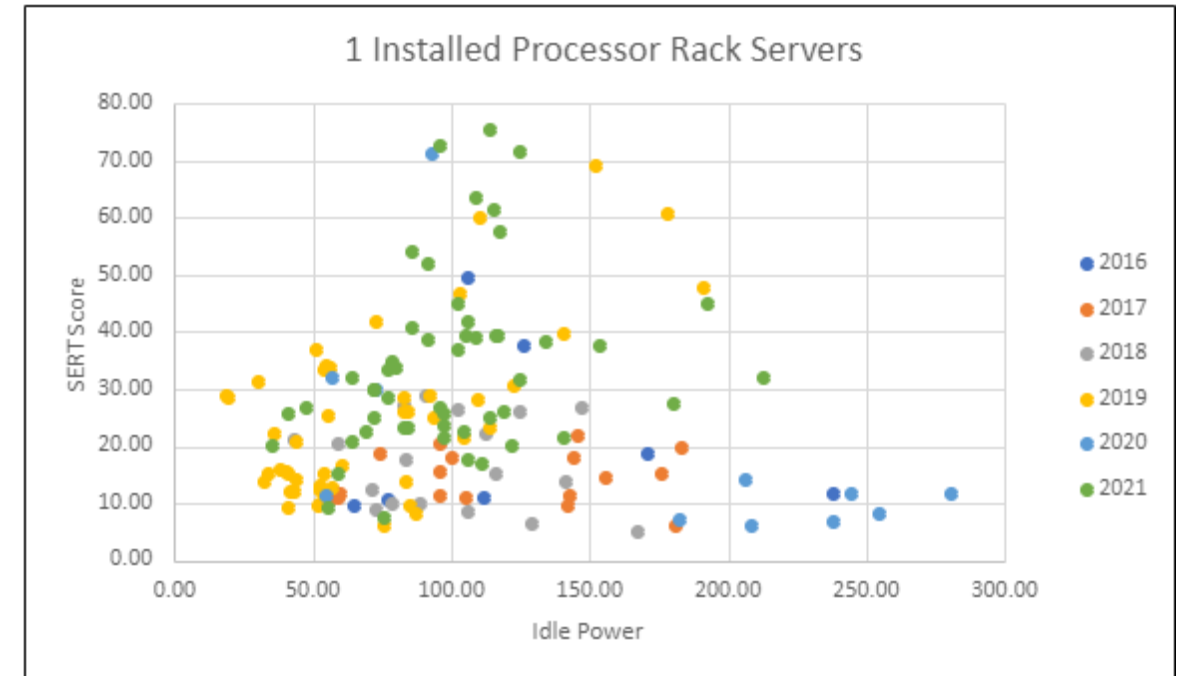
The figures and charts indicate the SERT score over idle power for the entire data set. This includes models from 2016–2021 of rack servers.
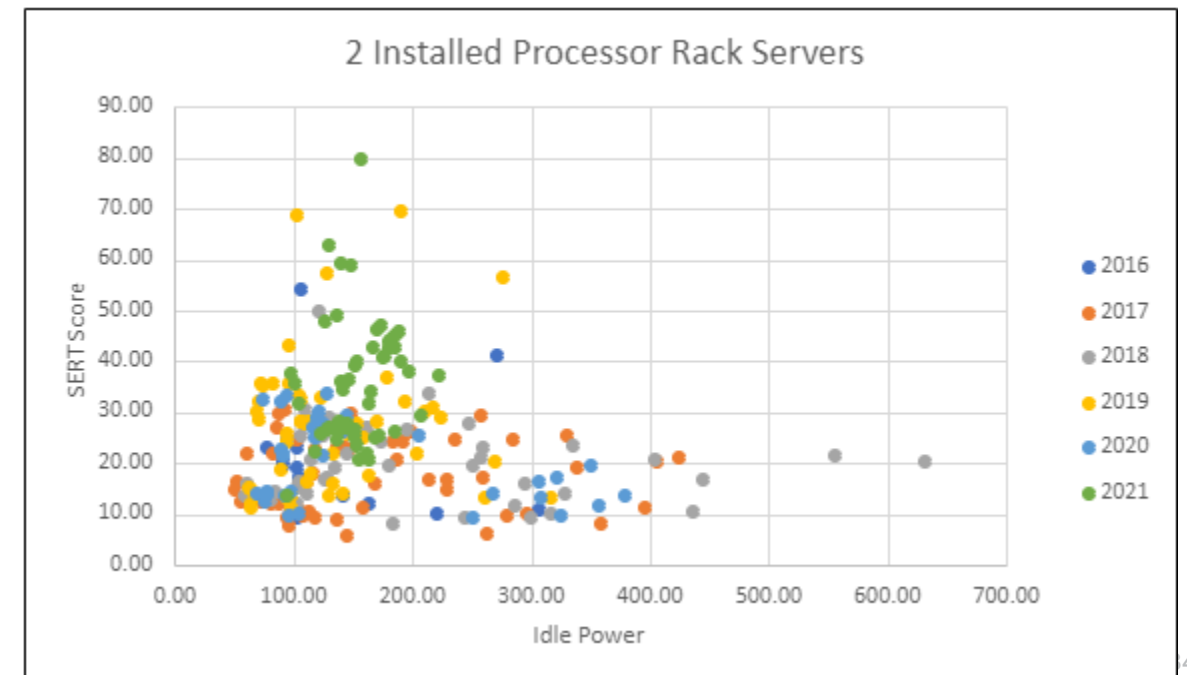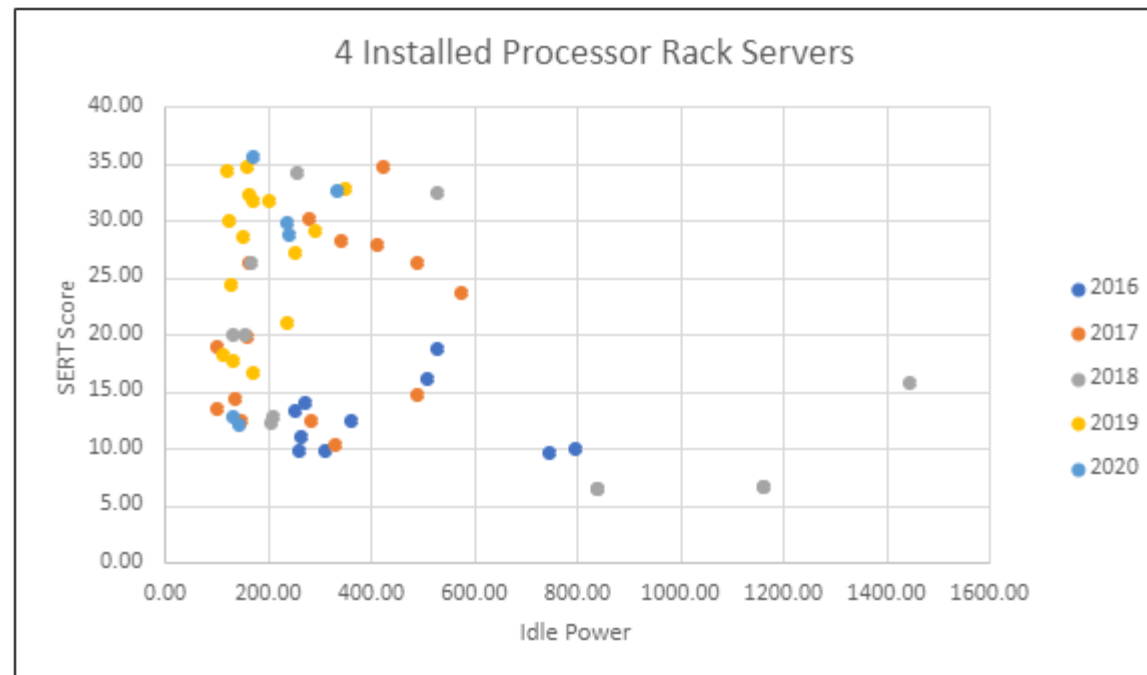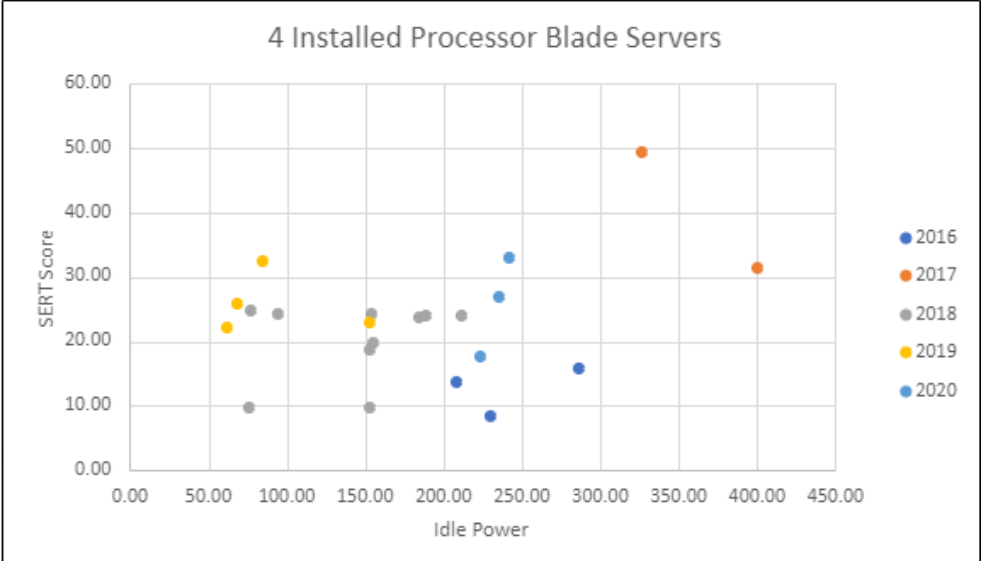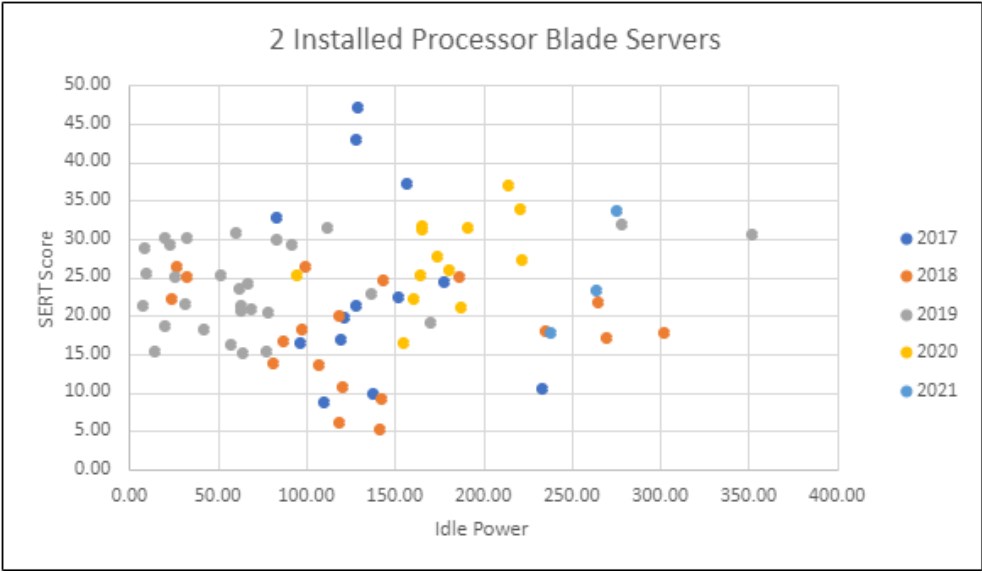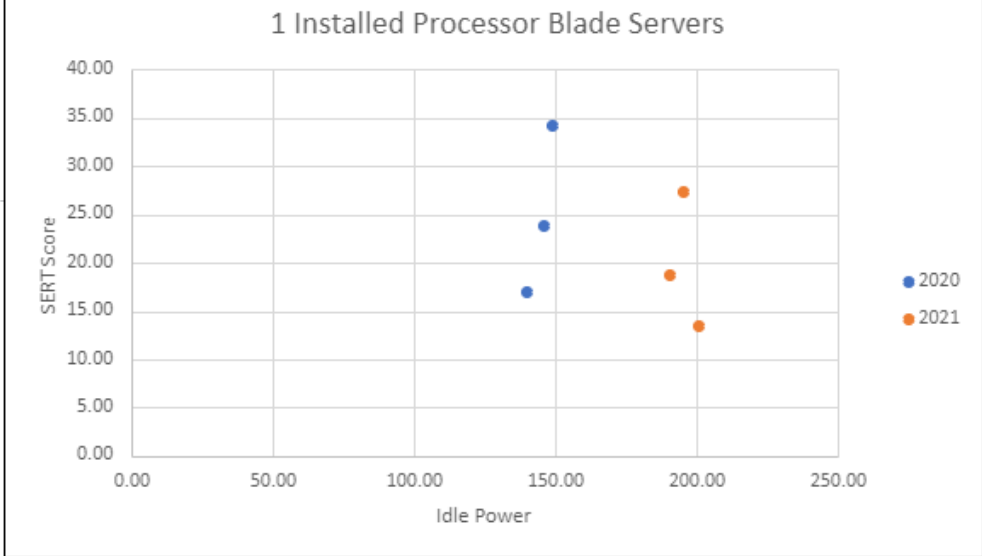
4

The figures and charts indicate the SERT score over idle power for the entire data set. This includes models of blade and tower servers.
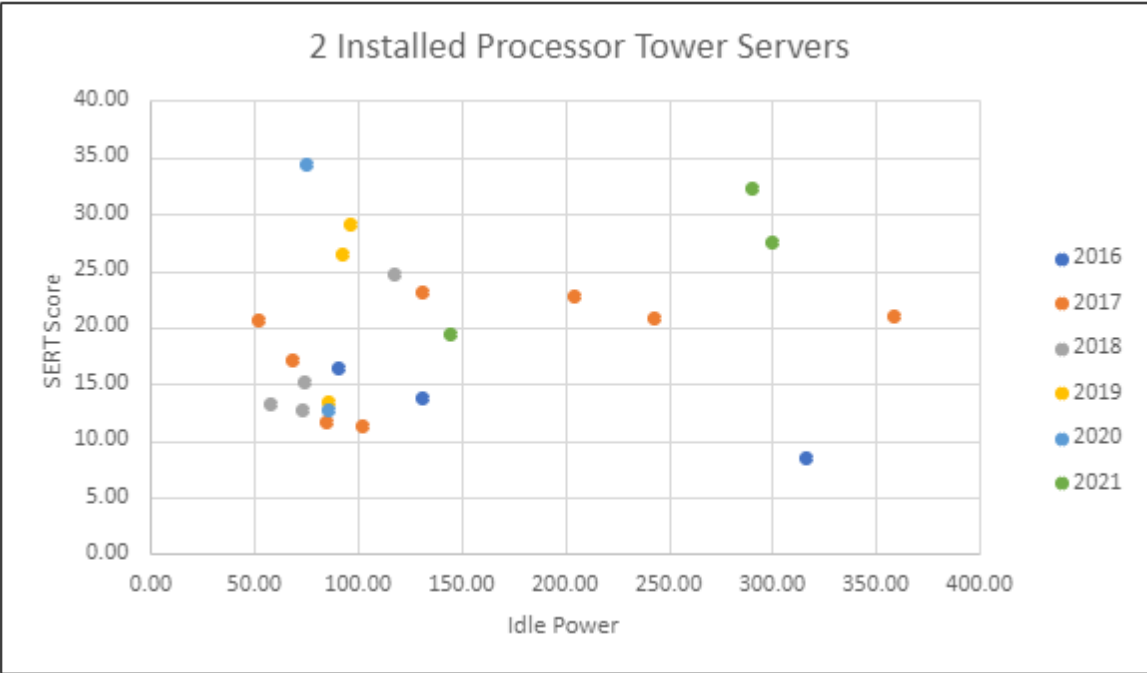
Task 4 – Technologies: Best Available Technology (BAT)

- **Microprocessors and memory**
  - The most advanced microprocessors being mass produced on the market currently employ TMSC's 4N feature size, which is a modified version of TMSC's 5nm node process . These smaller features allow for additional transistor density, generating additional performance and improved efficiency over previous generations of CPUs and GPUs. This latest technology is available on the market in certain high end GPU applications.
  - While DDR5 is relatively new on the market and is currently the most advanced form of server memory available, additional iterations on the technology will cause its CAS latency ratings to fall over time. This will unlock additional performance and access the full potential of DDR5's upgraded speed and bandwidth over previous generations of DDR.

- **Modular Servers and Microservers**
  - They now employ more advanced features including improved fabric and bus technologies such as CXL, higher speed connectors such as silicon photonics, and support higher maximum power limits.
  - Innovation in the microserver space has lagged since the last preparatory study was finalized as the market for these products did not materialize to the degree initially expected. There are a handful of microservers still available on the market, but they are largely a niche application.

- **Advanced cooling**
  - The best available advanced cooling technologies for ICT equipment are currently CPU cold plate and immersion
  - These technologies are currently employed in HPC applications, but their use may increase in high rack density enterprise applications in the future.

Sense checking

Task 4
Production, Distribution and End-of-Life

Information request

Bill of Materials
- of an average rack server
- of a blade system with 8 servers
- Storage system (Controller/ Disc array enclosure)

Packaging
– For all the above types

We welcome stakeholders to provide input on these.

Summary of inputs/ feedback required

Updated quantitative questionnaire will be circulated shortly after

Task 2 Data

Information on the section for installed stock of servers.

The installed stock will be calculated by the study team in Task 5, when the modelling is undertaken. We invite stakeholders to provide sales data to allow us to calculate stock.

Information request

Feedback is requested from the stakeholders on shipment values and total GB capacity sales of storage for the data storage product categories:

- Storage Area Network (SAN)
- Direct Attached Storage (DAS)
- Network Attached Storage (NAS)
- Content Addressed Storage (CAS)

Utilisation of servers

Data requested on the utilisation rates for servers

The study team had limited access to data relating to the utilisation rate of servers. This is expected to be different averages depending on the server application

Feedback requested on procurement practices

The study team encourages stakeholders to provide insight into the usefulness of energy efficiency information for server procurement teams.

Energy label

Information on the section for installed stock of data storage products.

The installed stock will be calculated by the study team in Task 5, when the modelling is undertaken. This is due to a current lack of available data at the disposal of the study team. We invite stakeholders to provide sales data to allow us to calculate stock

Collection of the requests from previous slides

Feedback requested on disassembly tools

The study team invites the stakeholders to provide insight into which components cannot be disassembled with class A tools.

Information request – Sales data

Sales data divided by the server's form factor has not been sourced, therefore further engagement from stakeholders is required.

Information request

Bill of Materials
- of an average rack server
- of a blade system with 8 servers
- Storage system (Controller/ Disc array enclosure)

Packaging
– For all the above types
We welcome stakeholders to provide input on these.

Task 4 and 5 Technologies

Feedback requested on Repair and maintenance costs data

The study team has not yet been able to accurately determine the repair and maintenance costs for servers and data storage products.

ICF

Next Steps– Actions

Stakeholders

1. Feedback on the published draft reports, Phase 1 technical analysis and MEErP Task Reports 1–4 – by 24th October 2023

2. Feedback on the data requests from this presentation by 24th October 2023

3. Input on updated quantitative questionnaire by 24th October 2023

Study team

1. Slides will be uploaded to the website by 29th September 2023

2. Updated quantitative questionnaire released within the next days

3. Work on Task 5 base cases

4. Start work on Task 6 and 7 from November onwards

ICF

AOB

→ # Thank you

for your participation

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